HARVESTS AND USES OF CARIBOU, MOOSE, BEARS, AND DALL SHEEP BY COMMUNITIES OF GAME MANAGEMENT UNITS 9B AND 17, WESTERN BRISTOL BAY, ALASKA 2001-2002

Technical Paper No. 283

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Division of Subsistence
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Bristol Bay Native Association

Front Cover Image

"Charlie Johnson of Portage Creek took the picture. I was hunting with him that time up the Chichitnock River. It was taken about 15 years ago. I remember shooting the caribou from on top a small mountain while it pranced among the spruce trees and willows below (a long shot). I brought a plastic sled with us that year to pull caribou down to our skiff. We just gutted it, cut its head and lower legs off, and without quartering it, pulled it down to the skiff (skin and all). It worked well. It was a great hunt. Villagers from New Stuyahok and Koliganek call the caribou in the Chichitnock area "Woodland Caribou" for their usual big size, healthy condition, and long "oongaks" or beards to make dance fans. The lower part of their front legs are used to make "kamooksaks" for Yup'ik footwear."

Andy Golia ~ Dillingham, 2004

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ACKNOWLEDGEMENTS

The researchers would like to thank the communities involved for their support and all of the local assistants listed in chapter one for their hard work. In addition to the authors listed on the cover, Molly Chythlook and James Fall of the Division of Subsistence and Ralph Andersen of BBNA, also greatly contributed to this project. Davin Holen would especially like to thank Harvey Anelon, Myrtle Anelon, Andrew Balluta, Mike Delkittie, Jack Hobson, Bill Trefon Sr., and Dolly and George Jacko Sr. for agreeing to be interviewed at length. Funding for this project was provided through a cooperative agreement with the US Fish and Wildlife Service (FWS Agreement Number 701811J3557; ADF&G Number COOP 01-073) and the USFWS provided additional funds through agreement Number 701814M197 (ADF&G IHP-04-064) to assist with the final production and distribution of the subsistence harvest area maps.

CHAPTER ONE: INTRODUCTION AND BACKGROUND

PURPOSE AND OBJECTIVES

Project Background

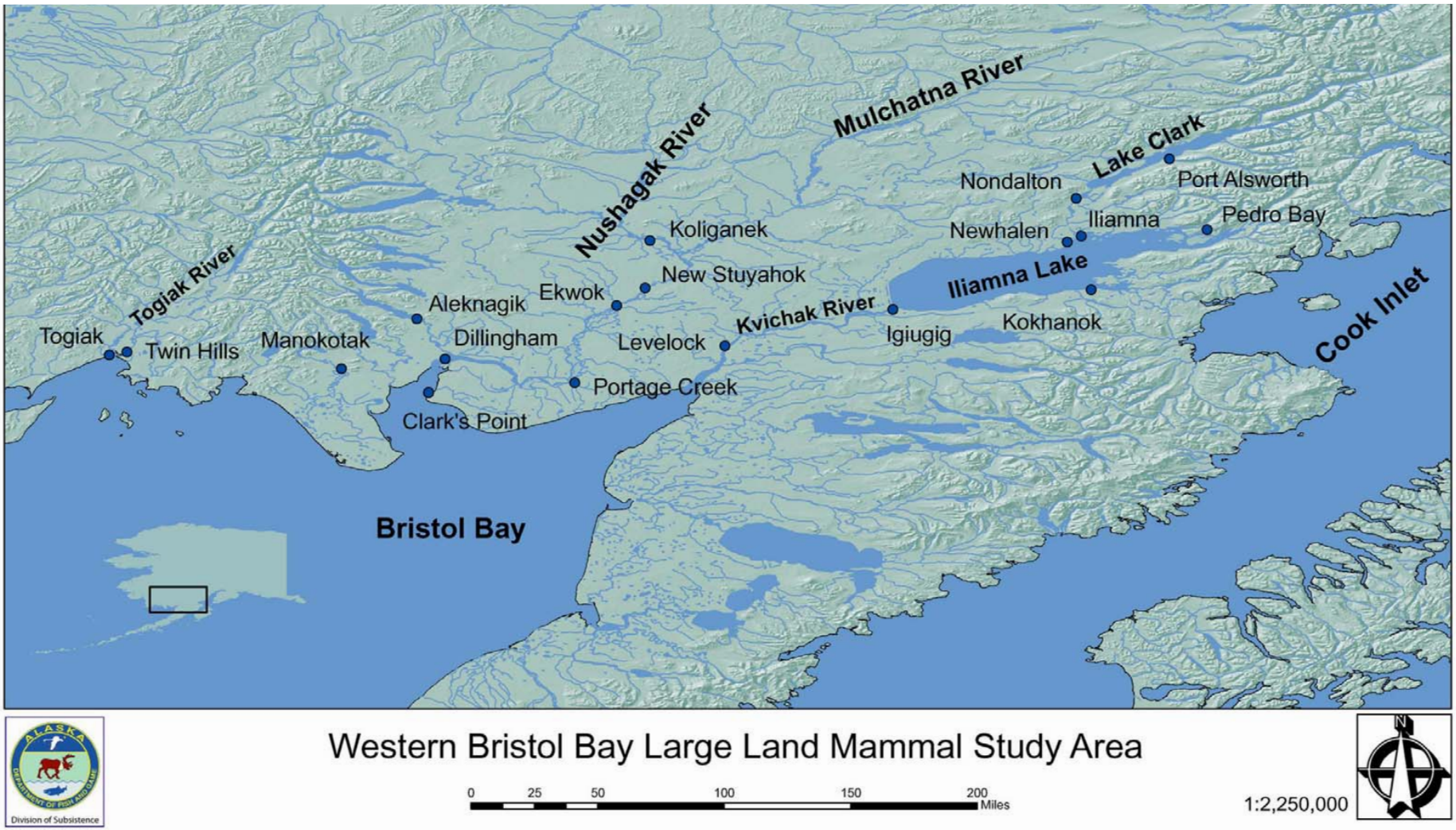
The goal of this project was to estimate harvests of caribou (primarily the Mulchatna and Nushagak Peninsula herds), moose, black bear, brown bear, and Dall sheep (collectively identified as "large land mammals" in this report) by residents of the communities of the western Bristol Bay Area in Game Management Units (GMU) 9B and 17 (Figure 1). The research was modeled after the Northern Alaska Peninsula Large Land Mammal Project conducted jointly by the Division of Subsistence of the Alaska Department of Fish and Game (ADF&G) and the Natural Resource Department of the Bristol Bay Native Association (BBNA) (Krieg et al. 1996, Krieg et al. 1998). This project was also conducted by ADF&G and BBNA. It was funded through a cooperative agreement with the US Fish and Wildlife Service (FWS Agreement Number 701811J3557; ADF&G Number COOP 01-073). Using local research assistants hired by BBNA, household interviews were conducted to collect harvest and use information for large land mammals. Hunters also mapped areas used to hunt and harvest these species. Study communities were Aleknagik, Clarks Point, Dillingham, Ekwok, Igiugig, Iliamna, Kokhanok, Koliganek, Levelock, Manokotak, Newhalen, New Stuyahok, Nondalton, Pedro Bay, Portage Creek, Port Alsworth, Togiak, and Twin Hills (Figure 1). Key respondent interviews were also conducted in Unit 9B to document their traditional ecological knowledge (TEK) relating to harvest methods, and trends in both the environment and large land mammal populations. These interviews took place in the communities of Igiugig, Iliamna, Kokhanok, Newhalen, Nondalton, Pedro Bay, and Port Alsworth.

Table 1. Population of Communities of GMU 17 & 9B, 2000

City	Population by Ethnicity: Alaska Native	Population by Ethnicity: Other Ethnicity	Population by Ethnicity: Total Population	Total Households
Aleknagik	187	34	221	70
Clark's Point	69	6	75	24
Dillingham	1,503	963	2,466	884
Ekwok	122	8	130	42
Igiugig	44	9	53	16
Iliamna	59	43	102	35
Kokhanok	158	16	174	52
Koliganek	159	19	182	53
Levelock	116	6	122	45
Manokotak	378	21	399	93
New Stuyahok	452	19	471	105
Newhalen	146	14	160	39
Nondalton	199	22	221	68
Pedro Bay	32	18	50	17
Portage Creek	31	5	36	7
Port Alsworth	23	81	104	34
Togiak	750	59	809	202
Twin Hills	65	4	69	24
Total	4,493	1,347	5,844	1,810

Source: Federal Census 2000

Figure 1


Mulchatna River
Nushagak River
Lake Clark
Nondalton
Port Alsworth
Iliamna
Pedro Bay
Newhalen
Koliganek
New Stuyahok
Iliamna Lake
Togiak River
Ekwok
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Kvichak River
Cook Inlet
Togiak
Twin Hills
Manokotak
Dillingham
Levelock
Igiugig
Kokhanok
Portage Creek
Clark's Point
Bristol Bay
Western Bristol Bay Large Land Mammal Study Area
0 25 50 100 150 200 Miles
1:2,250,000
Division of Subsistence

In 2004, the USFWS provided additional funds through agreement Number 701814M197 (ADF&G IHP-04-064) to assist with the final production and distribution of the subsistence harvest area maps. Products for that agreement include a CD with a full set of the maps and a limited set of atlases for each study community and project partner (see "products," below).

The primary reason for conducting the research was to update harvest data for large land mammals for the study communities. Past studies in Bristol Bay communities demonstrated that the harvest ticket and permit system for reporting harvests results is, at best, only a partial estimate of the subsistence harvests of these species (see for example Behnke 1982 on Nondalton; Schichnes & Chythlook 1991 on Ekwok, Koliganek, and New Stuyahok; Andersen and Alexander 1992 on Interior Alaska Communities). The only comprehensive household survey to collect subsistence harvest information for most of the study communities was conducted by the University of Alaska in 1974 (Gasbarro and Utermohle 1974; Table 2).[1] Although updated data were available through studies by the Division of Subsistence, these household survey data for many of the study communities were 10 years old or more (Scott et al. 2001). Finally it was important to interview knowledgeable individuals about patterns and trends in subsistence hunting and to document their personal and traditional knowledge about natural resources in their areas. This is pertinent as both cultural and environmental changes are occurring in this region, which are affecting the ability of local users to engage in subsistence hunting.

Project Objectives

1. For the communities of Game Management Units 9B and 17, estimate the percentage of households using, hunting, harvesting, receiving, and giving away each species of large land mammal in the 2001/02 regulatory year (July 1 2001 through June 30, 2002), including:

- caribou
- moose
- brown bear
- black bear (where appropriate)
- Dall sheep (where appropriate)

2. Estimate the harvests of large land mammals by residents of the communities of Game Management Units 9B and 17 in the 2001/02 regulatory year;

3. Record timing of harvests by month;

4. Produce maps of hunting and harvest locations for each large land mammal species in 2001/02;

5. Produce maps of areas hunted for each large land mammal species over the last 20 years, or since the last mapping project was conducted in the community;

6. Document receipt of big game meat by local households from non-local hunters ("sport hunters") and guides; and

7. Identify issues related to subsistence hunting of large land mammals.

[1] Togiak, Twin Hills, Portage Creek, and Port Alsworth were not included in the University of Alaska study.

Table 2 . Estimated Harvests of Large Land Mammals, Study Communities, 1973/74[1]

Community[2]	Number of HHs	Number of People	Caribou Percent Harvesting	Caribou Number Harvested	Caribou No. Per Person	Moose Percent Harvesting	Moose Number Harvested	Moose No. Per Person	Black Bear Percent Harvesting	Black Bear Number Harvested	Black Bear No. Per Person	Brown Bear Percent Harvesting	Brown Bear Number Harvested	Brown Bear No. Per Person
Communities of GMU 9B														
Igiugig	8	39	83.3%	64	1.66	33.3%	4	0.10	0.0%	0	0.00	33.3%	4	0.10
Iliamna	17	62	33.3%	15	0.24	22.2%	4	0.06	22.2%	4	0.06	11.1%	2	0.03
Kokhanok	13	81	11.1%	12	0.14	66.7%	14	0.18	22.2%	3	0.04	44.4%	12	0.14
Levelock	17	79	68.8%	36	0.46	62.5%	20	0.26	0.0%	0	0.00	0.0%	0	0.00
Newhalen	16	72	72.7%	32	0.44	63.6%	13	0.18	0.0%	0	0.00	9.1%	1	0.02
Nondalton	29	151	61.5%	108	0.71	53.8%	28	0.18	23.1%	9	0.06	3.8%	1	0.01
Pedro Bay	10	40	0.0%	0	0.00	50.0%	8	0.19	0.0%	0	0.00	25.0%	6	0.16
Communities of GMU 17														
Aleknagik	21	105	12.5%	8	0.08	43.8%	9	0.09	0.0%	0	0.00	0.0%	0	0.00
Clarks Point	14	77	54.5%	41	0.53	27.3%	6	0.08	0.0%	0	0.00	0.0%	0	0.00
Dillingham	229	979	34.4%	243	0.25	25.0%	79	0.08	0.0%	0	0.00	6.3%	14	0.01
Ekwok	21	102	35.3%	60	0.59	52.9%	19	0.18	0.0%	0	0.00	0.0%	0	0.00
Koliganek	20	113	60.0%	108	0.95	60.0%	31	0.27	6.7%	1	0.01	20.0%	4	0.04
Manokotak	37	220	26.3%	39	0.18	42.1%	33	0.15	0.0%	0	0.00	5.3%	2	0.01
New Stuyahok	31	194	53.8%	164	0.85	69.2%	68	0.35	0.0%	0	0.00	0.0%	0	0.00

[1] Data not collected for Dall sheep

[2] Port Alsworth, Portage Creek, Togiak, and Twin Hills were not included in this survey

Source: Gasbarro and Utermohle 1974

RESEARCH METHODS

Agreements, Approvals, Guidelines

As noted above, funding for this project was provided by the USFWS through two cooperative agreements with ADF&G Division of Subsistence. BBNA's involvement was supported through a cooperative agreement with ADF&G (Number COOP-02-066). BBNA agreed to complete the following tasks as part of the agreement:

1. Contact tribal governments in the proposed study communities, inform them about the project, and request formal approval to conduct the research;
2. Hire and supervise local research assistants in the study communities;
3. Participate in community and/or subregional community meetings to introduce the project; and
4. Provide comments on the study design and draft study findings.

ADF&G's obligations under the terms of this contract with BBNA included preparing the data collection forms and training materials; providing training to BBNA staff and local assistants; assisting local researchers with conducting interviews; conducting all data management functions; preparing a draft final and final report; and providing overviews of the study findings and copies of the final report and maps to BBNA. Also, the Division of Subsistence was responsible for all interviewing in Port Alsworth.

The research was conducted in accordance with BBNA's "Policy Guidelines for Research in Bristol Bay" (which are based on the Alaska Federation of Natives' research guidelines) (attached as Appendix A) and the "Ethical Principles for the Conduct of Research in the North," the standard for the Division of Subsistence. These guidelines stress informed consent and return of study findings to the communities. Accordingly, participation in the interviews was entirely voluntary and individual and household responses are confidential. Study findings are reported at the community and area level. Key respondents are noted by community, however, their names are not used to ensure confidentiality. Prior to conducting fieldwork, BBNA staff obtained tribal resolutions from each of the study communities in support of the project.

Sampling Design and Statistical Analysis

The primary data gathering method was systematic household surveys using the ADF&G Division of Subsistence standard data-gathering instrument, modeled after that administered in Alaska Peninsula communities in the mid 1990s (Krieg et al. 1996, 1998) (see Appendix B for an example). The surveys were conducted face-to-face in people's homes. At that time a project overview was distributed to each household (see Appendix C for an example)

The goal was to interview representatives of all households in communities with 70 households or less (Table 3). Originally, in the mid-sized communities of Manokotak, New Stuyahok, and Togiak, a stratified design was to be used, including attempting to interview all households with large land mammal hunters and a random sample of other households. BBNA wanted to get a census sample of as many communities as possible so at the request of BBNA, Manokotak and New Stuyahok became census sample communities with the goal to interview all households. The stratified random design was retained for Togiak, a much larger community where interviewing all households would have been difficult. In Togiak hunters were identified through consultation with community officials and other key

Table 3. Estimated Number of Hunting Households, Western Bristol Bay Communities and Inititial Interviewing Goals

	Caribou	Moose	Brown Bear	Black Bear	Dall Sheep	Year Base	Total HHs in 2000	Interviewing Goal[1]
Aleknagik	42	44	11	0		1989	70	70
Clark's Point	13	11	0	0		1989	24	24
Ekwok	30	32	0	0		1987	42	42
Igiugig	16	10	2	0		1992	16	16
Iliamna	33	15	3	2		1991	35	35
Kokhanok	51	29	14	3		1992	52	52
Koliganek	39	30	4	5		1987	53	53
Levelock	29	26	5	0		1992	45	45
Newhalen	39	13	4	3		1991	39	39
Nondalton	68	49	3	19	3	1983	68	68
Pedro Bay	16	8	0	0		1996	17	17
Portage Creek						None	7	7
Port Alsworth	31	21	0	3	3	1983	34	34
Twin Hills	20	14	0	0	0	1999	24	24
	427	302	46	35	6		526	526
Manokotak	53	41	2	1	0	1999	93	75
New Stuyahok	87	63	3	3		1987	105	75
Togiak	120	70	12	0	0	1999	202	75
	260	174	17	4	0		400	225
Dillingham	237	283	0			1984	884	200
Total	924	759	63	39	6		1810	951

1 Initial goal was a stratied random sample in Manokotak, New Stuyahok, Togiak, and Dillingham. Strata would be hunting households and other households.

Blank cells mean data not available

Source: based on data from Community Profile Database (Scott et al. 2001)

respondents, and department records. In Togiak, the goal was to interview a random sample of about 50 percent of the two strata for a total of 75 interviews.

In Dillingham, like Togiak, the design also called for random sampling with two strata: hunting households and other households. ADF&G obtained a list of all hunting license holders with Dillingham mailing addresses. Licenses are issued to individual hunters, and names and mailing addresses were used to cluster hunters into assumed households. These totaled 454 households. The goal was to interview 100 households selected randomly from this list and 100 households selected from the approximately 400 other households in the community. As discussed below, due to difficulties in hiring local assistants in Dillingham and other problems, the interviewing focused exclusively on the list of hunting households.

Of the 572 households in the 16 communities where census samples was the goal, 437 interviews were completed (76.4 percent) (Table 4). The refusal rate for this group was 12.6 percent. In Togiak, 45 of 69 hunting households were interviewed (65.2 percent) and 30 of 85 other households (35.3 percent), for a combined sample of 75 households (48.7 percent). All households contacted in Togiak participated in the research.

Table 4. Sample Achievement, Western Bristol Bay Large Land Mammal Harvest Survey, 2001/02

Community	Type of Sample	Total Households	Interviewed	Sample Achievement	No Contact	Refusals	Refusal Rate
Aleknagik	Census	48	36	75.0%	4	8	18.2%
Clarks Point	Census	21	21	100.0%	0	0	0.0%
Ekwok	Census	34	32	94.1%	0	2	5.9%
Igiugig	Census	11	11	100.0%	0	0	0.0%
Iliamna	Census	28	21	75.0%	3	4	16.0%
Kokhanok	Census	35	16	45.7%	15	4	20.0%
Koliganek	Census	42	23	54.8%	11	8	25.8%
Levelock	Census	25	17	68.0%	3	5	22.7%
Manokotak	Census	79	60	75.9%	9	10	14.3%
Newhalen	Census	39	34	87.2%	3	2	5.6%
New Stuyahok	Census	89	64	71.9%	10	15	19.0%
Nondalton	Census	40	33	82.5%	5	2	5.7%
Pedro Bay	Census	21	19	90.5%	0	2	9.5%
Portage Creek	Census	7	7	100.0%	0	0	0.0%
Port Alsworth	Census	28	20	71.4%	7	1	4.8%
Twin Hills	Census	25	23	92.0%	2	0	0.0%
Subtotals		572	437	76.4%	72	63	12.6%
Togiak	Stratified Random	154	75	48.7%	6	0	0.0%
Hunters		69	45	65.2%	3	0	0.0%
Other		85	30	35.3%	3	0	0.0%
Dillingham[1]	Random, Hunters Only	416	110	26.4%	26	19	14.7%
Totals (targetted households)		1,142	622	54.5%	104	82	11.6%
Totals (all households)[2]		1,602	622	38.8%	NA	NA	NA

[1] Due to project staffing problems, interviewing of a random sample of the approximately 460 other (non-hunting) households in Dillingham did not take place.

[2] Includes 460 "other households" in Dillingham that were not included in sample selection. See discussion in Chapter One.

In Dillingham, 110 households randomly selected from the "hunting household" list were interviewed, 26.4 percent of the estimated 416 households in Dillingham with members with hunting licenses. (The initial estimate of 454 households was adjusted to account for households that had moved.) The refusal rate in Dillingham was 14.7 percent (19 households). Although the research design called for interviewing non-hunting households due to problems retaining local assistants this did not take place.

In total, 622 interviews were conducted for this project. This is a sample of 54.5 percent of the total estimated households in the 17 smaller communities plus the hunting households in Dillingham. The overall refusal rate for the project was 11.6 percent (82 households).

Mapped Data Collection

A large part of this project included mapping of hunting areas and harvest locations of large land mammals. Hunters indicated areas where they hunted each large land mammal species as well as the specific harvest location for the 2001/02 study year. In addition many communities were mapped for harvest areas for the last 20 years while living in the study communities. For most communities included in this project, the last extensive mapping of large land mammal hunting areas took place in 1982 and 1983. Those maps depict hunting areas from the early 1960s to the early 1980s (Wright et al. 1985). In 1993, the Division of Subsistence updated community harvest area maps for Kokhanok, Igiugig, and Levelock, covering the period from the early 1980s to the early 1990s. For Levelock, the present study asked about hunting areas over "the last 10 years" to cover the time since this last mapping effort, but Kokhanok and Igiugig residents were still asked to depict their hunting areas for the last 20 years. In 1999, the division mapped hunting areas since the early 1980s in Togiak, Twin Hills, and Manokotak. Therefore, in these three communities, the present study only mapped harvests and hunting in the 2001/02 study year.

In most cases the mapping section of the interview was completed by one of the three principal investigators (Krieg, Holen, or Nicholson), except for the community of Iliamna where two local assistants were hired to do both the household survey and mapping component. Both paper and mylar maps were used depending on community and intensity of hunting. The maps used for the communities of Nondalton, Port Alsworth, Pedro Bay, Iliamna, Newhalen, Kokhanok, and Igiugig were 11x17 paper maps at a scale of 1:500,000 created with the GIS program Arcview 3.2. The survey area was split into seven maps to detail the area surrounding each village. For communities in Unit 17 some adjustments were made to provide better coverage surrounding villages so that the least number of paper maps were required to provide the needed coverage to map the subsistence areas. As the maps were 11x17 in many cases two maps were used to include the household's entire hunting area. In a few rare instances the maps detailing hunting activity over the past 20 years could be extensive and require 3 – 4, 11x17 maps especially if a respondent worked as a guide.

For each hunter interviewed in Nondalton, Port Alsworth, Pedro Bay, Iliamna, Newhalen, Kokhanok, and Igiugig two maps (or sets of maps) were created: 1) for the 2001 – 2002 hunting season and 2) for hunting over the past 20 years, or while a hunter resided in the community. If a household indicated that they hunted the same area every year two separate maps were still created; one for the last year, and one for 20 years, even if the areas hunted were exactly the same. Hunting areas were drawn using colored pens; a key located on the bottom of the map listed the colors for each large land mammal species.

In addition to areas hunted, harvest locations were mapped for the 2001 – 2002 hunting season. These locations were marked on the 2001 – 2002 map. In a very few cases, households declined to identify specific kill sites, or could not recall exact locations. This was compensated for by spreading their harvests over their recorded hunting areas. In most cases the hunting area was small and validity in the overall depiction of harvest locations was maintained. Harvest locations were recorded chronologically to match the order in which harvests were recorded on the survey form. For example, harvested caribou number 1 on the survey form became C1 on the map.

The map of the 2001 – 2002 hunting season was created first during or immediately after the interview. When the harvest survey interview was complete, the mapping session to document the respondent's hunting activity for the past 20 years was conducted. The 2001 – 2002 hunting activity was included in the past 20 years and gave a frame of reference from which to expand the 20 year map. During this process it was found that although the respondents related initially that they hunted "the same area" every year, by separating the two mapping sections during the survey, many respondents remembered older areas where they used to hunt. This method of constructing two separate maps of hunting areas thus resulted in more accurate detail for both time periods. The more time devoted to the mapping process, the more the hunters remembered about their activities over the past 20 years.

When using the base map with mylar overlays both the study year and last 20 year mapping could be documented on one sheet of mylar using different color pens with colors designated for species and the hunting time period. The colors used on the mylar were included in the legend for each map.

Hiring of Local Research Assistants

ADF&G staff contacted Hans Nicholson of the BBNA Natural Resources Department in early February of 2002 and asked BBNA to collaborate on this project. During the months of February and March 2002 Hans contacted the tribal councils of each of the 17 BBNA communities. (Port Alsworth is not a BBNA associated community.) Project descriptions were provided to each of the tribal councils and approval by council resolution was given for BBNA to participate with ADF&G and to hire local assistants on behalf of each council. Posting of job notices, project descriptions and providing job applications to hire Local Research Assistants (LRAs) was approved and facilitated by each council. After BBNA received completed job applications and the local assistants were selected, plans were made to hold sub-regional hiring and training sessions to bring the individuals in to one of the communities in the sub-region to hire and train them as a group. Following is a description of the hiring and training process and a description of the principal investigators' work in the study communities.

Training of Local Research Assistants as a Group

Many of the LRAs were trained on a community by community basis, often having one-on-one training with BBNA or ADF&G staff just prior to the survey being conducted. For the Nushagak and Kvichak Watershed communities a group training session was attempted with limited success; mainly due to weather as described below.
A training meeting in Iliamna for Local Research Assistants (LRAs) was scheduled for March 25, 2002. The LRAs to be hired from Igiugig, Kokhanok, Pedro Bay, Nondalton, and Iliamna were to be flown into Iliamna where Hans Nicholson from BBNA and Ted Krieg from ADF&G in Dillingham were scheduled to meet Davin Holen from the ADF&G Anchorage office to conduct the training. Due to weather the training meeting was postponed. On March 26, 2002, Davin Holen, who had arrived in

Iliamna the previous day, trained the Iliamna LRAs Garrett and Tarek Anelon, and Newhalen LRA Letha Warne.

On March 27, 2002 Hans, Ted, and Annie Wilson, the LRA from Igiugig, traveled to Iliamna to pick up Davin Holen, and then proceed to Nondalton to conduct training with the local assistants. The Kokhanok LRA was unable to attend and the pick-up in Pedro Bay was cancelled due to weather on that end of the lake. The training took about two hours as most training would be on the job. Ted, Hans, and Annie Wilson then departed Nondalton for their return trip. Davin stayed in Nondalton to work with the LRA. It was decided to train the LRA's from Pedro Bay and Kokhanok when Hans, Ted, or Davin traveled to those communities to begin the surveys as regularly scheduled seat fare flights are not available from Dillingham to the Iliamna Lake area and a chartered aircraft for an additional trip was cost prohibitive.

Up to the time when plans were made to hold the sub-regional training meeting on April 1, 2002 in New Stuyahok, caribou had not been in the Nushagak River area throughout the winter. Due to the lack of caribou in the area and scheduling concerns for this project it was determined that surveys could be started to a limited degree, based on the knowledge and discretion of the local assistants, so that harvest and sharing could still be accurately documented prior to the end of the caribou season on April 15.

On April 1, 2002 Hans Nicholson and Ted Krieg traveled to New Stuyahok to hire and train the LRAs: Alexie Kapotak from Portage Creek, Greg Andrew Jr. from Levelock, Andy Larson Jr. from Koliganek, Thomas Nelson Sr. from Ekwok, and Walter Hansen and Phillip Christopher from New Stuyahok. A plane was chartered out of Dillingham and each of those individuals was picked up in their community transported to New Stuyahok and then returned home after the meeting.

The plan was for Ted to stay in New Stuyahok and help the LRAs complete surveys after the meeting on April 1, but most of the hunters were out of the village hunting a portion of the Mulchatna Caribou Herd that had recently moved into the area between Levelock and New Stuyahok. With this development and the potential for a significant harvest of caribou prior to the close of the caribou season on April 15 it was determined to wait until after that time to start the surveys in the Nushagak River communities and Levelock. Also of particular note, a concern that was discussed at the April 1 meeting for the Lake Iliamna and Nushagak River communities was the absence of caribou in the sub-region throughout the winter as most of the Mulchatna Caribou Herd had moved to the northwest into the Kuskokwim region. This had area residents concerned as they were having difficulty meeting their red meat requirements over the winter. This was exacerbated by the downturn in the economy of the region; because of the previous two years of poor commercial salmon fishing, households had limited funds to purchase meat as a substitute for caribou. (And, of course, local residents prefer caribou over purchased meat.)

Up to the end of the caribou season on April 15 caribou remained in the area to the east of the Nushagak River. Additionally the snow and weather conditions were excellent for travel by snow machine. Due to the factors listed above, villages in the area requested BBNA to submit an emergency action request to the Board of Game to extend the caribou season beyond the April 15 end date. By the time the Board was able to meet after the season had closed, the weather had changed and spring breakup had ensued, heavy rains were falling and travel conditions by snow machine were dangerous. At that point BBNA retracted the request.

On April 16, 2002, Hans Nicholson, Molly Chythlook (ADF&G), and Ted Krieg traveled to Togiak to hire and train a large land mammal surveyor from both Togiak and Twin Hills. Bessie Small was

transported from Twin Hills to be trained with the Togiak LRA, Elizabeth Myas, at the Togiak City office. Elizabeth was not immediately available so training for Bessie and Elizabeth did not run concurrently. After the training and all of the paperwork had been signed Hans, Molly and Ted returned to Dillingham via Twin Hills.

Overview of Training and Fieldwork by Study Community

The following is a detailed description of training and fieldwork in each community. Timing for this project was paramount as hunting effort into a new year could cause confusion when conducting surveys, therefore the principal investigators were in a hurry to complete the fieldwork. In addition there were difficulties in each community, some more than others, and this description illustrates the amount of effort necessary to conduct surveys and mapping in the 18 study communities. Table 4 summarizes the sample achieved in each community.

Aleknagik

On April 15, 2002, Thomas S. Tinker was hired and trained at the Dillingham ADF&G office to conduct the household surveys. On May 13, 2002 Ted traveled to Aleknagik to conduct mapping sessions with the hunting households. Most of the surveys had been completed by the LRA and Ted worked to complete the mapping component. On September 23, 2002 Hans traveled to Aleknagik to attempt to contact the households for which mapping was still needed.

On September 24, 2002 Hans and Ted traveled to Aleknagik to complete mapping. Hans enlisted the assistance of Mike Etuckmulria Sr. for the day. He provided transportation across the lake, identified households, and provided transportation to households.

On October 23, 2002 Hans and Ted traveled to Aleknagik, again to attempt to complete mapping. Out of the five households that attempts were made to contact only one household was completed. In many cases the head of household was working and unavailable or traveling outside of Aleknagik. No further attempts were made. In total out of 48 households 36 were interviewed, 8 households refused, and 4 moved for a 75 percent success rate.

Clarks Point

On June 5, 2002 Hans traveled to Clarks Point for the purpose of hiring and training a local researcher for this project and the migratory bird subsistence harvest survey project. The first person Hans hired for the migratory bird surveys was not able to complete the work before leaving for commercial fishing. Harry Wassily Sr. was trained to do both surveys.

On June 20, 2002 Ted traveled to Clarks Point to work with the LRA to continue the surveys and mapping. On August 30, 2002, Hans and Ted traveled to Clarks Point to work with the LRA to complete surveys and mapping. Out of an estimated 29 households, 21 were interviewed for a 72 percent success rate, or 100 percent of all available households as the 8 not surveyed had moved. There were no refusals.

Dillingham

For this project household interviewing was planned for April and May. Caribou season in the Dillingham area closes April 15 so surveys could not start until after that date. The principal investigators were based in Dillingham so work could be started there without coordinating travel. For that reason traveling to the villages first to start work on the project was a priority.

On April 30, 2002, Hans and Ted conducted training for two local assistants in the ADF&G office in Dillingham. At this time, only the lists of randomly selected hunting households were given to the assistants to work on. The plan was to complete the hunting households first and then begin on the non-hunting households because the hunting households could be more easily identified and contacted through the information provided on the hunting records, including hunters' names. The non-hunting Dillingham household list, although recently updated, in some instances identified households by the location of the house and not by the name of the residents.

After the Dillingham assistants were hired and trained on April 30, the principal investigators assumed that work was progressing, and they focused their attention on the other villages. However, on June 6, three new LRAs were hired and trained because the original two local assistants resigned after completing only a very few surveys. The plan to complete surveys with the hunting households before starting work on the non-hunting households was still in place. Also by this time the prime time to conduct the household surveys had passed and it was more difficult for the LRAs to find people at home and not busy with summer activities.

The status of the work of these assistants by July 8 was as follows. One had completed the list of households for which she was given responsibility and then resigned because she was also working at another full time job. She worked diligently and consistently to complete 47 surveys and the associated mapping component while documenting a total of 22 households that declined to participate or could not be contacted. Due to the timing of the surveys during summer activities, including subsistence fishing and the start of the commercial fishing season, she reported encountering a number of refusals that were due to inconvenience rather than disinterest in or opposition to the project. The next most productive assistant was able to complete 22 surveys and mapping while documenting a total of 14 households that refused, moved, or could not be contacted before leaving to commercial fish. The third assistant completed seven surveys and was not able to contact two households.

An additional Dillingham assistant was hired on June 13 but she was not able to start working on the surveys until later in June and then due to other responsibilities was only able to work sporadically. She was able to complete the list of hunting households that was given to her and she started preliminary work to identify the randomly selected non-hunting households.

To supplement the work of the local assistants, on July 19, 2002, Davin Holen traveled to Dillingham to assist Ted Krieg to complete the surveys with the hunting households. On July 20th, 12 interviews were completed, all over the phone as reaching people at home was difficult. However, many of the hunters in these households were out of town and the researchers questioned the validity of the information gathered over the phone from other family members. Therefore, the next day the researchers decided surveys must be done face-to-face and another attempt was made to reach hunters in these 12 households at home. After a day of work only one interview was completed. At that time an inventory of completed surveys indicated that the sample of 100 hunting households had been exceeded, and interviewing with this group ended.

The remaining Dillingham assistant indicated that she was willing to attempt to continue work on the non-hunting households but by the second week in August, after very limited success, further interviewing in Dillingham was halted. At this stage of the project with the start of a new caribou season on August 1 and the start of the registration moose hunt on August 20 it was basically too late to effectively conduct the additional surveys in Dillingham. Also, identifying and contacting the non-hunting households was time consuming. This household list also included the hunting households so that when contacting the household the assistant had to ask if anyone in the household had obtained a hunting license. If a household member possessed a current hunting license that household was exempt from the non-hunting list and would not be surveyed. When this questioning process was described to the assistants it created some anxiety but did not appear to be an insurmountable barrier to completing the work at the start of the project. However, asking a household if they purchased a hunting license proved intimidating to the assistants especially when they did not know the people they were contacting. In some cases, the list identified the house location and not the family name because the name of the people in the household was not known or because new residents occupied the house. Dillingham has a significant number of apartments and rental units in which the occupants recurrently change.

In summary, the goal to interview 100 households in Dillingham with members who had hunting licenses was accomplished. However, no non-hunting households were interviewed due to the procedural and personnel problems described above. Thus a representative sample of all Dillingham households was not achieved. Implications of this limited sample for data analysis are described below.

Ekwok

On May 16, 2002 Ted Krieg traveled to Ekwok to work with the LRA to complete surveys and continue the mapping. On June 5, 2002 Ted traveled to Ekwok to work with the LRA to complete mapping. In Ekwok out of 34 households 32 were interviewed and 2 households refused for a success rate of 94 percent.

Igiugig

On April 23, 2002 Davin Holen traveled to Igiugig to work with the LRA. The LRA conducted the survey, while Davin completed the mapping and took notes. Five households including the main hunters were surveyed at this time. Annie Wilson completed the additional surveys on her own. All 11 households were interviewed for a 100 percent success rate.

Iliamna

On April 9, 2002, Davin Holen traveled to Iliamna to conduct the surveys and mapping with the two LRAs, having trained them on March 26, 2002. Four surveys and mapping sessions were conducted on the first day. Garret Anelon conducted the survey while Terek Anelon mapped the household's hunting effort, and Davin took notes. On the second day Davin Holen accompanied the LRAs to 4 more houses and then they continued on their own completing four more households. Confident that they could complete the task on their own Davin Holen left them to finish surveying the community. In Iliamna out of an estimated 32 households 21 were interviewed for a 66 percent success rate, or 75 percent of available households. 4 households had moved, 4 refused, the LRAs were unable to contact 3 more.

Kokhanok

On April 23, 2002 Davin Holen traveled to Kokhanok to train and work with the first person selected as the LRA, Sheila Nelson. After the training one household was surveyed, but the LRA was not available to do more work at that time. After several unsuccessful attempts to contact the LRA from Anchorage by phone, on June 24, Davin Holen flew to Kokhanok on a chartered flight from Iliamna, where he was working on another project, to check on the status of the household surveys. He learned that only two households had been surveyed and the person initially trained failed to follow through. Another individual, Tammy Mann, was trained to do both the survey and the mapping. Within two weeks, 45 percent of the community was surveyed. Kokhanok had a high rate of refusals and no-contacts. There were 4 refusals and 15 households where Tammy made repeated attempts to contact with no success. Tammy related she had a hard time getting people to do the survey as they did not want to discuss their subsistence activities with her.

Koliganek

On April 25, 2002 Ted went to Koliganek to work with the LRA to complete surveys and mapping. On June 10, Ted traveled to Koliganek to work with the LRA to complete surveys and mapping.

On June 18, Hans Nicholson and Ted Krieg traveled to Koliganek to work with the LRA to contact household that had not previously been available to complete the survey and mapping. One household was completed. Most of the attempted contacts were traveling or out doing subsistence activities. In the end out of an estimated 45 households in Koliganek surveys were completed in 23 for a 55 percent success rate. The LRA could not contact 11 households and there were 8 refusals and 3 households had moved.

Levelock

On May 3, 2002 Ted traveled to Levelock to work with the LRA to complete surveys and mapping. On September 16, Hans Nicholson and Ted Krieg traveled to Levelock and met with the LRA, Greg Andrew, at the village corporation building. Greg set up interviews with households that had not been completed. Some household heads came to the village corporation office to complete surveys and maps while others were surveyed in their homes. There are 36 households in Levelock and 17 households were interviewed. The interviewers could not contact 3 households and 5 households refused to be surveyed. It was learned that out of the 36 households 11 households had moved leading to a 68 percent success rate for available households to be interviewed.

Manokotak

On April 5, 2002 Hans Nicholson, Molly Chythlook, and Ted Krieg traveled to Manokotak for the purpose of hiring and training Barbara Moore to do the surveys. Molly, Ted, and Hans waited at the village council building until Barbara arrived after completing her duties at the school. Barbara's husband Lester sat in on the training session, as he would be assisting her with the survey.

On May 10, 2002 Molly and Ted went to Manokotak to map the households that hunted during the survey year. Most of the surveys had been completed by the LRA by this time.

On October 15, 2002 Hans, Ted, and Molly traveled to Manokotak to complete surveys and maps. At the city office the staff provided a table for the work. The plan was to map six households and if possible survey and map the households that had been refusals or were no contacts. Five households were surveyed and mapped and three of the six households that still needed mapping were mapped. Remaining at this time were seven no contacts and 10 refusals. After the work of October 15, the LRA unsuccessfully attempted to contact the remaining households to complete the surveys and mapping. In the end out of 80 households 60 were interviewed for a 75 percents success rate. Interviewers could not contact 9 households and 10 households refused to participate while 1 household had moved.

New Stuyahok

As described above the sub-regional hiring and training meeting was held in New Stuyahok on April 1, 2002. On April 16, an elder from New Stuyahok was cited by state enforcement agents for taking caribou out of season and the caribou were confiscated. The caribou season closes April 15 in Unit 17 C where the incident occurred. The elder's understanding was that as an elder with his permanent hunting license he could hunt whenever he needed to. People in New Stuyahok were upset that meat had been taken from an elder and this may have contributed to some households refusing to complete the surveys.

From April 22 to 23, Ted worked with one of the LRA's in New Stuyahok going house to house or meeting with people at the community building to map the households that had completed surveys. Many individuals questioned the authorities' justification for confiscating the elder's caribou. Hunting regulations aside, the issue was the confiscation of the meat -- that food had been taken away from an elder. Work was able to proceed but the issue remained and may have influenced who was available to participate in the survey or mapping during these two days.

On May 14, June 7, and June 24 Ted traveled to New Stuyahok to work with LRA's to continue mapping and surveys. On July 1 and 2, Ted was in New Stuyahok to work with the LRAs to complete surveys and mapping. At this point approximately 76 percent of the households were surveyed; from three to six households were at Lewis Point subsistence fishing and could not be contacted these two days. No further efforts to contact households took place. Out of 94 households 64 were interviewed for a 68 percent success rate. Interviewers could not contact 10 households, 15 households refused, and 5 had moved.

Newhalen

On April 8, Davin Holen traveled to Newhalen to work with the LRA. Surveys began the following morning, beginning in the Newhalen Tribal Council Office. Davin watched as Letha Warne conducted three surveys in the office. Davin conducted the mapping session and took notes. Over two days 13 surveys were completed and the LRA related that all of the main hunting households had been interviewed; with both survey and mapping completed. Letha completed the surveys on her own within a few weeks. Out of 39 households in Newhalen 34 were interviewed for an 87 percent success rate. The LRA had two households refuse to do the survey and she was unable to contact three households.

On October 6, 2003 Davin Holen and Ted Krieg traveled to Newhalen to present preliminary results to the community. The meeting was lightly attended and materials were left with the tribal council for community review.

Nondalton

On March 27, 2002, the day after the group training Davin Holen worked with the Nondalton LRA, Charlotte Balluta. Charlotte administered the survey while Davin took notes and conducted the mapping. Main hunters were interviewed first to obtain good map data. Thirteen households were interviewed over two days. At the time there was a shortage of fuel oil so many households were engaged in gathering firewood for heat. The households that we mapped were those of the major hunters except a couple of people who were in Iliamna, out fishing, or were gathering firewood. Charlotte did an excellent job lining up the major hunters to interview and do the mapping with. She completed the remainder of the surveys within a few weeks. Out of an estimated 45 households in Nondalton 33 were interviewed for an 83 percent success rate for available households. Five households had moved, Charlotte was unable to contact five households, and two households refused.

On October 7, 2003 Ted Krieg and Davin Holen traveled to Nondalton to present preliminary results of the project. A death of an elder had occurred the previous evening and Nondalton was a buzz of activity. In addition to preparations for the funeral, village council elections were being held. The roof of the church needed fixing, a potlatch moose needed harvesting, and food needed to be prepared. Although a formal presentation was not feasible, residents did make an effort to stop by, pick up the findings and project overview, and let researchers know what they thought. The session was very informative for the researchers and community members.

On Friday April 23, 2004 Davin Holen attended a meeting of a special committee for the Lake Clark National Park and Preserve Subsistence Resource Commission (SRC). The meeting was held in the Nondalton community center and was attended by the Nondalton Tribal Council, interested members of the community, and some members of the SRC. Davin presented findings from the project with major emphasis placed on moose harvests in the community of Nondalton, because lack of moose was a prime concern to this special committee and the community. Findings for Nondalton were supplemented with findings for Newhalen and Port Alsworth because members of those communities were also present.

Pedro Bay

On Wednesday April 24, 2002 Davin Holen traveled to Pedro Bay and trained Karla Jensen the LRA. The following day 13 households were surveyed with the LRA conducting the survey while Davin did the mapping and took notes. All but two households in the community were interviewed with all the major hunting households covered. Karla finished the other two households within a week for a total of 19 surveys out of an estimated 22 households, or a 90 percent success rate. Two households refused and one was unable to be contacted.

Portage Creek

On October 9, 2002 Hans Nicholson and Ted Krieg traveled to Portage Creek to work with the LRA, Alexie Kapotak to complete surveys. Up to this point contacting households and completing surveys with them had been difficult. Many households were traveling, working, or out doing subsistence activities, especially after fishing season when many communities are participating in local meetings and training. Hans and Ted were able to help interview and map three households before returning to Dillingham. All 7 households were interviewed for a 100 percent success rate.

Togiak

On May 17, 2002 Molly and Ted went to Togiak to work with the LRA to map the households that had hunted during the study year. All of the surveys were complete by this date so only the mapping remained. On June 26 Molly and Ted traveled to Togiak to complete mapping, but not all households were contacted during this visit.

On September 18, Hans Nicholson, Molly Chythlook and Ted Krieg traveled to Togiak to complete mapping. Molly and Ted set up in the city office and contacted heads of households to come to the office for mapping. Hans walked to households to complete mapping with those that could not be contacted or were unable to come to the city office. See Table 4 for a breakdown of the sampled households.

Twin Hills

On September 18, 2002 Hans Nicholson was scheduled to travel to Twin Hills to complete mapping while Molly and Ted were working in Togiak. Due to Village meetings in Twin Hills that day and the likelihood that the households that needed to be contacted would be at the meetings he went to Togiak to work there (see above). Out of 28 households 23 were interviewed for a success rate of 92 percent. 3 households had moved and interviewers were unable to contact 2 households.

Port Alsworth

On March 30, 2002 Davin Holen traveled to Port Alsworth from Nondalton. That day Davin trained the LRA Dennis Fowler. The following day was Sunday so they waited until Monday, April 1 to start the interviews. Dennis made a list of the main hunters in Port Alsworth; these individuals were interviewed first. Dennis conducted the survey while Davin did the mapping and took notes. Twelve households in Port Alsworth were interviewed that day covering all the major hunters except two who were out of town. Dennis was confident conducting the mapping and later completed both the surveys and mapping for the remainder of the community within a few weeks. Out of 29 households 20 were interviewed for a 71 percent success rate. The LRA was unable to contact 7 households, one household had moved, and one refused.

Key Respondent Interviews

No formal key respondent interviews were conducted in the Nushagak River, Nushagak Bay, or the Togiak area. Project staff focused on getting the household surveys administered and completing the mapping of harvest areas.

In all, six key respondent interviews were conducted in the GMU 9B communities. There were three taped interviews conducted in Nondalton on March 28, 2002, one in Newhalen on April 10, and one in Iliamna on June 25. In addition there was a group interview that was not taped in Pedro Bay on April 25, although the researcher took copious notes. All taped interviews were transcribed and then coded for analysis. Transcripts are on file at ADF&G. The major focus of these interviews was traditional ecological knowledge of large land mammals. During the course of the interviews many respondents commented on cultural changes, changes in climate or weather, and changes in the environment (see

Appendix D for interview protocol). This information will be used in this report to augment quanitative data. A discussion relating to cultural and environmental change will conclude this report.

DATA ANALYSIS

Survey Data

A Microsoft Access database was used for data entry and storage. To minimize data entry errors, data were entered twice, compared, and edited until the two data sets were identical. Standard "logic checking" programs were used to identify inconsistent data; then surveys were consulted and data corrected as needed. The Statistical Package for the Social Sciences (SPSS) was used with standard divisional survey processing programs to generate estimates and reports.

As noted above, the original goal was to interview a representative random sample of 200 households in Dillingham in two strata: hunting households (as identified through ADF&G hunting license records) and other households. Although 110 households were interviewed in the first group, none were interviewed from the second. Data analysis proceeded with the assumption that no households in Dillingham without hunting licenses hunted big game in the 2001/02 study year. (In a regional center such as Dillingham, it is very likely that virtually all hunters obtain licenses.) Thus, harvest estimates and estimates of the number of hunters and hunting households for each big game species derived from the interviews are treated as the totals for the entire community. In calculating confidence intervals, the harvests of the 460 other households are treated as known and as zero. The percentage of households hunting and harvesting based on the hunting household strata has been adjusted for the entire community, with zero values assumed for the 460 other households. Because non-hunting households may use, receive, or give away large land mammal resources even if they do not hunt, and because it cannot be assumed that these values are the same for both hunting and non-hunting households, it is not possible to estimate the percentage of Dillingham households that used, received, or gave away each species in the study year. Values for these variables for the hunting household stratum in Dillingham are presented in Appendix E.

Map Data

The number of mapped interviews, conducted by community, are summarized in Table 5. All map data were digitized and entered into ArcView 3.2, a GIS mapping program. Maps were then created in ARCGIS 9, a GIS program with better graphics presentation ability. Maps were exported in Adobe PDF format as this is a common program that is readily accessible to the general public. Maps depicting the extent of hunting areas for each large land mammal species in each community for the study year and over the last 20 years where applicable were prepared (or the past 10 years for Levelock). Also for each community, a map was prepared depicting locations of harvests overlaying harvest use for the study year. In all 116 maps were completed. Specific harvest locations will not be depicted on maps made available to the public in order to protect confidential information. Maps also do not show intensity of hunting, however, this is possible utilizing this database and may be done for community use in the future. Table 6 summarizes the type of maps produced for each study community.

Products

In addition to this final report on the results of the household survey, study findings were summarized in a four-page overview that was distributed to households in the study communities (Appendix F). Atlases of the harvest area maps were prepared and provided to each study community. A CD with the map data was also produced and is included in a pocket inside the back cover of this report as Appendix G. Survey results were incorporated into the Division of Subsistence Community Profile Database.

Table 5. Number and Percentage of Households that Provided Mapped Data, Study Communities

	Number of Households			Percentage That Completed Maps	
Community	Total	Surveyed	Completed Maps	Of All Households	Of Surveyed Households
Aleknagik	48	36	17	35%	47.2%
Clark's Point	21	21	16	76%	76.2%
Dillingham[1]	416	110	88	21%	80.0%
Ekwok	34	32	14	41%	43.8%
Igiugig	11	11	5	45%	45.5%
Iliamna	28	21	16	57%	76.2%
Kokhanok	35	16	10	29%	62.5%
Koliganek	42	23	18	43%	78.3%
Levelock	25	17	12	48%	70.6%
Manokotak	79	60	23	29%	38.3%
Newhalen	39	34	11	28%	32.4%
New Stuyahok	89	64	45	51%	70.3%
Nondalton	40	33	17	43%	51.5%
Pedro Bay	21	19	14	67%	73.7%
Portage Creek	7	7	7	100%	100.0%
Port Alsworth	28	20	10	36%	50.0%
Togiak[2]	154	75	17	11%	22.7%
Twin Hills	25	23	3	12%	13.0%
Total	1,142	622	343	30%	55.1%

[1] Households with members with hunting licenses only. A random sample was interviewed.

[2] Stratified random sample of hunting households and other households.

Table 6. Inventory of Maps in the Atlas and CD, Western Bristol Bay Large Land Mammal Project

	Caribou			Moose			Brown Bear			Black Bear			Dall Sheep		
	20 Year	1 Year	Harvest	20 Year	1 Year	Harvest	20 Year	1 Year	Harvest	20 Year	1 Year	Harvest	20 Year	1 Year	Harvest
Aleknagik	*	*	*	*	*	*	*	*	*	*					
Clarks Point	*	*	*	*	*	*	*	*	*						
Dillingham	*	*	*	*	*	*	*	*	*	*	*				
Ekwok	*	*	*	*	*	*	*								
Igiugig	*	*	*	*	*	*	*	*					*		
Iliamna	*	*	*	*	*	*	*			*	*		*	*	
Kokhanok	*	*	*	*	*	*	*	*	*						
Koliganek	*	*	*	*	*	*	*	*	*	*	*				
Levelock	*	*	*	*	*	*	*	*	*	*					
Manokotak		*	*		*	*									
Newhalen	*	*	*	*	*	*	*			*	*	*	*	*	
New Stuyahok	*	*	*	*	*	*	*								
Nondalton	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Pedro Bay	*			*	*	*	*			*					
Portage Creek	*	*	*	*	*	*	*			*					
Port Alsworth	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
Togiak		*	*		*	*		*	*						
Twin Hills		*	*		*	*									

CHAPTER TWO: DEMOGRAPHY

STUDY FINDINGS: DEMOGRAPHY

For an ethnographic overview of the Bristol Bay region see Wright et al. (1985: 17-31).

Table 7 presents demographic information for the study communities from the US decennial Census in 2000 and the households surveys for 2002. Generally, the household surveys resulted in a slightly lower population estimate than estimated by the federal census for 2000. Overall, the survey estimate was 5,395 people living in 1,602 households in 2002, compared to the federal census estimate of 5,844 people living in 1,810 households in 2000. Most likely, this is a result of the survey only including year-round residents of the communities, and excluding households that had only lived in the communities for a short time.

In 2000, 51.2 percent of the population of the study communities was Alaska Native. In 13 communties, Alaska Natives were over 80 percent of the population. In only one community, Port Alsworth, was the majority of the population non-Alaska Native.

The household survey did not collect information on the ethnicity of household members. Rather, each household was classified as "Alaska Native" if at least one member was Alaska Native. As shown in Table 7, 76.1 percent of the households in the study community were Alaska Native households.

DEMOGRAPHIC TRENDS

Table 8 presents population estimates for the study communities from 1960 through 2000 based on the federal census. There has been steady growth in the total population of western Bristol Bay over this 40-year time span.

Table 7. The Human Population of Western Bristol Bay Communities, 2000 and 2002[1]

Community	2000 US Census Human Population	2000 US Census Number of Households	2000 US Census Percent Alaska Native Individuals	Survey Results for 2002 Human Population	Survey Results for 2002 Number of Households	Survey Results for 2002 Percent Alaska Native Households
Residents of GMU 09B						
Igiugig	53	16	83.0%	27	11	100.0%
Illiamna	102	35	57.8%	91	28	66.7%
Kokhanok	174	52	90.8%	133	35	100.0%
Levelock	122	45	95.1%	62	25	100.0%
Newhalen	160	39	91.3%	148	39	97.1%
Nondalton	221	68	90.0%	152	40	100.0%
Pedro Bay	50	17	64.0%	59	21	89.5%
Port Alsworth	104	34	22.1%	112	28	25.0%
Subtotal	986	306	78.8%	783	227	85.2%
Residents of GMU 17A						
Togiak	809	202	92.7%	700	154	98.2%
Twin Hills	69	24	94.2%	72	25	100.0%
Subtotal	878	226	92.8%	771	179	98.5%
Residents of GMU 17B						
Koliganek	182	53	87.4%	184	42	100.0%
Subtotal	182	53	87.4%	184	42	100.0%
Residents of GMU 17C						
Aleknagik	221	70	84.6%	157	48	97.2%
Clark's Point	75	24	92.0%	59	21	100.0%
Dillingham[1]	2,466	884	60.9%	2,443	876	60.9%
Ekwok	130	42	93.8%	104	34	93.8%
Manokotak	399	93	94.7%	369	79	100.0%
New Stuyahok	471	105	96.0%	488	89	100.0%
Portage Creek	36	7	86.1%	36	7	100.0%
Subtotal	3,798	1,225	72.2%	3,656	1,154	70.0%
Grand total	5,844	1,810	76.9%	5,395	1,602	76.1%

[1] In Dillingham, for the 2002 study a random sample was drawn from the 416 households with members holding hunting licenses. These households had an estimated population of 1,467 people. The Alaska Department of Labor and Workforce Development estimated Dillingham's population in 2002 at 2,443. Using the average household size from the 2000 census, this gives an estimate of 876 households in 2002. The percent of Alaska Native households in 2002 is based on the survey.

Source: ADF&G and BBNA household survey 2002; AK Dept. of Labor and Workforce Development 2004

Table 8. Population Trends in the Study Communities, 1960 to 2000

Community	Human Population 1960	1970	1980	1990	2000
Residents of GMU 09B					
Igiugig	36	36	33	33	53
Illiamna	47	58	94	94	102
Kokhanok	57	88	83	152	174
Levelock	88	74	79	105	122
Newhalen	110	88	87	160	160
Nondalton	205	184	173	178	221
Pedro Bay	53	65	33	42	50
Port Alsworth	NA	NA	22	55	104
Subtotal	596	593	604	819	986
Residents of GMU 17A					
Togiak	220	383	470	613	809
Twin Hills	NA	67	70	66	69
Subtotal	220	450	540	679	878
Residents of GMU 17B					
Koliganek	100	142	117	181	182
Subtotal	100	142	117	181	182
Residents of GMU 17C					
Aleknagik	231	128	154	185	221
Clark's Point	138	95	79	60	75
Dillingham	424	914	1,563	2,017	2,466
Ekwok	106	103	77	77	130
Manokotak	149	214	294	385	399
New Stuyahok	145	216	331	391	471
Portage Creek	NA	60	48	5	36
Subtotal	1,193	1,730	2,546	3,120	3,798
Grand total	2,109	2,915	3,807	4,799	5,844

Source: Schroeder et al 1987; AK Dept. of Labor and Workforce Development 2004

CHAPTER THREE: CARIBOU

BACKGROUND & LOCAL OBSERVATIONS

The Mulchatna Caribou Herd

The Mulchatna Caribou Herd occupies GMUs 9B, 17, 18 south and 19B.The following description includes information from the Alaska Department of Fish and Game's Federal Aid in Wildlife Conservation Reports integrated and Woolington (2001a), integrated with local observations recorded during harvest surveys and key respondent interviews conducted in GMU 9B communities for this project.

A Russian explorer Petr Korsakovsky mentioned observing scattered caribou when he entered the Iliamna Lake area in July and August of 1818. He described "caribou here in herds in August and October; they swim across the river." His hunters killed caribou to feed the exploration party, before he departed overland for Cook Inlet (VanStone 1988).

Another Russian explorer Ivan Vasilev traveled into the Nushagak River and Tikchik Basin in 1829. The caribou population at the time was plentiful and extended from "Bristol Bay to Norton Sound, including the lower Yukon and Kuskokwim River drainages as far inland as Innoko River and the Taylor Mountains" (VanStone 1988). The caribou herd peaked in the 1860's and began to decline in the 1870's. By 1880 the herd had ceased migration north into the Yukon and Kuskokwim River drainages (Hicks 1997a).

Describing the experience of earlier generations, an elder of Newhalen in 2002 said "during those days (1880s to early 20th Century) there weren't very many caribou, there weren't very many animals at all. So what few they could see is what they went and got [for] their subsistence use in the fall-time. They go for caribou for the meat; and the skins too for clothing and blankets and warmth for the winter."

The Mulchatna caribou herd increased somewhat during the 1930's. However, by the late 1930's according to local reports, the herd was on the decline.

In the early part of the twentieth century reindeer herding became prevalent in Western Alaska. During this period, according to Kokhanok residents, there was a reindeer station near the village. During the 1940's reindeer herding declined as an occupation among Alaska Natives as they began to abandon this social experiment aimed at entering them into a herding economy that took them away from the ups and downs of a subsistence economy. The Mulchatna Caribou herd may have acquired animals from reindeer herds as they began to disperse. At this time the Mulchatna Caribou Herd started to grow again (Hicks 1997a). A hunter in Kokhanok observed in the 1990s a small group of the now wild reindeer near the village that were grouped together away from the larger caribou herd, and the animals were much smaller than their wild counterparts. Another separate observation this hunter made was a group of larger dark caribou in the herds; he thought they were moose when he first saw them. He claims the one he shot was 1,000 pounds. It took two trips to bring out all the meat, even without bringing out the head. Another resident in the village confirmed this observation. These caribou are possibly the descendants of those domesticated caribou, and according to local hunters they travel with the caribou herds but still maintain their distance from their wild counterparts.

The first aerial survey of the Mulchatna herd occurred in 1949 and estimated the population to be 1000

caribou (Hicks 1997a). By 1965 the population had increased to 5000 caribou, and a census conducted in June of 1974 yielded a count of 13,079 caribou. In October of that year the herd was recounted and the population was revised upward to 14,231 caribou. However, throughout the rest of the 1970's the herd began a gradual decline.

According to a Nondalton resident "maybe 25-30 years ago, there was no caribou in this area. You had to go back around Nikabuna and Tutna Lakes" to find caribou. Since that time the caribou have moved down from those areas into the Nondalton environs.

Photo censuses by wildlife biologists have improved the accuracy of counting large herds. Although the Mulchatna Herd was declining a more accurate photo census in 1981 determined that the Mulchatna Caribou Herd included 18,599 animals with an extrapolated estimate of 20,618. Using the same technique of photo census to count the Mulchatna herd, population estimates have steadily increased and as of 1996, just 15 years since the 1981 census and the herd stands at 192,818 caribou. This represents an estimated increase of 17% annually over 15 years, except between 1992 to 1994 when the increase jumped to 28%.

During that time local hunters observed the increase in caribou numbers. However, the range of the caribou is constantly shifting. Although the caribou herds may have increased in size, their movement has taken them away from some villages only to return later. This fluctuation in range makes the caribou a resource that cannot be consistently relied upon. According to a Nondalton resident "in the past, maybe 40 years ago, caribou never came up past Nikabuna Lakes, about 30 miles south-east of Nondalton. However, maybe as the herd has grown they have been seen up near Nondalton every few years."

An elder from a GMU 9B community who worked for the National Park Service in researching the caribou herd made these observations from both his work for the Park Service and as a traditional hunter.

> When I worked for the National Park Service we studied caribou - their migration, their growth. At the time when we first started it was 11,000 caribou and we tracked caribou. We started collaring them with radio collars. And we tracked caribou for several years while I was still there, and yes they do move to their calving grounds, to their summer feeding grounds and their winter-feeding grounds. And that caribou herd, the Mulchatna caribou herd; when I was working for the park service it went from 11,000 to 40,000 before I quit.
>
> Right now, in our hunting area right here, last two years now we haven't had any caribou at all, they migrated somewhere else, probably to better feeding grounds. So for a couple of years now we haven't any caribou at all. We have to do a lot of hunting for them before we find them because they are pretty scattered."

The wintering area for the seasonal migration of the Mulchatna Caribou Herd begins on the west side of Iliamna Lake, north of the Kvichak River where they are reported to be mixing with the Northern Alaska Peninsula Caribou Herd. This has occurred from the early 1980's to the present. The Mulchatna Caribou Herd has begun to migrate into previously unused territory and during the winter of 1996/ 1997 25,000 animals of the herd moved into the McGrath area while another 30,000 caribou spent the winter in Unit 17A. Large numbers of caribou also were located near Aniak on the Kuskokwim River,

however, no portion of the herd is reported to have crossed the river (Hicks 1997a).

An anomaly in the migration of the caribou occurred in Pedro Bay in 1997. Caribou are not common at Pedro Bay. A resident of Pedro Bay, a community that is hemmed in by mountains relayed that in 1997, about 2,000 caribou came through the village. He said, "they must have been lost, it's the first time I have ever seen them, and I will never see them in my lifetime again." This local observation is consistent with the above description of caribou moving into previously unused territory.

Changes have also occurred in the past five years in the Newhalen – Iliamna area. According to one hunter "I hunt caribou and moose when they are around. I didn't see very much decline until they had that hoof rot. That was about four to five years ago. We haven't had caribou here for probably three years, at least three years. They have been coming through the village, but they haven't the past three years."

Effective management of caribou herds requires an understanding of migration trends over time. People on the land understand these trends and wait for caribou during their yearly migration. According to one elder "In the old days, they wait[ed] for caribou in the spring. The [caribou] will go back to their calving grounds and the bulls will go higher up on the mountains to feed for the summer, that would be their feeding grounds and the cows and calves would stay down below for better feeding grounds and raise their calves."

In recent years the Mulchatna Herd has changed its calving areas. The traditional calving area is the upper reach of the Mulchatna River and Bonanza Hills. During the calving season of 1994 most of the females started using the area between the upper Nushagak River and upper Tikchik lakes. In 1996, 1997, and 1998 most females calved in the King Salmon River and Klutuspak Creek drainages of the upper Nushagak River.

Following calving in 1996 the herd moved to the east side of the Mulchatna River, between Tutna Lake and the Stuyahok River. By August the herd moved into the Nushagak Hills and west to the Holitna River. The herd then moved into their winter habitat extending their range in recent years throughout Game Management Units 17, 19, and 9B. The caribou followed a similar pattern in 1997 and 1998 with more caribou joining those extending their range during the winter.

This is consistent with local observations made by Nondalton residents. "One of the things has to do with the feed, they move to different areas. I noticed that for a couple, two – three years they were up here in big herds. They just ate up all the feed, then they moved to a different area. They haven't been back here in a couple of years now; two – three years they haven't been back." The herd then had to extend its winter range to search out new areas for feed after 1998.

The Mulchatna Caribou Herd as of 1999 was estimated at over 200,000 caribou. According to the Alaska Department of Fish and Game Dillingham office the 2001 assessment shows a slight decline with a population of 175,000 caribou.

Today, caribou have not moved back into the area near Nondalton in large numbers. According to one Nondalton resident "there is kind of a cycle that they just go to different areas. I suspect they will be back in this area, hopefully in the next couple of years or so. They were here for a little while earlier this winter, but they didn't stay very long. They went right back down toward Naknek or King Salmon." From what the elders say and from what one hunter remembers; "There used to be lots of caribou, going

up on the Chulitna or on the mountain (he points out the window to Hoknede Mountain which is right behind the village, just over the mountain is the Chulitna River valley), [you] used to see caribou all the time but over the past years it seems to have declined."

At the present there is little caribou population stress on local habitat as segments of the herd have extended their range into unused land with available lichen. Moose have also increased their range and have become more intensively hunted taking the pressure off caribou. Bear and wolf kills are low compared to the herd size. For the foreseeable future according to biologists and local hunters the herd will stabilize.

Nushagak Peninsula Herd

In 1988 the Nushagak Peninsula Caribou Herd was established on the Nushagak Peninsula by transplanting 146 caribou from the then-healthy Northern Alaska Peninsula Caribou Herd. The Nushagak Peninsula is divided by the boundary of Units 17A and 17C. Regulations prohibited hunting the herd until it had a chance to grow to the size where the population could sustain an annual harvest. In 1995, a hunt was established that was limited to the area of the Nushagak Peninsula and the co-management villages of Manokotak, Togiak, Twin Hills, Aleknagik, Dillingham, Clarks Point, and Ekuk.

The herd expanded from the Nushagak Peninsula in a westerly direction toward Togiak where a portion of the herd appeared to establish a range. Regulations were enacted to prohibit hunting in that portion of 17A to allow the herd to permanently establish its range in that area, closer to Togiak.

Caribou Hunting Regulations: 2001/2002 Regulatory Year

State General Season Hunt

In Unit 17A, all drainages east of Right Hand Point, and the "remainder of Unit 17C" (west of Wood River and the Wood River Lakes) the caribou hunting season is opened by emergency order if enough Mulchatna caribou are present in the unit. The remainder of Unit 17A (all drainages west of Right Hand Point) was open to caribou hunting from August 1-March 31. This provision was new to the regulations for the 2001-2002 regulatory year; previously all of Unit 17A was included in the area to be opened by emergency order.

In Unit 17B and the portion of Unit 17C east of the Wood River and Wood River Lakes, the caribou hunting season was open from August 1-April 15. During the 2001 – 2002 regulatory year, only two bulls could be harvested during the October 1-November 30 time period; during the remainder of the season five caribou of either sex could be harvested. The two bull restriction limits the number of trophy bulls that one hunter may harvest during the rut when local hunters do not hunt. (For the 2003-2004 season the regulation was changed to allow only one bull during the Aug.1-Nov. 30 time period.)

In Unit 9B, the regulations were identical to those described above for Unit 17B and the portion of Unit 17C east of the Wood River and Wood River Lakes except that for residents the season was open from July 1- April 15. The bull restrictions and changes to the regulations for the 2003-2004 season are also identical.

In Unit 9A and that portion of Unit 9C within the Alagnak River drainage one caribou could be harvested during the August 1 – March 31 open season. In the remainder of Unit 9C, part of the range

of the Northern Alaska Peninsula Herd, Tier II hunting restrictions were in place with open seasons from Aug. 10 – Sept. 20 and Nov. 15 – Feb. 28. These remained in place through the 2003 – 2004 regulatory year.

Additionally, from Jan. 1-Apr.15 in Units 9B, 17B, and that portion of 17C east of the Nushagak River, same day airborne hunting was allowed, provided the hunter was 300 feet from the airplane.

GMUs 17A and 17C west of the Wood River were closed to the hunting of caribou prior to the 1995 – 1996 regulatory year. This closure was management tool to allow the Mulchatna Caribou Herd to extend its range. By 1995 sufficient numbers of Mulchatna caribou were consistently moving into this area. Therefore, the Alaska Board of Game adopted regulations that went into effect on July 1, 1995 that opened a season in Unit 17C east of the Wood River and allowed a season in Unit 17A to be opened by emergency order. Then, as noted above, before the 2001 – 2002 regulatory year a sufficient number of Mulchatna caribou were established in the Togiak area to support a regulatory change to open a season in Unit 17A in the drainages west of Right Hand Point.

Federal Subsistence Regulations

During the 2001 – 2002 regulatory year on the Nushagak Peninsula in Units 17A and 17C, two caribou could be harvested with a Federal registration permit by the residents of Togiak, Twin Hills, Manokotak, Aleknagik, Dillingham, Clark's Point, and Ekuk. The season was Aug.1-Sept. 30 and Dec.1-Mar.31. Three hundred permits (one caribou per permit) were available for distribution by the tribal councils of the eligible communities to community members. Designated hunters could hunt for another person (with no age limit or disability requirements) by signing the permit(s) stating that they are the designated hunter. The designated hunter takes the permits and harvest reports with them. The tribal council administrators had to be notified so that the name of the designated hunter could be added to the hunter list. One person was allowed to harvest no more that a total of five caribou (not including those harvested as a designated hunter or as a proxy under state regulations) combined under state and federal hunts.

After years of steady growth, the population of the Nushagak Peninsula herd declined to the point where the harvest was limited to 100 permits during the 2002-2003 regulatory year. During the 2003-2004 regulatory year, the harvest was limited to 50 caribou including harvests that were documented even though the hunter did not obtain a permit. Additionally during the 2003-2004 regulatory year successful hunters were required to report harvests within 24 hours to the Togiak National Wildlife Refuge (TNWR). The season could be closed by announcement of the TNWR manager.

During the 2001 – 2002 regulatory year, selected drainages in Units 17A and 17C west of the Wood River and Wood River Lakes, not including the Nushagak Peninsula, were subject to a season, a harvest limit of up to five caribou, and a hunt area that could be announced by the TNWR manager in conjunction with state management between August 1 and March 31.

During the 2001 – 2002 regulatory year, the area not including the Nushagak Peninsula in Units 17A and 17C west of the Wood River and Wood River Lakes selected drainages, was subject to a season, harvest limit of up to five caribou, and hunt area that were announced by the TNWR manager in conjunction with state management between Aug. 1 and Mar. 31.

For the 2003 – 2004 regulatory year the federal regulations mirrored the state regulations for the 2003

– 2004 regulatory year except that the two bull limit from Oct. 1 – Nov. 30 was still in effect and in the areas on TNWR land openings and closures were at the discretion of the TNWR manager. For the remainder of Federal lands in Unit 17, state general season regulations applied.

During the 2001 – 2002 regulatory year, in Unit 9B the Federal regulations were identical to those described above for the state except that the open season was August 1 - April 15. For Unit 9C, that portion within the Alagnak River drainage, one caribou could be harvested between August 1 and March 31. In the remainder of Unit 9C, within the range of the Northern Alaska Peninsula Herd, hunting was subject to Federal registration or state Tier II permits. Federal regulations for the 2003-2004 regulatory year were identical to those stated for the 2001 - 2002 regulatory year.

Table 9. Estimated Number of Hunters and Successful Hunters of Caribou, by Community and Area, 2001/2002.

Communtiy	Total Hunters	Successful Hunters	Percentage Successful
Igiugig	12	12	100.0%
Illiamna	27	19	70.0%
Kokhanok	15	11	71.4%
Levelock	18	15	83.3%
Newhalen	49	42	86.0%
Nondalton	27	12	45.5%
Pedro Bay	3	0	0.0%
Port Alsworth	14	4	30.0%
GMU 09 (B) Subtotal	165	115	69.8%
Togiak	91	66	72.5%
Twin Hills	4	4	100.0%
GMU 17 (A) Subtotal	95	70	73.7%
Koliganek	55	46	83.3%
GMU 17 (B) Subtotal	55	46	83.3%
Aleknagik	29	23	77.3%
Clark's Point	16	13	81.3%
Dillingham*	355	200	56.4%
Ekwok	21	11	50.0%
Manokotak	43	41	93.9%
New Stuyahok	104	88	84.0%
Portage Creek	6	3	50.0%
GMU 17 (C) Subtotal	576	378	65.7%
GMU 17 (C) Subtotal without Dillingham	220	178	80.7%
Grand totals	890	609	68.4%
Grand totals without Dillingham	535	408	76.3%

* In Dillingham, only households with members holding hunting licenses were interviewed.

Source: Division of Subsistence ADF&G and BBNA, household surveys, 2002

Table 10. Levels of Participation in the Use and Harvest of Caribou and Caribou Harvest Levels, 2001/02 Regulatory Year.

	Percentage of Households					Caribou Harvest							
Community	Used Caribou (%)	Hunted Caribou (%)	Harvested Caribou (%)	Received Caribou (%)	Gave Caribou (%)	Total	Per Household	Per Person	Per Hunter	Per Successful Hunter	95% Confidence Limit of Total Harvest %	Low*	High
Residents of GMU 09B													
Igiugig	100.0	90.9	90.9	36.4	81.8	23.0	2.1	0.9	1.9	1.9	0.0%	23.0	23.0
Illiamna	76.2	57.1	42.9	57.1	47.6	40.0	1.4	0.4	1.5	2.1	34.4%	30.0	53.8
Kokhanok	93.8	31.3	25.0	87.5	12.5	19.7	0.6	0.1	1.3	1.8	84.4%	9.0	36.3
Levelock	100.0	58.8	52.9	64.7	41.2	27.9	1.1	0.5	1.6	1.9	36.7%	19.0	38.2
Newhalen	94.1	73.5	64.7	82.4	52.9	71.1	1.8	0.5	1.4	1.7	14.2%	62.0	81.2
Nondalton	93.9	42.4	27.3	90.9	36.4	23.0	0.6	0.2	0.9	1.9	30.2%	19.0	30.0
Pedro Bay	21.1	5.3	0.0	21.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Port Alsworth	90.0	35.0	10.0	90.0	20.0	4.2	0.2	0.0	0.3	1.0	81.6%	3.0	7.6
Subtotal	85.5	47.7	36.5	72.6	34.3	209.0	0.9	0.3	1.3	1.8	12.2%	183.5	234.4
Residents of GMU 17A													
Togiak	49.0	49.0	36.8	17.0	28.1	105.6	0.7	0.2	1.2	1.6	27.1%	77.0	134.2
Twin Hills	100.0	17.4	17.4	95.7	100.0	7.6	0.3	0.1	1.8	1.8	30.7%	7.0	9.9
Subtotal	56.1	44.6	34.1	28.0	38.2	113.2	0.6	0.1	1.2	1.6	25.2%	84.6	141.8
Residents of GMU 17B													
Koliganek	91.3	69.6	56.5	65.2	43.5	93.1	2.2	0.5	1.7	2.0	41.1%	54.9	131.4
Subtotal	91.3	69.6	56.5	65.2	43.5	93.1	2.2	0.5	1.7	2.0	41.1%	54.9	131.4
Residents of GMU 17C													
Aleknagik	88.9	55.6	47.2	52.8	27.8	48.0	1.0	0.3	1.6	2.1	23.2%	36.8	59.2
Clark's Point	85.7	71.4	57.1	42.9	57.1	28.0	1.3	0.5	1.8	2.2	0.0%	28.0	28.0
Dillingham **	n/a	25.0	15.5	n/a	n/a	344.1	0.4	0.1	1.0	1.7	29.6%	242.4	445.9
Ekwok	96.9	40.6	31.3	78.1	15.6	27.6	0.8	0.3	1.3	2.6	22.9%	26.0	34.0
Manokotak	88.3	41.7	41.7	53.3	31.7	68.5	0.9	0.2	1.6	1.7	16.9%	56.9	80.0
New Stuyahok	98.4	76.6	65.6	73.4	62.5	260.0	2.9	0.5	2.5	3.0	13.0%	226.3	293.8
Portage Creek	71.4	71.4	28.6	57.1	28.6	10.0	1.4	0.3	1.7	3.3	0.0%	10.0	10.0
Subtotal	n/a	33.0	23.8	n/a	n/a	786.3	0.7	0.2	1.4	2.1	13.8%	678.0	894.6
Subtotal without Dillingham	92.1	58.1	49.9	62.0	40.8	442.1	1.6	0.4	2.0	2.5	8.4%	405.0	479.2
Grand total	n/a	37.3	27.6	n/a	n/a	1,201.6	0.8	0.2	1.3	2.0	10.0%	1,081.3	1,321.9
Grand total without Dillingham	81.1	52.2	42.2	57.1	38.2	857.5	1.2	0.3	1.6	2.1	7.5%	793.3	921.6

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: Division of Subsistence, ADF&G and BBNA, household surveys, 2002

CARIBOU HARVESTS AND USES IN 2001/2002

Participation in the Subsistence Harvest and Use of Caribou

As reported in Table 9, an estimated 890 residents of the study communities hunted caribou in the 2001/2002 regulatory year. There were caribou hunters in every study community. Most caribou hunters were successful: 68.4 percent of the hunters (609 hunters) harvested at least one caribou. There were successful hunters in every community but Pedro Bay. In only three communities (Pedro Bay, Port Alsworth, and Nondalton) did less that 50 percent of the hunters harvest at least one caribou.

As shown in Table 10, 37.3 percent of households in the study communities had at least one member who hunted caribou in 2001/02, and 27.6 percent had successful hunters. Excluding Dillingham (for which comprehensive data are lacking), 81.1 percent of study community households used caribou in 2001/2002, 57.1 percent received caribou, and 38.2 percent gave caribou to other households.

Caribou Harvest Quantities

As also reported in Table 10, the estimated harvest of caribou by the study communities in 2001/02 was 1,202 animals. For the area overall, this represents a harvest of 0.8 caribou per household and 0.2 caribou per person. For all hunters, the average harvest was 1.3 caribou; successful hunters averaged 2.0 caribou. Of the total estimated harvest, 660.8 (63.5 percent of those animals for which the sex was recorded) were male and 379.7 (36.5 percent) were female; 161.1 were of unknown sex (Table 11).

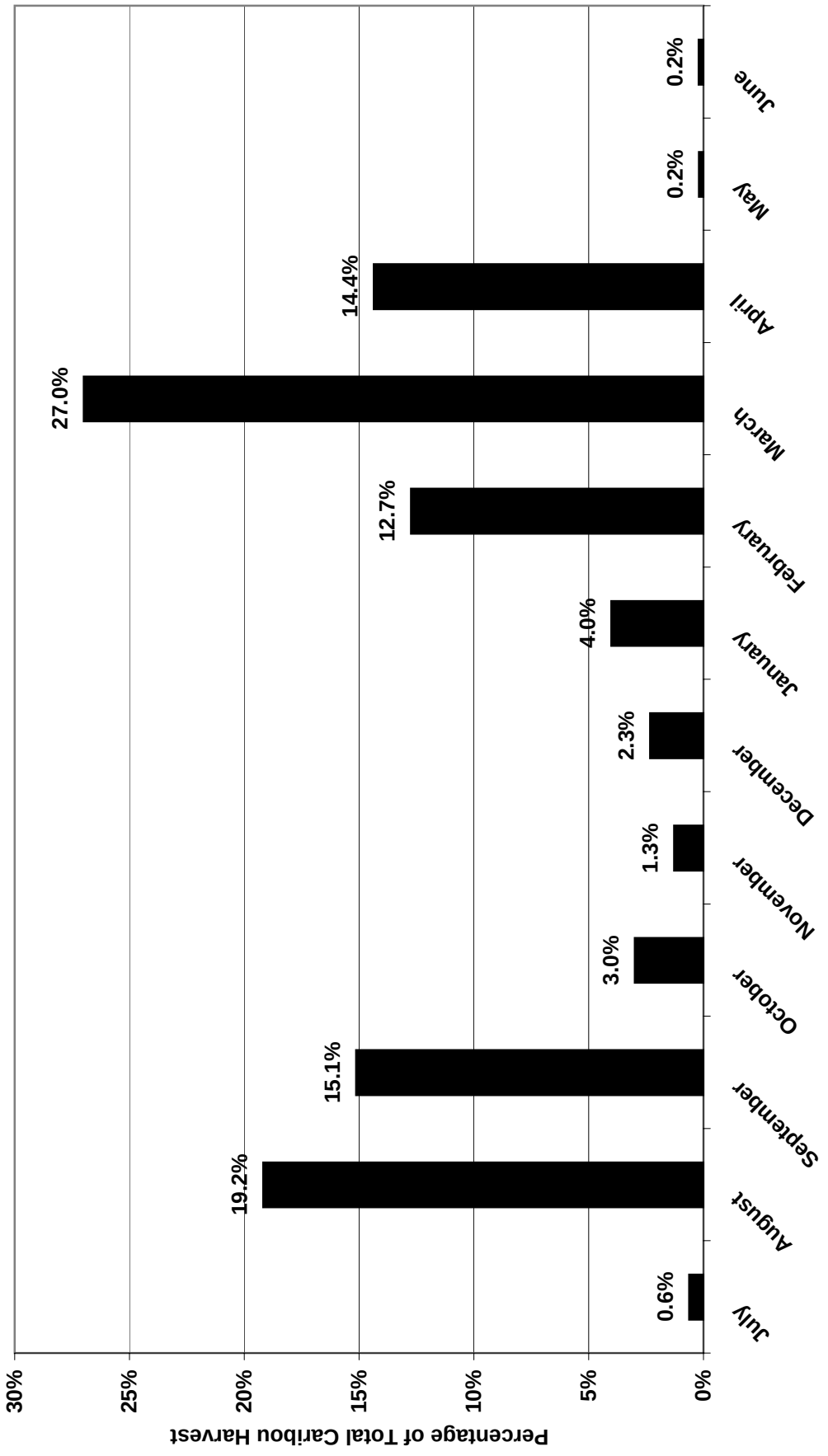
The seven communities located in GMUs 17B and 17C harvested an estimated 879 caribou. The GMU 17C community of New Stuyahok and the GMU 17B community of Koliganek in combination harvested 353 caribou. This was about 40.2 percent of all caribou harvested by the communities of GMU 17B and 17C and about 29.4 percent of the total for all the GMU 17 and 9B study communities. Except for Manokotak and Aleknagik, the caribou hunting areas for communities of GMU 17B and 17C in 2001/02 were completely within the Nushagak River watershed, which is within the range of the Mulchatna Herd. Manokotak residents hunted caribou exclusively within the range of the Nushagak Peninsula Herd, and the areas hunted by Aleknagik residents were within the ranges of both herds. (See the maps on the CD included as Appendix E.)

Timing of Caribou Harvests

Table 11 reports the estimated harvest of caribou by study community by month. Figure 2 shows the percentage of the caribou harvest by month for those animals for which a month of harvest was known. Although some harvest occurred in every month, there were two peaks. The first occurred in August and September, when 19.2 percent and 15.1 percent, respectively, of the annual harvest took place. The second peak was February, March, and April, when 12.7 percent, 27.0 percent, and 14.4 percent, respectively, of the total harvest occurred.

Generally in late winter months of February, March, and April, snow conditions are good for travel by snow machine, and daylight hours are longer with generally warmer temperatures. If caribou are in the area and there is an adequate snow cover, the winter travel conditions are optimal for hunting caribou. During the survey work in New Stuyahok in early April of 2002, most hunters were unavailable because they were hunting; a portion of the Mulchatna herd had moved into the area where they were accessible by snow machine.

Figure 2. Timing of Caribou Harvests by Month, 2001/2002, Communties of GMU 17 and 9B



The harvest of caribou in the late summer and early fall by residents in GMUs 17B and 17C is opportunistic based on the availability of caribou along the Nushagak River and its tributaries. In recent years (2002 and 2003) large numbers of caribou have crossed the Nushagak River above Portage Creek in late July or early August. When caribou are present along the major waterways they can be efficiently harvested and transported back to the communities by skiff. By August 1st the main part of the commercial sockeye salmon fishing season is over and caribou season reopens in GMUs 17B and 17C. At that time most households have exhausted their supply of caribou and moose meat from the previous season and fresh red meat is in high demand. In the fall the caribou are fat. Local households prefer large bulls and people have time to hunt them before the start of moose season (in most areas) on August 20. The key factor is that caribou are accessible along the waterways by skiff in August and September. Toward the end of September and beginning of October the harvest drops off as caribou go into rut. After the moose season opens and people are actively hunting for moose they also harvest caribou if they are encountered along the rivers.

Sharing of Caribou

With the exception of Dillingham, 57.1 percent of households in the study communities received caribou from people living outside their households (Table 10). Survey respondents were asked to distinguish between caribou meat they received from "traditional" sources such as family and friends, and caribou they received from "sport" (nonlocal) hunters and guides. Table 12 reports the percentage of households in each study community receiving caribou from either source.

There were considerable differences between study communities in the percentage of households that received caribou meat from "sport" hunters and guides. In some communities (such as Aleknagik, Clark's Point, Igiugig, Levelock, Manokotak, Portage Creek, Togiak, and Twin Hills) very few to no households received caribou from these sources. On the other hand, a majority of the households in Port Alsworth (85 percent) and Nondalton (60.6 percent), and almost half in Ekwok (46.9 percent), Iliamna (47.6 percent), and Newhalen (47.1 percent) obtained caribou meat from nonlocal hunters or hunting guides. Overall (excluding Dillingham), 19.9 percent of households received some caribou meat from "sport hunters" and guides and 50.3 percent received caribou meat from traditional sharing networks.

Survey respondents were also asked if they had received offers of caribou meat from "sport hunters" that they declined as well as their reasons for not accepting the meat (Table 12). Again, there were considerable differences between study communities. Overall, communities that had relatively large percentages of households receiving caribou meat from nonlocal hunters or guides also had a relatively large percentage who declined at least some offers of caribou meat. Examples include Ekwok, Iliamna, Koliganek, Newhalen, Nondalton, and Port Alsworth. Overall (excluding Dillingham), 12.1 percent of households reported rejecting some offers of caribou meat from "sport hunters."

Most commonly, respondents who did not accept offers of caribou meat from nonlocal "sport hunters" did so because of the poor condition or suspect quality of the meat. Respondents said that hunters coming from outside the local area often hunt in late September and October, looking for large bull with trophy value. Such animals are in the rut and are not considered edible by most local residents. Other reasons for not accepting caribou meat included already having enough meat through hunting or other sharing, and personal circumstances such as not being home when the meat was offered (Table 12).

Table 11. Estimated Caribou Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
GMU 09 (B)	Igiugig	All	1.0	1.0	0.0	0.0	2.0	1.0	0.0	8.0	10.0	0.0	0.0	0.0	0.0	23.0	0.0	0.0%
		Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	3.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0%
		Male	1.0	1.0	0.0	0.0	0.0	0.0	0.0	5.0	2.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0%
		Unknown	0.0	0.0	0.0	0.0	2.0	1.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0%
	Illiamna	All	0.0	5.3	6.7	0.0	0.0	4.0	10.7	5.3	8.0	0.0	0.0	0.0	0.0	40.0	13.8	34.4%
		Female	0.0	0.0	1.3	0.0	0.0	0.0	4.0	0.0	5.3	0.0	0.0	0.0	0.0	10.7	4.7	44.2%
		Male	0.0	5.3	5.3	0.0	0.0	1.3	6.7	5.3	1.3	0.0	0.0	0.0	0.0	25.3	10.1	39.7%
		Unknown	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	1.3	0.0	0.0	0.0	0.0	4.0	4.2	104.3%
	Kokhanok	All	0.0	10.9	2.2	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	19.7	16.6	84.4%
		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	0.0	0.0%
		Male	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	3.4	157.0%
		Unknown	0.0	8.8	2.2	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	17.5	16.6	95.1%
	Levelock	All	1.5	0.0	4.4	1.5	1.5	0.0	7.4	7.4	2.9	1.5	0.0	0.0	0.0	27.9	10.2	36.7%
		Female	0.0	0.0	0.0	1.5	0.0	0.0	0.0	4.4	2.9	1.5	0.0	0.0	0.0	10.3	5.2	50.3%
		Male	0.0	0.0	1.5	0.0	1.5	0.0	4.4	0.0	0.0	0.0	0.0	0.0	0.0	7.4	4.3	58.1%
		Unknown	1.5	0.0	2.9	0.0	0.0	0.0	2.9	2.9	0.0	0.0	0.0	0.0	0.0	10.3	7.7	75.2%
	Newhalen	All	0.0	5.7	4.6	1.1	2.3	3.4	3.4	5.7	36.7	4.6	2.3	0.0	1.1	71.1	10.1	14.2%
		Female	0.0	1.1	0.0	0.0	0.0	0.0	1.1	1.1	17.2	3.4	0.0	0.0	0.0	24.1	5.9	24.4%
		Male	0.0	4.6	4.6	1.1	2.3	3.4	2.3	4.6	19.5	1.1	2.3	0.0	0.0	45.9	6.7	14.7%
		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	1.1	1.1	0.8	72.8%
	Nondalton	All	3.6	7.3	1.2	0.0	0.0	0.0	0.0	0.0	3.6	4.8	0.0	2.4	0.0	23.0	7.0	30.2%
		Female	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	0.0	0.0	0.0	3.6	1.7	47.6%
		Male	2.4	7.3	1.2	0.0	0.0	0.0	0.0	0.0	1.2	4.8	0.0	2.4	0.0	19.4	6.1	31.6%
		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	0.0	0.0%
	Pedro Bay	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	0.0	0.0%
		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	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	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	0.0	0.0%

Table 11. Estimated Caribou Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
	Port Alsworth	All	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	3.4	81.6%
		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	0.0	0.0%
		Male	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	3.4	81.6%
		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	0.0	0.0%
	GMU 09 (B)	All	6.1	30.3	23.3	2.6	10.1	8.4	21.5	26.4	61.3	10.9	2.3	2.4	3.3	209.0	25.5	12.2%
		Female	1.2	1.1	1.3	1.5	0.0	0.0	5.1	8.6	30.9	4.9	0.0	0.0	0.0	54.7	8.9	16.2%
		Male	3.4	20.4	16.8	1.1	3.8	4.8	13.4	14.9	24.0	6.0	2.3	2.4	0.0	113.4	14.3	12.6%
		Unknown	1.5	8.8	5.1	0.0	6.4	3.7	2.9	2.9	6.3	0.0	0.0	0.0	3.3	40.9	17.5	42.7%
GMU 17 (A)	Togiak	All	0.0	17.7	28.4	8.7	0.0	4.6	1.5	0.0	21.5	14.4	0.0	0.0	8.7	105.6	28.6	27.1%
		Female	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	3.1	4.4	0.0	0.0	0.0	10.5	7.0	66.4%
		Male	0.0	12.0	15.1	3.1	0.0	4.6	0.0	0.0	18.4	10.0	0.0	0.0	5.7	68.9	21.2	30.7%
		Unknown	0.0	5.7	10.3	5.7	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	3.1	26.2	15.7	60.1%
	Twin Hills	All	0.0	0.0	3.3	0.0	0.0	3.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0	7.6	2.3	30.7%
		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	0.0	0.0%
		Male	0.0	0.0	3.3	0.0	0.0	3.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0	7.6	2.3	30.7%
		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	0.0	0.0%
	GMU 17 (A)	All	0.0	17.7	31.7	8.7	0.0	7.9	1.5	1.1	21.5	14.4	0.0	0.0	8.7	113.2	28.6	25.2%
		Female	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	3.1	4.4	0.0	0.0	0.0	10.5	6.9	66.2%
		Male	0.0	12.0	18.4	3.1	0.0	7.9	0.0	1.1	18.4	10.0	0.0	0.0	5.7	76.5	21.2	27.7%
		Unknown	0.0	5.7	10.3	5.7	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	3.1	26.2	15.7	59.8%
GMU 17 (B)	Koliganek	All	0.0	23.7	12.8	7.3	0.0	5.5	0.0	0.0	16.4	27.4	0.0	0.0	0.0	93.1	38.3	41.1%
		Female	0.0	3.7	0.0	1.8	0.0	3.7	0.0	0.0	5.5	18.3	0.0	0.0	0.0	32.9	19.5	59.2%
		Male	0.0	20.1	12.8	5.5	0.0	1.8	0.0	0.0	11.0	9.1	0.0	0.0	0.0	60.3	23.5	39.1%
		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	0.0	0.0%
	GMU 17 (B)	All	0.0	23.7	12.8	7.3	0.0	5.5	0.0	0.0	16.4	27.4	0.0	0.0	0.0	93.1	38.3	41.1%
		Female	0.0	3.7	0.0	1.8	0.0	3.7	0.0	0.0	5.5	18.3	0.0	0.0	0.0	32.9	19.5	59.2%
		Male	0.0	20.1	12.8	5.5	0.0	1.8	0.0	0.0	11.0	9.1	0.0	0.0	0.0	60.3	23.5	39.1%
		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	0.0	0.0%

Table 11. Estimated Caribou Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
GMU 17 (C)	Aleknagik	All	0.0	0.0	10.7	0.0	0.0	0.0	0.0	13.3	24.0	0.0	0.0	0.0	0.0	48.0	11.2	23.2%
		Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	0.0	0.0	8.0	4.9	61.9%
		Male	0.0	0.0	10.7	0.0	0.0	0.0	0.0	5.3	13.3	0.0	0.0	0.0	0.0	29.3	7.6	25.9%
		Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	2.7	0.0	0.0	0.0	0.0	10.7	5.5	51.8%
	Clark's Point	All	1.0	7.0	7.0	1.0	0.0	3.0	5.0	0.0	4.0	0.0	0.0	0.0	0.0	28.0	0.0	0.0%
		Female	0.0	2.0	4.0	0.0	0.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0%
		Male	1.0	5.0	2.0	0.0	0.0	3.0	3.0	0.0	1.0	0.0	0.0	0.0	0.0	15.0	0.0	0.0%
		Unknown	0.0	0.0	1.0	1.0	0.0	0.0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0%
	Dillingham **	All	0.0	45.4	56.7	3.8	0.0	3.8	0.0	52.9	94.5	79.4	0.0	0.0	7.6	344.1	102.9	29.9%
		Female	0.0	7.6	15.1	0.0	0.0	0.0	0.0	30.3	34.0	45.4	0.0	0.0	0.0	132.4	55.5	41.9%
		Male	0.0	22.7	41.6	3.8	0.0	3.8	0.0	22.7	45.4	34.0	0.0	0.0	0.0	174.0	59.5	34.2%
		Unknown	0.0	15.1	0.0	0.0	0.0	0.0	0.0	0.0	15.1	0.0	0.0	0.0	7.6	37.8	34.8	92.1%
	Ekwok	All	0.0	3.2	6.4	4.3	3.2	0.0	7.4	0.0	3.2	0.0	0.0	0.0	0.0	27.6	6.3	22.9%
		Female	0.0	1.1	1.1	1.1	0.0	0.0	3.2	0.0	1.1	0.0	0.0	0.0	0.0	7.4	2.7	36.2%
		Male	0.0	2.1	4.3	3.2	3.2	0.0	4.3	0.0	2.1	0.0	0.0	0.0	0.0	19.1	4.1	21.6%
		Unknown	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	0.5	49.5%
	Manokotak	All	0.0	1.3	2.6	0.0	0.0	0.0	2.6	17.1	42.1	2.6	0.0	0.0	0.0	68.5	11.6	16.9%
		Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	10.5	1.3	0.0	0.0	0.0	23.7	7.2	30.4%
		Male	0.0	0.0	1.3	0.0	0.0	0.0	2.6	2.6	23.7	1.3	0.0	0.0	0.0	31.6	6.9	22.0%
		Unknown	0.0	1.3	1.3	0.0	0.0	0.0	0.0	2.6	7.9	0.0	0.0	0.0	0.0	13.2	6.7	50.8%
	New Stuyahok	All	0.0	93.2	34.8	4.2	1.4	2.8	9.7	32.0	62.6	19.5	0.0	0.0	0.0	260.0	33.7	13.0%
		Female	0.0	4.2	1.4	0.0	0.0	1.4	0.0	25.0	50.1	18.1	0.0	0.0	0.0	100.1	20.0	19.9%
		Male	0.0	86.2	33.4	1.4	0.0	1.4	0.0	2.8	12.5	0.0	0.0	0.0	0.0	137.7	20.9	15.2%
		Unknown	0.0	2.8	0.0	2.8	1.4	0.0	9.7	4.2	0.0	1.4	0.0	0.0	0.0	22.3	12.4	55.8%
	Portage Creek	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	3.0	3.0	0.0	0.0	0.0	10.0	0.0	0.0%
		Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	0.0	0.0	2.0	0.0	0.0%
		Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	0.0	0.0	0.0	4.0	0.0	0.0%
		Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	0.0%
	GMU 17 (C)	All	1.0	150.1	118.2	13.2	4.6	9.6	24.8	119.4	233.4	104.5	0.0	0.0	7.6	786.3	108.3	13.8%

Table 11. Estimated Caribou Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
		Female	0.0	14.8	21.6	1.1	0.0	1.4	4.2	67.1	105.7	65.8	0.0	0.0	0.0	281.6	59.0	20.9%
		Male	1.0	116.0	93.2	8.4	3.2	8.2	9.9	33.4	100.1	37.4	0.0	0.0	0.0	410.7	63.2	15.4%
		Unknown	0.0	19.2	3.4	3.8	1.4	0.0	10.7	18.8	27.7	1.4	0.0	0.0	7.6	94.0	37.5	39.9%
	GMU 17 (C) without Dillingham	All	1.0	104.7	61.4	9.4	4.6	5.8	24.8	66.4	138.9	25.1	0.0	0.0	0.0	442.1	37.1	8.4%
		Female	0.0	7.2	6.5	1.1	0.0	1.4	4.2	36.9	71.7	20.4	0.0	0.0	0.0	149.3	21.5	14.4%
		Male	1.0	93.3	51.6	4.6	3.2	4.4	9.9	10.7	54.7	3.3	0.0	0.0	0.0	236.7	23.1	9.8%
		Unknown	0.0	4.1	3.4	3.8	1.4	0.0	10.7	18.8	12.6	1.4	0.0	0.0	0.0	56.1	14.8	26.4%
Grand totals	Grand totals	All	7.1	221.8	185.9	31.9	14.7	31.3	47.8	146.9	332.6	157.2	2.3	2.4	19.6	1,201.6	120.3	10.0%
		Female	1.2	19.6	26.0	4.4	0.0	5.0	9.3	75.7	145.1	93.3	0.0	0.0	0.0	379.7	62.8	16.5%
		Male	4.4	168.5	141.2	18.1	7.0	22.6	23.3	49.4	153.5	62.5	2.3	2.4	5.7	660.8	71.6	10.8%
		Unknown	1.5	33.6	18.8	9.4	7.8	3.7	15.2	21.7	34.0	1.4	0.0	0.0	14.0	161.1	44.1	27.4%
Grand totals without Dillingham	Grand totals without Dillingham	All	7.1	176.4	129.2	28.1	14.7	27.6	47.8	93.9	238.1	77.8	2.3	2.4	12.1	857.5	64.2	7.5%
		Female	1.2	12.0	10.9	4.4	0.0	5.0	9.3	45.4	111.1	47.9	0.0	0.0	0.0	247.3	30.4	12.3%
		Male	4.4	145.8	99.6	14.3	7.0	18.9	23.3	26.8	108.1	28.5	2.3	2.4	5.7	486.8	40.9	8.4%
		Unknown	1.5	18.5	18.8	9.4	7.8	3.7	15.2	21.7	18.9	1.4	0.0	0.0	6.4	123.3	27.6	22.4%

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

Table 12. Receipt of Caribou Meat and Reasons for Not Accepting Meat from Nonlocal ("Sport") Hunters

		Percentage of Households			Did Household Decline Offer of Meat from Sport Hunter?					
					Percentage of Households Saying "Yes"	Reason for Declining (Percent of Households)				
	Number of Households in Community	Receive, Any Source	Receive, Another Household	Receive, Sport Hunter		Poor condition of meat	Didn't need the meat	Personal circumstances	Other	No reason given
Aleknagik	48	52.8%	50.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Clark's Point	21	42.9%	42.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ekwok	34	78.1%	62.5%	46.9%	56.3%	53.1%	0.0%	0.0%	0.0%	3.1%
Igiugig	11	36.4%	36.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Illiamna	28	57.1%	28.6%	47.6%	38.1%	28.6%	4.8%	4.8%	0.0%	0.0%
Kokhanok	35	87.5%	81.3%	18.8%	6.3%	0.0%	6.3%	0.0%	0.0%	0.0%
Koliganek	42	65.2%	56.5%	39.1%	34.8%	17.4%	17.4%	0.0%	0.0%	0.0%
Levelock	25	64.7%	64.7%	5.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manokotak	79	53.3%	53.3%	1.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Stuyahok	89	73.4%	71.9%	21.9%	12.5%	6.3%	4.7%	0.0%	1.6%	0.0%
Newhalen	39	82.4%	70.6%	47.1%	23.5%	17.6%	0.0%	0.0%	0.0%	5.9%
Nondalton	40	90.9%	84.8%	60.6%	21.2%	6.1%	0.0%	0.0%	9.1%	6.1%
Pedro Bay	21	21.1%	21.1%	10.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Port Alsworth	28	90.0%	15.0%	85.0%	45.0%	20.0%	15.0%	10.0%	0.0%	0.0%
Portage Creek	7	57.1%	57.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Togiak	154	17.0%	17.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Twin Hills	25	95.7%	95.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
All	726	57.1%	50.3%	19.9%	12.1%	7.4%	2.6%	0.6%	0.7%	0.8%
Dillingham [1]	416	40.0%	34.5%	10.0%	8.2%	0.9%	5.5%	0.0%	0.9%	0.9%

[1] In Dillingham, only households with at least one member holding a hunting license were interviewed. Of the 416 such households in Dillingham, 110 were interviewed for this project. Data in this table may not be representative of the entire community of Dillingham.

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

Households' Assessments of Meeting Needs in 2001/2002

Households were asked if their "need for caribou [was] met during the 2001/2002 hunting season." If needs had not been met, respondents were asked why. Findings by community are reported in Table 13 and Table 14. Figure 3 illustrates the percentage of households in each community that reported that their caribou needs had not been met in 2001/02. Overall, assessments were mixed. In some communities, few households reported not meeting needs (including Aleknagik, Igiugig, Manokotak, and Twin Hills). In others, a majority said they did not meet their needs, including Clark's Point, Iliamna, Kokhanok, Portage Creek, and Togiak.

Table 13. Caribou: Were household's needs met during 2001/2002 Hunting Season?

	Caribou needs met during 2001/2002 hunting season?			
	Yes		No	
	Count	Row %	Count	Row %
Aleknagik	35	97.2%	1	2.8%
Clark's Point	9	42.9%	12	57.1%
Dillingham	74	67.3%	36	32.7%
Ekwok	26	83.9%	5	16.1%
Igiugig	10	90.9%	1	9.1%
Illiamna	7	33.3%	14	66.7%
Kokhanok	1	6.3%	15	93.8%
Koliganek	14	60.9%	9	39.1%
Levelock	13	76.5%	4	23.5%
Manokotak	52	89.7%	6	10.3%
New Stuyahok	48	75.0%	16	25.0%
Newhalen	19	55.9%	15	44.1%
Nondalton	18	54.5%	15	45.5%
Pedro Bay	15	78.9%	4	21.1%
Port Alsworth	17	85.0%	3	15.0%
Portage Creek	3	42.9%	4	57.1%
Togiak	37	49.3%	38	50.7%
Twin Hills	23	100.0%		

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

Figure 3. Percentage of Households Not Meeting Caribou Needs, 2001/02

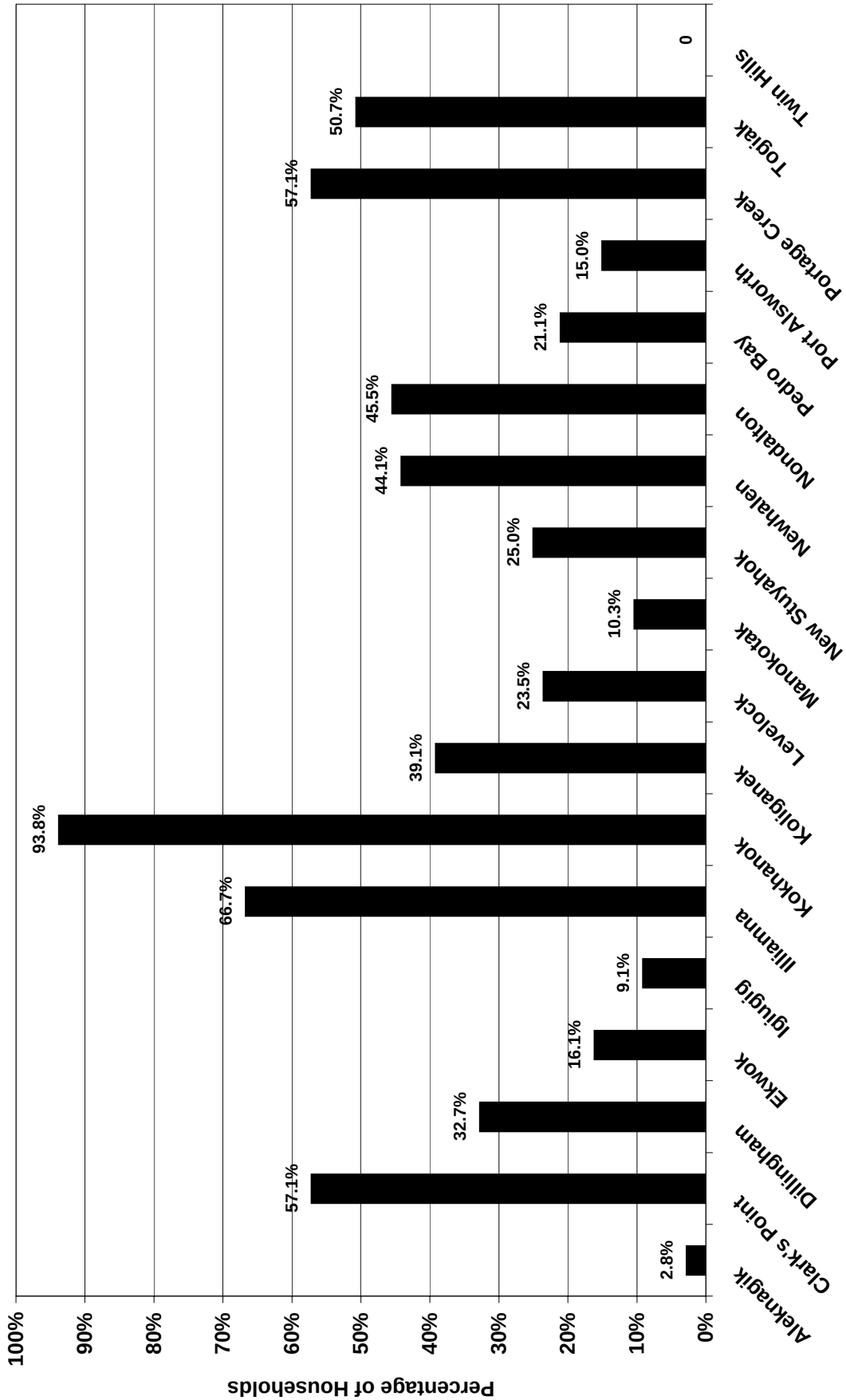


Table 14. Reasons Given by Households for Not Meeting Caribou Needs in 2001/2002.

				Percentage of Households Not Meeting Needs[1]						
		Households Not Meeting Needs								
Community	Total Households	Number	Percent	Resource Scarcity	Competition	Personal Reasons	Did Not Receive Enough	Did Not Have Enough, Unspecified	Regulations	Missing/ not given
Aleknagik	48	1	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Clark's Point	21	12	57.1%	58.3%	0.0%	8.3%	0.0%	33.3%	0.0%	8.3%
Ekwok	34	5	15.6%	100.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%
Igiugig	11	1	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Illiamna	28	19	66.7%	42.9%	0.0%	21.4%	7.1%	7.1%	0.0%	35.7%
Kokhanok	35	33	93.8%	73.3%	0.0%	6.7%	13.3%	26.7%	0.0%	0.0%
Koliganek	42	16	39.1%	22.2%	0.0%	33.3%	33.3%	22.2%	0.0%	11.1%
Levelock	25	6	23.5%	25.0%	0.0%	75.0%	0.0%	25.0%	0.0%	0.0%
Manokotak	79	8	10.0%	0.0%	0.0%	66.7%	33.3%	33.3%	16.7%	0.0%
New Stuyahok	89	22	25.0%	18.8%	0.0%	31.3%	12.5%	50.0%	6.3%	6.3%
Newhalen	39	17	44.1%	40.0%	0.0%	20.0%	6.7%	26.7%	0.0%	6.7%
Nondalton	40	18	45.5%	73.3%	6.7%	6.7%	6.7%	6.7%	6.7%	0.0%
Pedro Bay	21	4	21.1%	75.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%
Port Alsworth	28	4	15.0%	66.7%	0.0%	0.0%	0.0%	33.3%	0.0%	0.0%
Portage Creek	7	4	57.1%	75.0%	0.0%	25.0%	0.0%	0.0%	0.0%	0.0%
Togiak	154	84	54.7%	20.7%	0.0%	77.5%	0.0%	0.0%	0.0%	1.8%
Twin Hills	25	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
All	726	256	35.2%	39.3%	0.5%	40.0%	7.4%	15.7%	1.5%	6.2%
Dillingham [2]	416	136	32.7%	27.8%	0.0%	41.7%	8.3%	38.9%	0.0%	5.6%

[1] Households could give more than one reason.

[2] In Dillingham, only households with at least one member holding a hunting license were interviewed. Of the 416 such households in Dillingham, 110 were interviewed for this project. Data in this table may not be representative of the entire community of Dillingham.

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

Table 15. Comparison of Estimates of Number of Caribou Hunters, 2001/02, from Harvest Ticket Returns and Household Surveys

	Number of Caribou Hunters		Number of Successful Caribou Hunters	
	Harvest Tickets[1]	Household Surveys[2]	Harvest Tickets	Household Surveys
Aleknagik	14	29	12	23
Clarks Point	5	16	3	13
Dillingham	238	355	172	200
Ekwok	15	21	9	11
Igiugig	15	12	13	12
Iliamna	10	27	8	19
Kokhanok	1	15	0	11
Koliganek	18	55	17	46
Levelock	8	18	8	15
Manokotak	44	43	42	41
Newhalen[3]		49		42
New Stuyahok	28	104	22	88
Nondalton	5	27	3	12
Pedro Bay	0	3	0	0
Portage Creek	5	6	5	3
Port Alsworth	5	14	3	4
Togiak	4	91	3	66
Twin Hills	0	4	0	4
Totals	415	890	320	609
Totals w/o Dillingham	177	535	148	408

[1] Includes permits for the Nushagak Caribou Herd

[2] Data from harvest surveys are expanded estimates and are rounded.

[3] Included with Iliamna in harvest ticket data.

Source: ADF&G 2004 for harvest ticket data; ADF&G and BBNA 2002, household surveys

COMPARISONS WITH OTHER YEARS AND OTHER HARVEST ESTIMATES

Comparison with Harvest Ticket Data

For the period 1991/92 through 1999/00, reported harvests of Mulchatna Herd caribou ranged from 1,573 (1991/92) to 4,770 (1998/99). Total estimated harvests, including estimated unreported harvests, were more than twice as high, ranging from 3,273 (1991/92) to 9,770 (1998/99). In 1999/00, the reported harvest was 4,467 caribou and the estimated unreported harvest was 5,000 caribou, including 2,200 to 2,400 caribou by local residents. The total estimated harvest was 9,467 caribou (Woolington 2001a:35).

Based on harvest ticket returns, the total number of local hunters of Mulchatna caribou in 1999/00, two years before the study year, was 294 (174 successful, 120 unsuccessful). Nonlocal Alaska resident hunters totaled 1,477 and nonresident hunters totaled 2,250 (Woolington 2001a).

Table 16 . Estimated Harvests of Caribou, Study Communities, 1973/74

Community[1]	Number of HHs	Number of People	Caribou Percent Harvesting	Caribou Number Harvested	Caribou No. Per Person
Communities of GMU 9B					
Igiugig	8	39	83.3%	64	1.66
Iliamna	17	62	33.3%	15	0.24
Kokhanok	13	81	11.1%	12	0.14
Levelock	17	79	68.8%	36	0.46
Newhalen	16	72	72.7%	32	0.44
Nondalton	29	151	61.5%	108	0.71
Pedro Bay	10	40	0.0%	0	0.00
Total, GMU 9B	110	524	49.9%	267	0.51
Communities of GMU 17					
Aleknagik	21	105	12.5%	8	0.08
Clarks Point	14	77	54.5%	41	0.53
Dillingham	229	979	34.4%	243	0.25
Ekwok	21	102	35.3%	60	0.59
Koliganek	20	113	60.0%	108	0.95
Manokotak	37	220	26.3%	39	0.18
New Stuyahok	31	194	53.8%	164	0.85
Total, GMU 17	373	1790	36.1%	664	0.37

[1] Port Alsworth, Portage Creek, Togiak, and Twin Hills were not included in this survey

Source: Gasbarro and Utermohle 1974

Table 15 compares the number of caribou hunters and successful caribou hunters as indicated from returned harvest tickets for 2001/2002 with the household survey results. Survey results suggest that harvest ticket returns underestimate the number of local hunters by more than half. Excluding Dillingham, the underestimate is about two-thirds. A notable exception is Manokotak, where ADF&G records and the household survey result in an almost identical estimate of caribou hunters and successful hunters. In 2001/2002, Manokotak residents focused almost exclusively on the Nushagak Peninsula Herd for caribou hunting.[1] As discussed above, hunting of this herd is managed through a Federal subsistence permit system administered by tribal councils. Evidently, this system encourages harvest reporting and results in improved and reliable harvest data.

Harvest ticket returns indicate that most Mulchatna Herd caribou are harvested in August, September, and March. These are the same months with the highest harvests based on the household surveys.

[1] According to Federal permit records, in 2001-2002, 72 subsistence hunting permits for the Nushagak Peninsula Herd were issued to 36 permit holders from Manokotak. Of these, 4 did not hunt, 1 hunted unsuccessfully, 25 harvested caribou, and 6 did not report. The reported harvest was 46 caribou by these Manokotak hunters (Aderman and Woolington 2002).
[2] Records from the University of Alaska 1974 study estimate the number of caribou harvested instead of pounds usuable weight therefore this has been retained for comparison reasons.

Comparison with Survey Findings from other Study Years

It is not possible to identify trends in subsistence uses of caribou in the overall study area due to very incomplete harvest records and the variety of factors that affect harvests such as herd size, herd location, weather and travel conditions, competition, and local and regional social and economic conditions. This study conducted by ADF&G and BBNA for 2001/2002 was the first attempt to estimate large land mammal harvests for a single regulatory year for all the communities of western Bristol Bay. The only other study of comparable scope was conducted by the University of Alaska in 1974 (Gasbarro and Utermohle 1974). In that study, residents of all communities in the Bristol Bay area except Togiak, Twin Hills, Portage Creek, and Port Alsworth were interviewed about their harvests of wild resources during a 12-month period in 1973/74.[2] According to the results of that study (Table 16), in 1973/74 residents of communities of GMU 9B (except Port Alsworth) harvested 267 caribou (0.51 caribou per person); the corresponding estimate for 2001/2002 is 205 caribou (0.31 per person). For communities of GMU 17B and C (except Portage Creek), the 1973/74 estimated caribou harvest was 664 animals (0.37 per person), compared to 869 in 2001/2002 (0.33 per person).

Although area-wide comparisons of caribou harvests for a single year are limited, at least one additional previous estimate of harvests is available for all the study communities through harvest surveys conducted by the Division of Subsistence. Table 17 reports estimated caribou harvests and levels of participation in the harvest and use of caribou for the study communities from these previous rounds of household surveys. Table 18 provides a chronological overview of total caribou harvests by each study community, and Table 19 provides an estimate of harvests in numbers of animals per person.

Table 17. Historic Harvests and Uses of Caribou, Study Communities, from Division of Subsistence Household Surveys

		Percentage of Households					Number Harvested		Average Pounds	
Community	Year	Use	Hunt	Harvest	Receive	Give	Number	+/-%	Per HH	Per Capita
Aleknagik	1989	84.20	60.50	55.30	60.50	60.50	57	10	205.26	60.46
Clark's Point	1989	76.50	52.90	41.20	64.70	47.10	18	0	158.82	48.21
Dillingham	1984	69.90	26.80	22.20	54.90	15.00	379	31	82.35	27.88
Ekwok	1987	93.10	72.40	62.10	58.60	37.90	57	12	268.97	80.41
Igiugig	1983		33.30	33.30	66.70		7	171	100.00	15.79
Igiugig	1992	100.00	100.00	100.00	70.00	90.00	62	14	780.00	200.00
Iliamna	1983		30.00	20.00	10.00		16	75	67.50	17.31
Iliamna	1991	95.70	69.60	69.60	60.90	65.20	107	19	534.78	164.00
Kokhanok	1983		5.30	5.30	47.40		1	200	7.89	1.48
Kokhanok	1992	97.20	63.90	63.90	72.20	63.90	137	13	525.00	118.13
Koliganek	1987	90.50	73.80	73.80	61.90	59.50	186	11	582.14	150.00
Levelock	1988	100.00	77.80	74.10	85.20	85.20	86	18	388.89	117.97
Levelock	1992	100.00	80.00	76.70	70.00	70.00	86	15	330.00	116.47
Manokotak	1985	88.90	42.60	31.50	64.80	46.30	44	13	112.50	21.54
Manokotak	1999	87.70	56.80	49.40	65.40	63.00	130	10	216.70	49.30
New Stuyahok	1987	97.50	82.50	82.50	60.00	57.50	253	18	513.75	107.59
Newhalen	1983		36.40	36.40	0.00		24	87	136.36	28.30
Newhalen	1991	100.00	80.80	80.80	76.90	69.20	154	16	721.15	146.48
Nondalton	1980			71.00			78		332.14	69.40
Nondalton	1981			68.00			81		347.37	61.11
Nondalton	1983		85.70	85.70	4.80		203	31	564.29	108.72
Pedro Bay	1982		5.90	5.90	0.00		6	83	44.12	15.01
Pedro Bay	1996	53.80	15.40	15.40	38.50	23.10	15	99	115.38	34.88
Port Alsworth	1983		46.20	23.10	7.70		6	66	46.15	12.76
Togiak	1999	70.60	55.60	47.40	45.00	40.60	178	23	151.30	36.60
Twin Hills	1999	91.70	83.30	75.00	66.70	66.70	25	32	162.50	54.20

Blank cells = data not collected

Source: Scott et al. 2001. Kenner et al. 2003

Subsistence harvest surveys estimated a harvest of 178 caribou by the residents of Togiak in 1999 (Coiley-Kenner et al. 2003; Table 17, Table 18, and Table 19). During the 2001/2002 regulatory year the estimated harvest was 117 caribou. The decline here is most likely due to a change in the availability of caribou. In 1999 the movement of a portion of the Mulchatna herd into the area near Togiak from the west resulted in a good harvest that year. Less of the Mulchatna herd was available to harvest in the Togiak area during the 2001/2002 study year. Similar factors might account for the drop in caribou harvests by Twin Hills residents as well.

Estimated caribou harvests by residents of Manokotak were higher in 1999 and 2001 than estimates from 1973 and 1985. This is likely in part a result of the new hunting opportunity created by the introduction of the Nushagak Peninsula herd.

The harvest of 260 caribou by New Stuyahok hunters in 2001/2002 was similar to the estimate of 253 for 1987, although on a per capita levels harvests were lower in 2001/02. Koliganek harvested approximately 186 caribou in 1987 and approximately 93 caribou in 2001/02, half of the 1987 harvest. This decline is most likely due to the availability of the Mulchatna caribou herd, which was not as close to the village during the winter hunting months. Similar factors might also account for the lower caribou harvest at Ekwok.

In GMU 9B, interviewed households and local research assistants reported a decline in the number of caribou available to harvest during the study year and in recent years. For example, during the training at Nondalton, Charlotte Balluta, the local research assistant, observed that only a few people were harvesting caribou in Nondalton because they were scarce near the community. She said that the last time anyone had observed caribou crossing Six Mile Lake in front of the village on their normal migration route towards Lake Clark was five years ago. During the study year, Nondalton hunters harvested only a handful of caribou south of Six-Mile Lake. According to residents, caribou moved no further towards Lake Clark than this area just south of Nondalton. Annie Wilson from Igiugig also said that there had not been caribou around Igiugig, and Iliamna residents had previously stated concerns about the lack of caribou to BBNA. Harvests during the 2001/02 study year were below the minimum number estimated for previous study years in Levelock, Nondalton, Port Alsworth, and Pedro Bay. Estimated harvests in 2001/02 were within the range of estimates for previous study years in Igiugig, Iliamna, Kokhanok and Newhalen, but less than half of the highest estimated harvest (Tables 17 and 18). These lower harvests are likely a direct result of the changing range of the Mulchatna Caribou Herd. In years before the study year, more caribou were in the area and easier for local hunters to access.

In conclusion, overall, there is a continuing interest in caribou hunting and a continuing important contribution of caribou to the subsistence harvests and use patterns in the communities of the western Bristol Bay area. Large numbers of local community residents hunt caribou. Harvests appear conditioned largely by caribou movements and travel conditions.

Table 18. Estimated Harvests of Caribou, Study Communities, 1973 - 2001

Community	Estimated Harvest of Caribou																						
	1973	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GMU 9B																							
Igiugig	64				7									62									23
Iliamna	15				16								107										40
Kokhanok	12				1									137									20
Levelock	36									86				86									28
Newhalen	32				24								154										71
Nondalton	108	78	81		203																		23
Pedro Bay	0			6														15					0
Port Alsworth					6																		4
GMU 17																							
Aleknagik	8										57												48
Clarks Point	41										18												28
Dillingham	243					379																	344
Ekwok	60								57														28
Koliganek	108								186														93
Manokotak	39						44														130		69
New Stuyahok	164								253														260
Portage Creek																							10
Togiak																					178		106
Twin Hills																					25		8

Source: Scott et al. 2001

Table 19. Estimated Percapita Harvests of Caribou, Study Communities, 1973 - 2001

Community	Estimated Number of Caribou Harvested per Capita																						
	1973	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GMU 9B																							
Igiugig	1.66				0.11									1.33									0.85
Iliamna	0.24				0.12								1.09										0.44
Kokhanok	0.14				0.01									0.79									0.15
Levelock	0.46									0.79				0.78									0.45
Newhalen	0.44				0.19								0.98										0.48
Nondalton	0.71	0.46	0.41		0.72																		0.15
Pedro Bay	0.00			0.10														0.23					0.00
Port Alsworth					0.09																		0.27
GMU 17																							
Aleknagik	0.08										0.40												0.31
Clarks Point	0.53										0.32												0.48
Dillingham	0.25					0.19																	0.11
Ekwok	0.59								0.54														0.27
Koliganek	0.95								1.00														0.51
Manokotak	0.18						0.14														0.33		0.19
New Stuyahok	0.85								0.72														0.53
Portage Creek																							0.28
Togiak																					0.24		0.15
Twin Hills																					0.36		0.11

Source: Scott et al. 2001

CHAPTER FOUR: MOOSE

BACKGROUND & LOCAL OBSERVATIONS

This section is derived from key respondent interviews conducted in GMU 9B communities during this project. The information has been integrated with biological observations derived from the Alaska Department of Fish and Game's Federal Aid in Wildlife Conservation Reports for both GMU 9B and 17 (Sellers 2002 for GMU 9 and Woolington 2002 for GMU 17).

Population, Range, and Local Observations

> "In the past my dad used to tell me stories that there were no moose in this area; that's the reason they lived up in the Mulchatna area. The only thing they had down here was the sheep and the bears and the fish, and that was it. They said when they moved down here and they found a moose track in the wintertime, they would follow them until they found it. So there were no moose in the past, maybe 75 – 80 years ago, or maybe longer…and then they got more and more."
>
> Bill Trefon Sr. ~ Nondalton

In the communities of the Kvichak Watershed (GMU 9B), a diverse ecosystem encompassing various communities with different cultural backgrounds, it is not unexpected to discover that there were various answers as to whether moose were a traditionally preferred species. Many people hunt moose periodically, but their hunting effort is concentrated on caribou. More than one hunter related that they do not eat moose, only caribou. They say the taste of moose is too strong. A hunter in Newhalen related that he had harvested a single moose as a young person but it was only for the purpose of a ceremonial hunt. After harvesting the moose, tradition dictated that the entire moose was given away and some of it was served at a potlatch in his honor for killing his first moose. He does not like moose and this was the only time he has hunted it; he concentrates on hunting caribou. Another hunter who moved over to Newhalen from Koliganek reported that he uses moose regularly – once a year – "I only take one [moose] a year. I don't like to waste meat."

According to local residents, moose in GMU 9B are not a native species. Many people remember or have heard stories about when there were no moose. One local resident relates a story about a time when there were few animals in the area to support people. "Long time ago there was hardly any moose. They talked about going way up, traveling way up that way (he points northwest towards the Mulchatna Hills) and spending a couple of days looking for a moose. And they actually talk about finding starving families that didn't have anything to eat on account of there was no moose or caribou around."

According to a resident of Newhalen, in the past there were no moose in the area and people relied on caribou. People would hunt moose only for special occasions and would have to travel great distances to find them. The average harvestable weight of a caribou is 150 lbs., while moose average 500 lbs of harvestable meat. The potential for so much meat makes it worthwhile to travel further to find a moose, and aside from special ceremonial occasions there were times when famine made finding moose critical. The Newhalen hunter says,

> Moose were pretty scarce. During the fall we had to travel quite a ways for it, even up on the mountains, and packed it, which we don't hardly do anymore. I have hunted moose way up in the mountains and pack the meat all the way back to where we could preserve it. And sometimes it would take three or four days to do that, sometimes we had to hang [the meat] and let it air out [to]… get a little glaze on it before we can do that. Yes, they were pretty scarce. In wintertime, the time that we really needed meat is during the Christmas holidays, so we used to go hunting for subsistence, maybe five or six dog teams, we used to travel by dog. We used to travel all the way to Mulchatna and that's about 70 to 80 miles with dog teams. If we get a couple of moose that's great, you know we haul it home for the whole village to feed them.

Elders who have been hunting in the area for many years state that today there are more moose than in the past. Another elder admits that in his father's day there were no moose in the area, and that now they are numerous. He says that in the past three or four years, as the caribou have not come this way, people are relying more on moose.

The absence of caribou and the reliance on moose is especially pronounced near Lake Clark and the northern shore of Iliamna Lake. One hunter in Iliamna says that he uses all the resources he can as he relies on subsistence foods more than store bought items; and so must hunt often. This past year he hunted moose more and caribou less as the caribou did not make it up near Iliamna like they have in the past. Another hunter in Nondalton says, "Since there hasn't been any caribou around, we have been mostly hunting moose."

The moose population has exploded in the area surrounding Nondalton.[1] One hunter suggests that this is due to a recent burn which has created ideal conditions for the propagation of tree species such as birch and willows, prime moose feed. One elder said that over the past year he has shot three moose right in back of the village.

Reports from wildlife surveys state that moose were scarce in GMU 9 until about 1950s, but increased in numbers in the 1950s and 1960s. Due to over browsing, populations began a decline in the 1970s. A 1983 census found approximately 2000 moose in subunit 9B, the highest density of unit 9. Since the late 1980s, moose populations in subunit 9B have stabilized. In March 1999, the Alaska Board of Game determined that moose in subunit 9B meet the criteria to be considered 'important for providing high levels of human consumptive use' under the intensive management statute (Hicks 2000).

The ability of hunters to maintain steady hunting activity near their communities demonstrates that the moose habitat in the Lake Clark/ Iliamna Lake area remains productive, and according to local residents this is especially evident near river drainages with willow stands and birch present near the water. Another facet of the healthy ecosystem for moose is the steady propagation of fire in the area. According to biologists, lightening strikes are frequent in unit 17, the western edge of the area and this causes fires that create enhanced conditions for the proliferation of willow stands and small birch. One resident relates, "After they burned it out, the vegetation grows back, it's just like the burn around here. We see a lot of moose coming back in there. Before they (moose) never used to hang around this close to the village. Now they are in that burn. All those low birch are growing back, that's what those moose are after."

[1] It must be noted that after this study was completed Nondalton residents reported to the authors that the moose population crashed in the area surrounding their community. In the 2003-2004 moose hunting season, according to residents of Nondalton, only one moose was taken.

In GMU 17 according to biologists, moose are relatively new inhabitants and were historically harvested opportunistically (Hicks 2000). In the 1980s and 1990s moose populations rose dramatically in GMU 17 due to moderate snowfall, low predation by wolves, and decreased human harvest of moose cows. According to biologists this last factor is due to Department of Fish and Game education efforts and the abundance of the Mulchatna caribou herd, which takes hunting pressure off the moose population (Hicks 2000).

In 2001, ADF&G considered moose to be "common" along the Nushagak and Mulchatna rivers and their tributaries. Moose have extended their range west into the Togiak and Kulukak River drainages of GMU 17A. A 1999 survey resulted in an estimate of approximately 500 moose in GMU 17A (up from less than 100 in the mid 1990s, and approaching the target population of 600 to 1,000 moose), less than 2,500 for GMU 17B (down from an estimate of 2500 to 3000 for 1987 and less than half the management objective of 4,900 moose), and 2,955 moose in GMU 17C (up from 1,400 to 1,700 moose in 1987 and at the population objective) (Sellers 2002 for GMU 9; Woolington 2002 for GMU 17).

Moose Hunting Regulations

The following is a description of current hunting regulations on State and Federal lands. A further discussion will be included in chapter seven as to how regulations affect local subsistence productions especially for moose.

State Registration Hunt

In GMU 17 during the 2001/2002 regulatory year, registration permits for moose hunting were available to Alaska residents with a valid hunting license, or permanent ID for any resident 60 years or older, and had to be picked up and signed for in person. With a registration permit any bull could be harvested; otherwise, only bulls with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on at least one side could be taken. Hunt reports were required to be returned by all hunters with any state or Federal permit or ticket.

In GMU 17A, a registration hunt season for moose was held from August 25-September 20. Togiak and Twin Hills are the only communities located in Unit 17A, registration permits to hunt moose in Unit 17A could only be obtained in Togiak at the City Office from August 20 to September 20 and in Dillingham at the Department of Fish and Game. The registration hunt for moose in Unit 17A was established in 1997 when the moose population increased to a sustainable level.[2]

Manokotak is located in Unit 17C near the eastern boundary of Unit 17A. Manokotak moose hunters generally hunt in Unit 17C. Registration permits to hunt moose during the Aug. 20-Sept. 15 season in Units 17B and 17C were available to Alaska residents in the Dillingham ADF&G office from July 15 to August 31. The Dillingham Wildlife Biologist traveled to the Nushagak River villages of Koliganek, New Stuyahok, and Ekwok and spent one day in each community prior to August 20 to issue registration permits. Registration permits for the December moose hunt in Units 17B and 17C were available beginning October 25 in Dillingham and issued for one day in each of the same Nushagak

[2] Included in the regulations starting with the 2003-2004 regulatory year was a provision for a 14 day winter moose season that may be announced between Dec.1- Jan. 31 in Unit 17A for one antlered bull.

River villages between October 25 and November 30. The area surrounding Manokotak in Unit 17C (…all lands west of Wood River and south of Aleknagik Lake including Sunshine Valley) was excluded from the December hunt. Also excluded from the December hunt in Unit 17B were all drainages of the Mulchatna River upstream from and including the Chilchitna River drainage.

The requirement that hunters who live outside of Unit 17 must obtain registration permits in Unit 17 at specific locations before they can hunt tended to make the hunt in Unit 17A and the early season in Units 17B and 17C a local resident hunt. Local residents also prefer to harvest moose earlier to avoid the rutting season, which generally starts in September, when they consider the meat of the bulls inedible.

During the 2001/2002 study year, registration moose hunts were not held in Unit 9B.

State General Season Hunt

During the 2001/2002 regulatory year, in Units 17B and 17C the state general season hunt required a harvest ticket that could be obtained statewide from license vendors and ADF&G offices. The harvest tickets were only valid for the September 1-15 season. The seasonal limit was one bull moose with with spike-fork or 50-inch antlers or antlers with 3 or more brow tines on at least one side.

Nonresidents could hunt in Unit 17B from September 5–15 but had to purchase a moose tag and could only harvest bull moose with 50-inch antlers or antlers with 4 or more brow tines on at least one side.

In Unit 9B residents could harvest one bull moose with a harvest ticket from September 1 –15 or Dec. 15 – Jan. 15. The same regulations applied to Unit 9C except that during the Dec. 15 – Jan. 15 season, in the area described as the remainder of Unit 9C not draining into the Naknek River (this area included the Alagnak River), one moose (bull or cow) could be harvested. After five cow moose were harvested the season was restricted to bulls only. [3]

Federal Subsistence Regulations

During the study year, unless Federal lands were closed to nonqualified rural residents or a Federal registration permit was required, State of Alaska hunting regulations applied on Federal land. During the 2001-2002 regulatory year (and in subsequent years) in Unit 17A any Alaska resident who obtained a state registration permit in Togiak or Dillingham could hunt moose on the Togiak National Wildlife Refuge (TNWR). State regulations also applied to hunting on Federal lands (almost exclusively the TNWR) in Units 17B and 17C.

In Unit 9B during the 2001-2002 regulatory year and throughout the 2003 – 2004 regulatory year the Federal season in the fall was August 20 – September 15; the August 20 to August 31 open season was not allowed under state regulations. Additionally, only the residents of Units 9(A), 9(B), 9(C), and 9(E) had a positive customary and traditional use determination that allowed them to hunt on Federal lands in any of those units under Federal regulations.

[3] Starting with the 2002 – 2003 regulatory year, the state winter cow moose hunt was eliminated and the hunt became bulls only.

In the remainder of Unit 9C, in the area that does not drain into the Naknek River, the Federal Sept. 1 – Sept. 15 season ran concurrently with the state hunt. During the Dec. 1 – 31 Federal season (the state season was Dec. 15 – Jan. 15) the harvest of antlerless moose was allowed. [4]

Federal regulations, unlike the state regulations, designated a sub-unit of Unit 9C described as that portion draining into the Naknek River from the north. The same open seasons, Sept. 1- Sept.15 and Dec. 1 – Dec. 31, as the remainder of Unit 9C described above applied but for bulls only. [5]

Table 20. Estimated Number of Hunters and Successful Hunters of Moose, by Community and Area, 2001/2002.

Communtiy	Estimated Total Hunters	Estimated Successful Hunters	Percentage Successful[1]
Igiugig	12	2	16.7%
Illiamna	24	9	38.9%
Kokhanok	22	18	80.0%
Levelock	19	10	53.8%
Newhalen	30	9	30.8%
Nondalton	35	25	72.4%
Pedro Bay	15	2	14.3%
Port Alsworth	10	1	14.3%
GMU 09 (B) Subtotal	167	77	46.3%
Togiak	49	13	27.2%
Twin Hills	2	1	50.0%
GMU 17 (A) Subtotal	51	14	28.2%
Koliganek	47	24	50.0%
GMU 17 (B) Subtotal	47	24	50.0%
Aleknagik	36	23	63.0%
Clark's Point	16	11	68.8%
Dillingham	586	204	34.8%
Ekwok	31	15	48.3%
Manokotak	28	20	71.4%
New Stuyahok	104	65	62.7%
Portage Creek	7	5	71.4%
GMU 17 (C) Subtotal	808	343	42.4%
GMU 17 (C) Subtotal without Dillingham	222	139	62.5%
Grand totals	1,074	458	42.7%
Grand totals without Dillingham	488	254	52.1%

[1] Percentages are based on estimated number of hunters; these estimates are rounded in this table to the nearest whole number.

Source: ADF&G and BBNA Household Survey 2002

[4] During the 2003 – 2004 regulatory year the Federal and state seasons ran concurrently: Sept. 1 – Sept 15 and Dec. 15 – Jan. 15 for bulls only.

[5] The regulations for this area remained the same throughout the 2003 – 2004 regulatory year.

On Federal lands that drain into the Naknek River from the south in Unit 9C regulations allowed for an additional 11 days on the front end of the season that the state did not allow, and during that period, from Aug. 20 – Aug. 31 bull moose could be taken by Federal registration permit only. Also, during the Dec. 1 – Dec. 31 season, antlerless moose could be taken by Federal registration permit only and the season was closed after five antlerless moose were taken. Federal public lands were closed during December for the hunting of moose, except by rural Alaska residents of Units 9(A), 9(B), 9(C), and 9(E).[6]

MOOSE HARVESTS AND USES IN 2001/2002

Participation in the Subsistence Harvest and Use of Moose

As reported in Table 20, an estimated 1,074 residents of the study communities hunted moose in the 2001/2002 regulatory year. There were moose hunters in every study community. Nearly half of the moose hunters were successful: 42.7 percent of the hunters (458 hunters) harvested a moose. There were successful hunters in every community with a wide range in the success rates by community. The lowest percentage of successful hunters based on the estimated number of total hunters for each community was 14.3 percent in Port Alsworth and the high was 80.0 percent at Kokhanok.

As shown in Table 21, 41.0 percent of households in the study communities had at least one member who hunted moose in 2001/02, and 23.5 percent had successful hunters. Excluding Dillingham (for which comprehensive data are not available), 73.4 percent of study community households used moose in 2001/2002; 60.1 percent received moose, and 34.1 percent gave away moose to other households.

Moose Harvest Quantities

As also reported in Table 21, the estimated harvest of moose by the study communities including Dillingham in 2001/02 was 581 animals. For the area overall, this represents a harvest of 0.4 moose per household and 0.1 moose per person. For the hunters in all study communities, the average harvest was 0.5 moose; successful hunters averaged 1.3 moose. Of the total estimated harvest for all communities, 487 (87.8 percent) were bull moose and 68 (1.2 percent) were cow moose; 26 were of unknown sex (Table 22).

At the subunit level, a large majority of households in GMU 9B (84.0 percent), GMU 17 B (86.7 percent, not including Dillingham), and GMU 17C (91.3 percent) used moose in the study year. Levels of use were lower in the combined communities of GMU 17A, at 35.2 percent (although every household in Twin Hills used moose). Only in Togiak did less than half the households use moose in the 2001/2002 study year, reflecting a relative scarcity of moose in GMU 17A and the large size of this community.

[6] The regulations for this area remained the same throughout the 2003 – 2004 regulatory year. Although residents of Unit 9B would be allowed to hunt under Federal regulations in that area of Unit 9C which drains into the Naknek River from the south it is unlikely that they did.

Table 21. Levels of Participation in the Use and Harvest of Moose and Moose Harvest Levels, 2001/02 Regulatory Year.

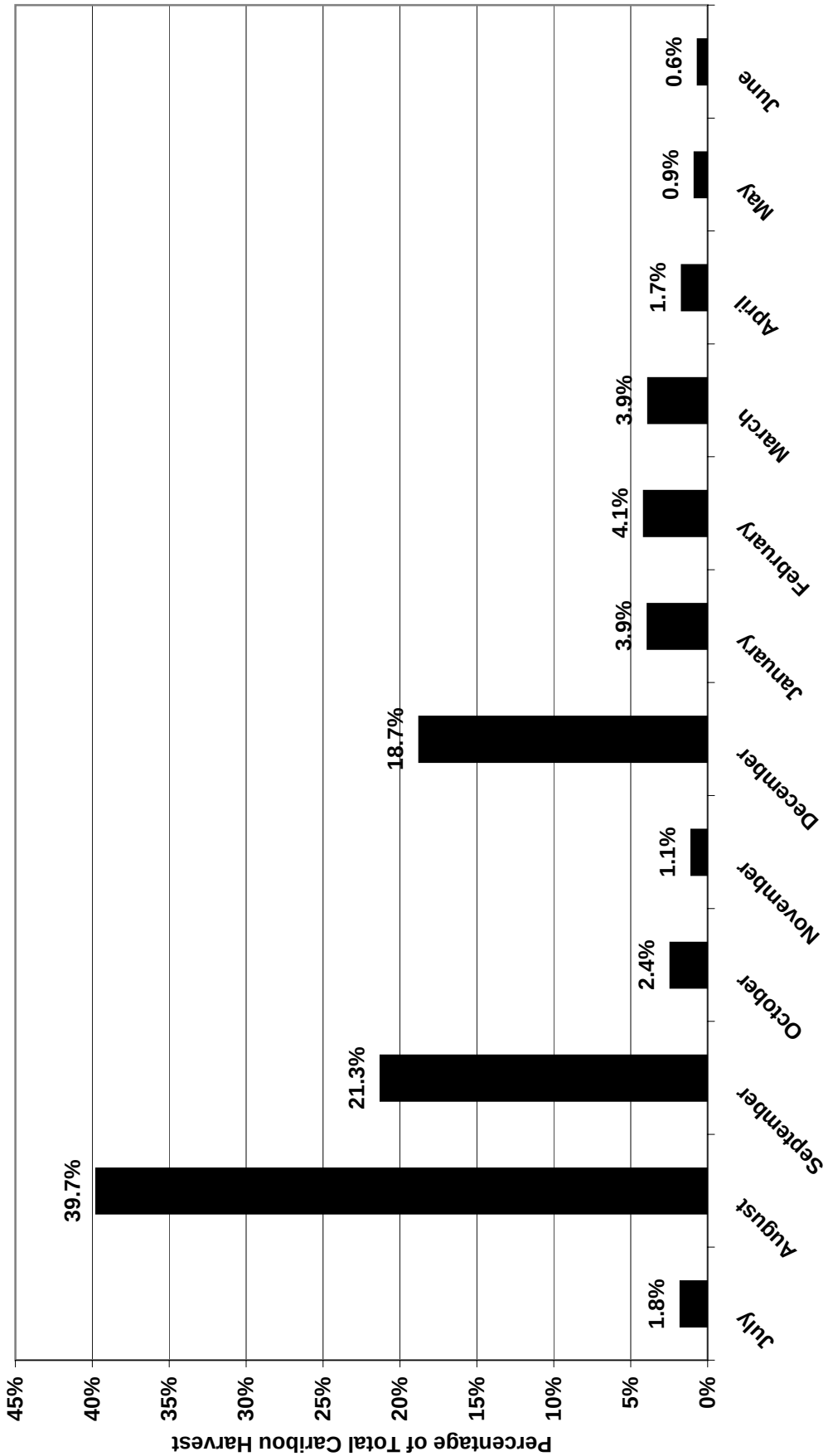
	Percentage of Households						Moose Harvest				95% Confidence Limit of Total Harvest		
Community	Used Moose (%)	Hunted Moose (%)	Harvested Moose (%)	Received Moose (%)	Gave Moose (%)	Total	Per Household	Per Person	Per Hunter	Per Successful Hunter	%	Low*	High
Residents of GMU 09B													
Igiugig	63.6	90.9	18.2	63.6	18.2	2.0	0.2	0.1	0.2	1.0	0.0%	2.0	2.0
Illiamna	71.4	42.9	19.0	57.1	47.6	9.3	0.3	0.1	0.4	1.0	49.9%	7.0	14.0
Kokhanok	100.0	50.0	43.8	87.5	31.3	26.3	0.8	0.2	1.2	1.5	48.7%	13.5	39.0
Levelock	94.1	58.8	35.3	82.4	52.9	16.2	0.6	0.3	0.8	1.6	44.8%	11.0	23.4
Newhalen	67.6	44.1	23.5	58.8	26.5	9.2	0.2	0.1	0.3	1.0	22.9%	8.0	11.3
Nondalton	100.0	57.6	51.5	90.9	51.5	94.5	2.4	0.6	2.7	3.7	35.1%	78.0	127.7
Pedro Bay	84.2	63.2	10.5	78.9	31.6	2.2	0.1	0.0	0.1	1.0	44.6%	2.0	3.2
Port Alsworth	75.0	30.0	5.0	75.0	25.0	1.4	0.1	0.0	0.1	1.0	111.9%	1.0	3.0
Subtotal	84.0	51.1	28.6	75.4	37.0	161.1	0.7	0.2	1.0	2.1	21.9%	125.8	196.4
Residents of GMU 17A													
Togiak	24.7	25.1	8.7	18.0	7.7	17.7	0.1	0.0	0.4	1.3	63.0%	9.0	28.8
Twin Hills	100.0	8.7	4.3	100.0	100.0	1.1	0.0	0.0	0.5	1.0	58.7%	1.0	1.7
Subtotal	35.2	22.8	8.1	29.5	20.6	18.8	0.1	0.0	0.4	1.3	59.2%	10.0	29.9
Residents of GMU 17B													
Koliganek	91.3	65.2	34.8	78.3	39.1	29.2	0.7	0.2	0.6	1.2	52.6%	16.0	44.6
Subtotal	91.3	65.2	34.8	78.3	39.1	29.2	0.7	0.2	0.6	1.2	52.6%	16.0	44.6
Residents of GMU 17C													
Aleknagik	83.3	69.4	47.2	52.8	36.1	24.0	0.5	0.2	0.7	1.1	19.0%	19.4	28.6
Clark's Point	95.2	61.9	47.6	71.4	42.9	12.0	0.6	0.2	0.8	1.1	0.0%	12.0	12.0
Dillingham **	n/a	36.3	18.1	n/a	n/a	208.0	0.2	0.1	0.4	1.0	24.8%	156.3	259.7
Ekwok	100.0	65.6	43.8	71.9	28.1	15.9	0.5	0.2	0.5	1.1	10.6%	15.0	17.6
Manokotak	73.3	20.0	20.0	61.7	18.3	25.0	0.3	0.1	0.9	1.3	30.8%	19.0	32.7
New Stuyahok	92.2	75.0	64.1	67.2	62.5	82.0	0.9	0.2	0.8	1.3	12.6%	71.7	92.4
Portage Creek	100.0	57.1	57.1	85.7	57.1	5.0	0.7	0.1	0.7	1.0	0.0%	5.0	5.0
Subtotal	n/a	41.0	24.5	n/a	n/a	372.0	0.3	0.1	0.5	1.1	14.4%	318.6	425.4
Subtotal without Dillingham	86.7	55.8	44.7	64.5	39.6	164.0	0.6	0.1	0.7	1.2	8.2%	150.5	177.5
Grand total	n/a	41.0	23.5	n/a	n/a	581.1	0.4	0.1	0.5	1.3	11.4%	514.7	647.5
Grand total without Dillingham	73.4	46.8	30.1	60.1	34.1	373.1	0.5	0.1	0.8	1.5	11.2%	331.3	414.9

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence and BBNA, household survey, 2002

Figure 4. Timing of Moose Harvests by Month, 2001/2002, Communties of GMU 17 and 9B



Timing of Moose Harvests

The estimated harvest of moose by the study community by month in the 2001/2002 regulatory year is included in Table 22. The timing of moose harvests is illustrated in Figure 4. The majority of moose harvests took place in August (39.7 percent), September (21.3 percent), and December (18.7 percent) when the open hunting seasons occur. In Unit 9B the winter season extends from December 15 – January 15. The months of August and September, after the commercial and subsistence salmon fishing seasons and before the onset of winter, are a preferred time for local people to hunt moose. At that time, before the rutting season, red meat is desired and the moose are fat and favored as a subsistence resource. One moose provides a substantial amount of meat that can be frozen for a winter supply. Outdoor temperatures are cooler by the end of August, which makes the meat easier to care for in the field. Also, prior to freeze up, travel by skiff to hunt moose is not too uncomfortable or dangerous.

The December hunt in Unit 17 is generally considered to be too early by most subsistence hunters and changing the season to include some or all of January has been discussed at local advisory committee meetings. In Unit 9B regulations have established the winter season to extend from mid December into mid January. Generally in December freeze up has not occurred to the point where rivers and streams are frozen sufficiently for safe travel. The management concern about establishing a hunt in January is the conservation of cow moose after the bulls have started to lose their antlers. The fear is that without the antlers the sex of the moose will be problematic for hunters to identify and may lead to a higher incidence of accidental cow harvests. Approximately 12 percent of the estimated harvest of moose in the study communities occurred in the months of January, February, and March when freeze up is more likely to have occurred and travel conditions are safe.

Moose Hunting and Harvest Areas

Areas used by study community residents to hunt moose during the study year appear on the maps included on the CD in Appendix E (in the pocket in the back of the report). For most communities, areas used for moose hunting over the last 20 years area also included (see Table 6 in Chapter One). For maps of moose hunting areas for earlier time periods, see Wright et al. 1983, Morris 1986, and Schichnes and Chythlook 1991.

Sharing of Moose

With the exception of Dillingham, 60.1 percent of households in the study communities received moose from people living outside their households (Table 21). Survey respondents were asked to distinguish between moose meat they received from "traditional" sources such as family and friends, and moose they received from non-local ("sport") hunters and guides. Table 23 indicates that 54.2 percent of households received moose from another household and 15.3 percent received moose from non-local hunters and guides.

The incidence of receiving moose meat from nonlocal hunters and guides varied greatly between communities (Table 23). For some (e.g., Aleknagik, Clark's Point, Igiugig, Levelock, Manokotak, New Stuyahok, Togiak, and Twin Hills), few if any households received moose meat from these nontraditional sources. On the other hand, more than half the households in Iliamna (52.4 percent) received moose meat from nonlocal hunters or guides, as did more than 30 percent of the households in Ekwok, Koliganek, Newhalen, Nondalton, and Port Alsworth.

Table 22. Estimated Moose Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month													95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
GMU 09 (B)	Igiugig	All	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0%
		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	0.0	0.0%
		Male	0.0	0.0	1.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	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	0.0	0.0%
	Illiamna	All	0.0	0.0	5.3	0.0	0.0	2.7	1.3	0.0	0.0	0.0	0.0	0.0	0.0	9.3	4.7	49.9%
		Female	0.0	0.0	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.8	104.3%
		Male	0.0	0.0	5.3	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	6.7	4.0	59.7%
		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	0.0	0.0%
	Kokhanok	All	0.0	0.0	0.0	0.0	0.0	4.4	6.6	8.8	4.4	2.2	0.0	0.0	0.0	26.3	12.8	48.7%
		Female	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	0.0	0.0	0.0	4.4	4.7	107.3%
		Male	0.0	0.0	0.0	0.0	0.0	4.4	4.4	4.4	2.2	0.0	0.0	0.0	0.0	15.3	10.0	65.3%
		Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	0.0	0.0	0.0	6.6	7.5	113.9%
	Levelock	All	1.5	0.0	4.4	2.9	0.0	0.0	1.5	4.4	1.5	0.0	0.0	0.0	0.0	16.2	7.2	44.8%
		Female	1.5	0.0	1.5	1.5	0.0	0.0	1.5	2.9	0.0	0.0	0.0	0.0	0.0	8.8	6.3	71.0%
		Male	0.0	0.0	2.9	1.5	0.0	0.0	0.0	1.5	1.5	0.0	0.0	0.0	0.0	7.4	4.3	58.1%
		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	0.0	0.0%
	Newhalen	All	0.0	1.1	2.3	1.1	1.1	2.3	0.0	0.0	1.1	0.0	0.0	0.0	0.0	9.2	2.1	22.9%
		Female	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	1.1	0.8	72.8%
		Male	0.0	1.1	2.3	1.1	1.1	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	2.0	24.9%
		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	0.0	0.0%
	Nondalton	All	8.5	8.5	7.3	7.3	4.8	15.8	7.3	7.3	12.1	7.3	4.8	3.6	0.0	94.5	33.2	35.1%
		Female	2.4	3.6	2.4	2.4	2.4	7.3	4.8	2.4	4.8	0.0	0.0	0.0	0.0	32.7	11.5	35.2%
		Male	6.1	4.8	4.8	4.8	2.4	8.5	2.4	4.8	7.3	7.3	4.8	3.6	0.0	61.8	22.0	35.6%
		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	0.0	0.0%
	Pedro Bay	All	0.0	0.0	1.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	1.0	44.6%
		Female	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	0.7	64.8%
		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	0.7	64.8%
		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	0.0	0.0%
	Port Alsworth	All	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.6	111.9%
		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	0.0	0.0%
		Male	0.0	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.6	111.9%

Table 22. Estimated Moose Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month													95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
		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	0.0	0.0%
	GMU 09 (B)	All	10.0	9.6	21.4	11.4	6.0	27.2	18.0	20.4	19.1	9.5	4.8	3.6	0.0	161.1	35.3	21.9%
		Female	3.9	3.6	3.9	3.9	2.4	11.0	8.5	7.6	6.0	0.0	0.0	0.0	0.0	50.8	13.6	26.8%
		Male	6.1	6.0	17.5	7.5	3.6	16.2	9.5	10.7	10.9	7.3	4.8	3.6	0.0	103.7	24.0	23.2%
		Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	2.2	0.0	0.0	0.0	6.6	6.9	105.5%
GMU 17 (A)	Togiak	All	0.0	10.3	4.4	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	17.7	11.1	63.0%
		Female	0.0	1.5	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	4.6	4.0	86.8%
		Male	0.0	7.2	4.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.6	10.3	89.3%
		Unknown	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	117.5%
	Twin Hills	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	0.6	58.7%
		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	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	0.6	58.7%
		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	0.0	0.0%
	GMU 17 (A)	All	0.0	10.3	5.5	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	18.8	11.1	59.2%
		Female	0.0	1.5	0.0	0.0	0.0	0.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	4.6	4.0	86.4%
		Male	0.0	7.2	5.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	10.3	81.4%
		Unknown	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	117.1%
GMU 17 (B)	Koliganek	All	0.0	14.6	3.7	0.0	0.0	9.1	0.0	0.0	1.8	0.0	0.0	0.0	0.0	29.2	15.4	52.6%
		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	0.0	0.0%
		Male	0.0	14.6	3.7	0.0	0.0	9.1	0.0	0.0	1.8	0.0	0.0	0.0	0.0	29.2	15.4	52.6%
		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	0.0	0.0%
	GMU 17 (B)	All	0.0	14.6	3.7	0.0	0.0	9.1	0.0	0.0	1.8	0.0	0.0	0.0	0.0	29.2	15.4	52.6%
		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	0.0	0.0%
		Male	0.0	14.6	3.7	0.0	0.0	9.1	0.0	0.0	1.8	0.0	0.0	0.0	0.0	29.2	15.4	52.6%
		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	0.0	0.0%
GMU 17 (C)	Aleknagik	All	0.0	16.0	4.0	0.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.0	4.6	19.0%
		Female	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.4	101.5%
		Male	0.0	16.0	4.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.7	4.5	20.1%
		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	0.0	0.0%
	Clark's Point	All	0.0	7.0	1.0	1.0	0.0	2.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	12.0	0.0	0.0%
		Female	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0%

Table 22. Estimated Moose Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month													95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
		Male	0.0	6.0	0.0	1.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	0.0	0.0%
		Unknown	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	0.0	0.0%
	Dillingham **	All	0.0	109.7	56.7	0.0	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0	11.3	208.0	52.3	25.1%
		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	0.0	0.0%
		Male	0.0	109.7	56.7	0.0	0.0	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	196.7	52.2	26.6%
		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	11.3	11.3	11.0	97.2%
	Ekwok	All	0.0	4.3	9.6	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9	1.7	10.6%
		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	0.0	0.0%
		Male	0.0	4.3	9.6	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.9	1.7	10.6%
		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	0.0	0.0%
	Manokotak	All	0.0	6.6	7.9	1.3	0.0	6.6	1.3	0.0	0.0	0.0	0.0	0.0	1.3	25.0	7.7	30.8%
		Female	0.0	0.0	1.3	0.0	0.0	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	4.0	2.2	55.7%
		Male	0.0	6.6	4.0	1.3	0.0	5.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.1	5.6	32.5%
		Unknown	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	4.0	2.9	72.6%
	New Stuyahok	All	0.0	45.9	11.1	0.0	0.0	22.3	2.8	0.0	0.0	0.0	0.0	0.0	0.0	82.0	10.3	12.6%
		Female	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	2.5	60.2%
		Male	0.0	44.5	11.1	0.0	0.0	18.1	2.8	0.0	0.0	0.0	0.0	0.0	0.0	76.5	10.0	13.1%
		Unknown	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.5	105.9%
	Portage Creek	All	0.0	2.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.0	0.0	0.0%
		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	0.0	0.0%
		Male	0.0	2.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	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	0.0	0.0%
	GMU 17 (C)	All	0.0	191.4	90.3	2.3	0.0	70.2	4.1	0.0	1.0	0.0	0.0	0.0	12.7	372.0	53.4	14.4%
		Female	0.0	1.0	1.3	0.0	0.0	7.8	1.3	0.0	1.0	0.0	0.0	0.0	0.0	12.5	3.5	28.3%
		Male	0.0	189.0	85.4	2.3	0.0	62.4	2.8	0.0	0.0	0.0	0.0	0.0	0.0	341.9	53.1	15.5%
		Unknown	0.0	1.4	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	17.7	11.4	64.2%
	GMU 17 (C) without Dillingham	All	0.0	81.7	33.6	2.3	0.0	40.0	4.1	0.0	1.0	0.0	0.0	0.0	1.3	164.0	13.5	8.2%
		Female	0.0	1.0	1.3	0.0	0.0	7.8	1.3	0.0	1.0	0.0	0.0	0.0	0.0	12.5	3.5	28.3%
		Male	0.0	79.3	28.6	2.3	0.0	32.1	2.8	0.0	0.0	0.0	0.0	0.0	0.0	145.2	12.2	8.4%

Table 22. Estimated Moose Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month													95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
		Unknown	0.0	1.4	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	6.3	3.2	49.8%
Grand totals	Grand totals	All	10.0	225.9	120.8	13.7	6.0	106.5	22.1	23.5	21.9	9.5	4.8	3.6	12.7	581.1	66.4	11.4%
		Female	3.9	6.2	5.2	3.9	2.4	18.9	9.8	10.6	7.0	0.0	0.0	0.0	0.0	67.9	14.5	21.4%
		Male	6.1	216.8	112.0	9.8	3.6	87.7	12.3	10.7	12.8	7.3	4.8	3.6	0.0	487.4	60.8	12.5%
		Unknown	0.0	2.9	3.6	0.0	0.0	0.0	0.0	2.2	2.2	2.2	0.0	0.0	12.7	25.8	13.4	51.9%
Grand totals (without Dillingham)	Grand totals (without Dillingham)	All	10.0	116.2	64.1	13.7	6.0	76.3	22.1	23.5	21.9	9.5	4.8	3.6	1.3	373.1	41.8	11.2%
		Female	3.9	6.2	5.2	3.9	2.4	18.9	9.8	10.6	7.0	0.0	0.0	0.0	0.0	67.9	14.5	21.4%
		Male	6.1	107.1	55.3	9.8	3.6	57.4	12.3	10.7	12.8	7.3	4.8	3.6	0.0	290.8	32.1	11.0%
		Unknown	0.0	2.9	3.6	0.0	0.0	0.0	0.0	2.2	2.2	2.2	0.0	0.0	1.3	14.4	7.8	53.8%

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

Table 23. Receipt of Moose Meat and Reasons for Not Acceepting Meat from Sport Hunters

		Percentage of Households			Did Household Decline Offer of Meat from Sport Hunter?					
						Reason for Declining (Percent of Households)				
Community	Number of Households in Community	Receive, Any Source	Receive, Another Household	Receive, Sport Hunter	Percentage of Households Saying "Yes"	Poor condition of meat	Didn't need the meat	Personal circumstances	Other	No reason given
Aleknagik	48	52.8%	52.8%	5.6%	2.8%	0.0%	2.8%	0.0%	0.0%	0.0%
Clark's Point	21	71.4%	66.7%	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ekwok	34	71.9%	65.6%	31.3%	31.3%	28.1%	0.0%	0.0%	0.0%	3.1%
Igiugig	11	63.6%	63.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Illiamna	28	57.1%	28.6%	52.4%	23.8%	14.3%	4.8%	0.0%	4.8%	0.0%
Kokhanok	35	87.5%	87.5%	12.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Koliganek	42	78.3%	60.9%	43.5%	39.1%	17.4%	17.4%	0.0%	0.0%	4.3%
Levelock	25	82.4%	82.4%	5.9%	5.9%	5.9%	0.0%	0.0%	0.0%	0.0%
Manokotak	79	61.7%	61.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Stuyahok	89	67.2%	65.6%	6.3%	6.3%	3.1%	1.6%	0.0%	1.6%	0.0%
Newhalen	39	58.8%	47.1%	32.4%	17.6%	14.7%	2.9%	0.0%	0.0%	0.0%
Nondalton	40	90.9%	90.9%	36.4%	18.2%	12.1%	0.0%	0.0%	3.0%	3.0%
Pedro Bay	21	78.9%	78.9%	10.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Port Alsworth	28	75.0%	25.0%	70.0%	20.0%	0.0%	10.0%	5.0%	5.0%	0.0%
Portage Creek	7	85.7%	71.4%	14.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Togiak	154	18.0%	16.2%	1.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Twin Hills	25	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
All	726	60.1%	54.2%	15.3%	8.5%	4.9%	2.1%	0.2%	0.7%	0.6%
Dillingham [2]	416	54.5%	49.1%	15.5%	9.1%	0.9%	5.5%	0.0%	1.8%	0.9%

[2] In Dillingham, only households with at least one member holding a hunting license were interviewed. Of the 416 such households in Dillingham, 110 were interviewed for this project. Data in this table may not be representative of the entire community of Dillingham.

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

It may be that communities with the highest percentage (above 30 percent) of households receiving meat from nonlocal "sport" hunters have guides or outfitters that operate out of their community at least for the duration of the hunting season. The distribution of moose meat by nonlocal hunters to local households, in most cases, is orchestrated by the guide, outfitter, or the hunter transporter because they are operating the airplane. Federal and State regulations require that hunter must salvage the edible meat of the animal that s/he has harvested. Within GMU's 9B and 17 the meat must remain on he bones of the front quarters and hindquarters until removed from the field. The meat must be transported from the kill site to the departure point from which the hunter will leave the field before the antlers or along with the last load of meat.

If the meat is given to someone else a signed transfer of possession form must be obtained from the person receiving the meat and the form must accompany the antlers. Where the meat that the hunter is not keeping ends up depends on logistics. To reduce weight and make room for more hunting gear to be flown back to the hub community (the location where the hunter can be flown by commercial air service directly into Anchorage) the meat will be flown from the field to the nearest village and distributed or it may be flown back to the hub community and distributed there. This is the reason easily accessible communities such as Newhalen, Iliamna, and Nondalton receive a considerable amount of meat.

Within the study area the hub communities with direct flights into Anchorage are Dillingham, Iliamna, and Port Alsworth. Although King Salmon is not one of the study communities, recreational hunters who hunt within the study area may fly out of King Salmon directly to Anchorage. Port Alsworth and Iliamna documented the highest percentage of households that received moose meat from nonlocal hunters at 70 percent and 52.4 percent respectively (Table 22). Another important factor is that a nonresident moose hunt occurs in GMU 9B.

Koliganek (43.5 percent) had the next highest percentage of households that received moose meat from non-local hunters. The Koliganek airport is within GMU 17B, the only subunit of GMU 17 in which a nonresident moose season is allowed. In most cases, this is probably the closest airport for non-local hunters and a likely location to distribute moose meat. Koliganek also has at least two bed and breakfast operations that recreational hunters may be using for lodging. During the moose season, in addition to local guides, nonlocal guides may be temporarily basing operations out of the community and/or using the airport as a transfer location or gear depot.

Nondalton (36.4 percent), Newhalen (32.4 percent), and Ekwok (31.3 percent) were the other communities in which more than 30 percent of the households received moose meat from nonlocal hunters. During the study year at least one guide operated out of Nondalton. Newhalen has access by road to the Iliamna airport where they have the opportunity to obtain moose meat from recreational hunters. Ekwok has one or more guide/outfitters operating out of the community that may bring nonlocal hunters through the community and provide the opportunity for local people to obtain moose meat.

In Dillingham most of the major outfitters that transport hunters to and from the field maintain a list of local households who have indicated they would like to receive meat when it is available. The outfitter calls the household and they can go to the outfitter to receive the meat.

Non-resident moose hunters in Unit 17B must attend an ADF&G approved hunter orientation course (to include trophy recognition and meat care) or must be accompanied by a registered guide or resident family member within the second degree of kindred (Alaska Hunting Regulations, Effective Dates July 1, 2001 – June 30, 2002, No. 42, page 78). Additionally, the guide, outfitter, or transporter can influence the quality of the meat brought in to the communities, but it is not their responsibility, the hunter is responsible for taking care of the meat. The instructions given to the hunter and the cargo requirements for clean and safe transportation of meat can influence the decisions the hunter makes concerning the quality of meat that comes out of the field. Due to the additional effort and cost of shipping out of state, non-resident moose hunters are most likely to offer meat to local residents.

During the 2001/2002 season and subsequent years the non-resident hunt ran concurrently with the resident hunt and the last 15 days of the registration hunt that starts Aug. 20. Most local hunters prefer to harvest a moose earlier in the season because near the end of the season, in mid-September, there is a concern that the large bulls are going into rut and the meat may not be edible. Local people report that moose meat offered to local households near the end of the hunting season may be suspect for that reason alone.

Survey respondents were also asked if they had received offers of moose meat from “sport hunters” that they declined as well as the reason for not accepting the meat. Excluding Dillingham, 8.5 percent of all households declined such offers. Not accepting moose meat from recreational hunts was most common in Koliganek (39.1 percent of households), Ekwok (31.3 percent), Iliamna (23.8 percent), and Port Alsworth (20.0 percent) (Table 23).

Approximately 4.9 percent of the households in the study area, excluding Dillingham, did not accept offers of moose meat from nonlocal hunters because of the suspect quality of the meat. This concern includes the fact that the meat is being handled by someone they do not know and someone they believe does not want the meat anyway. If the meat does not smell right, looks like it was not well cared for, has vegetation stuck to it, or is being transported in a garbage bag especially in warm weather, it will not be accepted. Resident in Nondalton and Newhalen report that meat has been left for long periods of time on the edge of the runway in black plastic bags during warm weather.

Approximately 2.1 percent of the households stated that they did not accept moose meat from nonlocal hunters because they already had enough meat through their own hunting or other sharing. Other general categories that were given as reasons for not accepting moose meat from nonlocal hunters included personal circumstances, other, or no reason was given. The total for these three categories was approximately 1.5 percent of the households in the study area excluding Dillingham.

Households Assessments of Meeting Needs in 2001/2002

Interviewed households were asked if their "needs" for moose were met during the 2001/2002 hunting season. If needs had not been met, respondents were asked for a reason why. The findings by community are reported in Table 24 and Table 25. Figure 5 illustrates the percentage of households in each community that reported that their moose needs had not been met. Findings varied greatly by community. In six communities (Togiak, Kokhanok, Pedro Bay, Iliamna, Igiugig, and Newhalen), more than half the households said their needs were not met. On the other hand, 25 percent or less of the households in seven communities did not meet their needs. These were New Stuyahok, Levelock, Nondalton, Manokotak, Ekwok, Aleknagik, and Twin Hills.

Most households gave personal reasons for not meeting moose harvest needs, such as conflicts with work or illness (43.7 percent). Resource scarcity was cited by 22.0 percent.

Table 24. Moose: Were household's needs met during 2001/2002 Hunting Season?

	Moose needs met during 2001/2002 hunting season?			
	Yes		No	
	Count	Row %	Count	Row %
Aleknagik	33	97.1%	1	2.9%
Clark's Point	11	52.4%	10	47.6%
Dillingham	77	70.0%	33	30.0%
Ekwok	29	90.6%	3	9.4%
Igiugig	4	36.4%	7	63.6%
Illiamna	7	33.3%	14	66.7%
Kokhanok	3	18.8%	13	81.3%
Koliganek	14	60.9%	9	39.1%
Levelock	13	76.5%	4	23.5%
Manokotak	51	85.0%	9	15.0%
New Stuyahok	48	75.0%	16	25.0%
Newhalen	14	41.2%	20	58.8%
Nondalton	28	84.8%	5	15.2%
Pedro Bay	5	26.3%	14	73.7%
Port Alsworth	12	60.0%	8	40.0%
Portage Creek	4	57.1%	3	42.9%
Togiak	13	17.3%	62	82.7%
Twin Hills	23	100.0%		

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

Figure 5. Percentage of Households Not Meeting Moose Needs, 2001/02

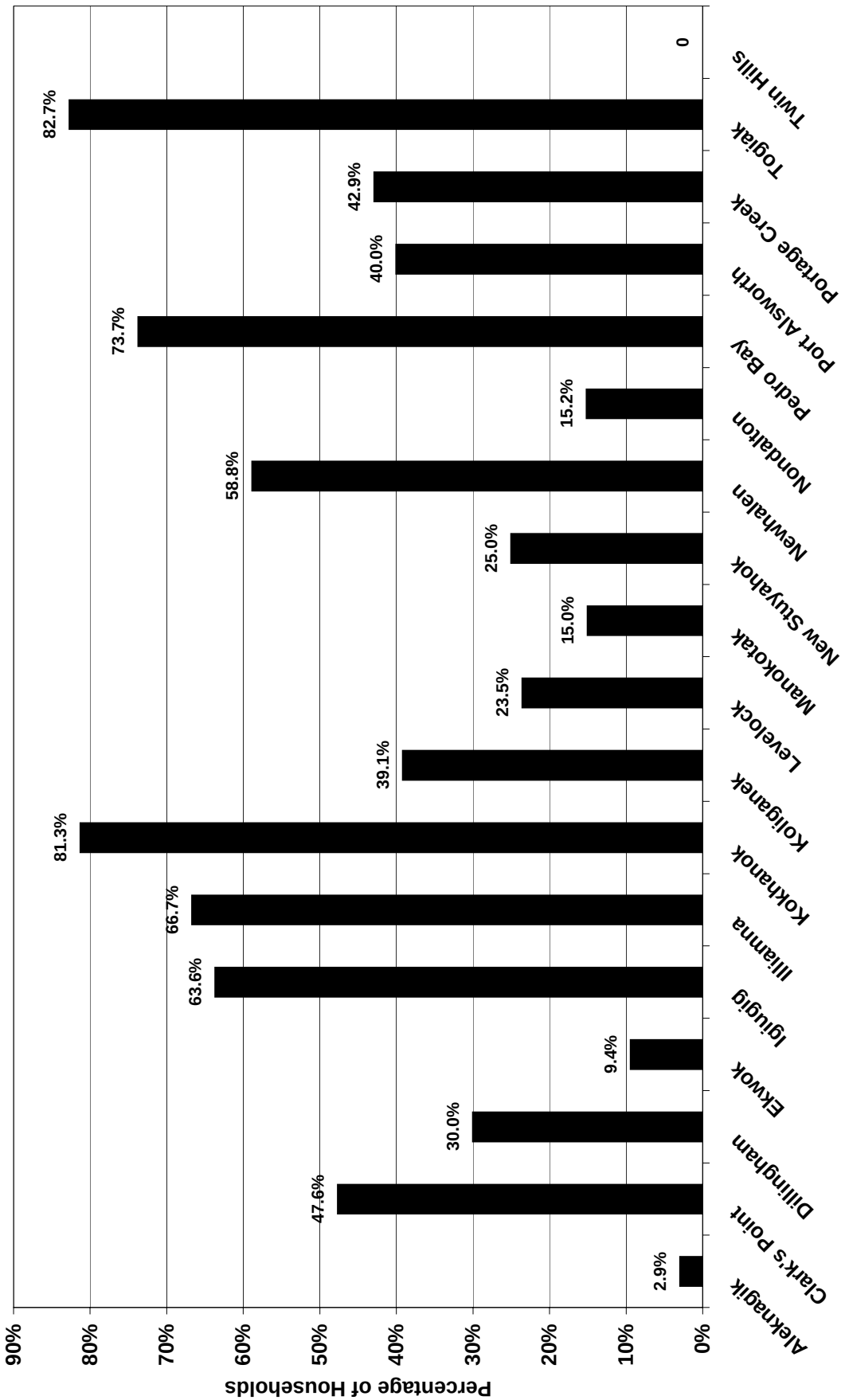


Table 25. Reasons Given by Households for Not Meeting Moose Needs in 2001/2002.

				Percentage of Households Not Meeting Needs[1]						
		Households Not Meeting Needs								
Community	Total Households	Number	Percent	Resource Scarcity	Competition	Personal Reasons	Did Not Receive Enough	Did Not Have Enough, Unspecified	Regulations	Missing/ not given
Aleknagik	48	1	2.8%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Clark's Point	21	10	47.6%	10.0%	0.0%	10.0%	0.0%	70.0%	10.0%	0.0%
Ekwok	34	3	9.4%	33.3%	0.0%	66.7%	0.0%	0.0%	0.0%	0.0%
Igiugig	11	7	63.6%	85.7%	0.0%	0.0%	0.0%	0.0%	0.0%	14.3%
Illiamna	28	19	66.7%	42.9%	0.0%	0.0%	14.3%	21.4%	0.0%	42.9%
Kokhanok	35	28	81.3%	15.4%	7.7%	7.7%	15.4%	61.5%	0.0%	0.0%
Koliganek	42	16	39.1%	11.1%	0.0%	22.2%	11.1%	44.4%	0.0%	11.1%
Levelock	25	6	23.5%	0.0%	0.0%	50.0%	50.0%	25.0%	0.0%	0.0%
Manokotak	79	12	15.0%	0.0%	0.0%	66.7%	22.2%	0.0%	0.0%	11.1%
New Stuyahok	89	22	25.0%	6.3%	0.0%	25.0%	0.0%	62.5%	6.3%	6.3%
Newhalen	39	22	55.9%	31.6%	5.3%	10.5%	21.1%	15.8%	0.0%	36.8%
Nondalton	40	6	15.2%	40.0%	0.0%	60.0%	0.0%	20.0%	20.0%	0.0%
Pedro Bay	21	15	73.7%	50.0%	7.1%	14.3%	7.1%	35.7%	14.3%	0.0%
Port Alsworth	28	11	40.0%	62.5%	0.0%	0.0%	0.0%	12.5%	25.0%	0.0%
Portage Creek	7	3	42.9%	0.0%	0.0%	33.3%	0.0%	33.3%	33.3%	0.0%
Togiak	154	128	82.8%	15.1%	0.0%	79.1%	0.0%	0.0%	2.2%	5.8%
Twin Hills	25	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% of all households	726	310	42.7%	22.0%	1.4%	43.7%	6.5%	20.6%	4.0%	9.3%
Dillingham[2]	416	125	30.0%	18.2%	0.0%	21.2%	3.0%	57.6%	6.1%	6.1%

[1] Households could give more than one reason.

[2] In Dillingham, only households with at least one member holding a hunting license were interviewed. Of the 416 such households in Dillingham, 110 were interviewed for this project. Data in this table may not be representative of the entire community of Dillingham.

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

DISCUSSION: COMPARISONS WITH OTHER YEARS AND OTHER ESTIMATES

Comparison with Harvest Ticket Data

Of 239 moose reported harvested in 1999 in all of GMU 9, 44 were harvested by local residents, 59 by non-local residents, and 127 by nonresidents (Sellers 2002). In GMU 17, due to increased numbers of moose, longer seasons, and more hunters, reported moose harvests tripled over an 18-year period from 1983/84 (127 moose reported harvested) to 2000/01 (reported harvest of 373 moose) (Woolington 2002: 253, 262). Local hunters prefer to hunt in the registration permit hunt, which allows the taking of any bull, opens in August, and is closed to nonresidents. For the five years from 1996/97 through 2000/01, the mean number of hunters participating in the regular season was 497; of these, only about 38 were local residents. Of the184 moose reported harvested during the 2000/01 regular season, 4 were taken by local residents, 41 by non-local Alaska residents, and 139 by non-residents. In contrast, during the same five-year period, there was an average of 415 local residents who hunted with registration permits, as well as an average of 118 non-local residents. In 2000/01, local hunters with registration permits reported a harvest of 144 moose, and nonlocal residents harvested 45 moose (Woolington 2002:264, 267).

Comparisons with the household survey results suggest that the harvest ticket data severely underestimate the number of moose hunters and the moose harvest within western Bristol Bay communities. Table 26 reports the number of moose hunters in each community from 1996 through 2003 based on harvest ticket returns. For the 2001/2002 study year, the estimate is 557 moose hunters, with 362 of them (65 percent) living in Dillingham. Household surveys estimated 1,074 moose hunters in the 18 study communities and 586 (55 percent) living in Dillingham in 2001/2002 (Table 20). Harvest ticket returns suggest that only 24 residents of GMU 9B communities hunted moose in 2001/ 2002; the estimated total based on household surveys is 167 moose hunters (Table 20).

As shown in Table 27, reported moose harvests by residents of the communities of GMU 9B and 17 have ranged from 149 (in 1996) to 250 (in 1999). The reported harvest was 189 moose in 2001/2002 study year; of these, 126 (67 percent) were taken by Dillingham hunters, and only 6 were reported harvested by residents of GMU 9B communities. In contrast, as reported in Table 21, household surveys resulted in a harvest estimate of 581 moose (+/-11.4%) in 2001/2002; of these, 208 (36 percent) were taken by Dillingham hunters. The estimated moose harvest for GMU 9B communities was 161 moose (+/-22%) in 2001/2002.

Comparison with Survey Findings from other Study Years

In 1973/74, residents of the study communities (excluding Port Alsworth, Portage Creek, Twin Hills, and Togiak) harvested 336 moose (0.145 moose per person) (Table 28), compared to 556 in 2001/2002 (0.124 moose per person). The estimated moose harvest for GMU 9B communities (excluding Port Alsworth) in 1973/74 was 91 (0.17 moose per person), compared to 160 in 2001/2002 (0.24 moose per person). Residents of communities of GMU 17 (excluding Togiak, Twin Hills, and Portage Creek) harvested 245 moose in 1973/74 (0.14 moose per person) and 396 moose in 2001/2002 (0.10 moose per person).

Table 26. Number of Moose Hunters, GMU 17 and 9B Communities, Based on Harvest Ticket Returns, 1996 - 2003

	1996	1997	1998	1999	2000	2001	2002	2003
GMU 17:								
Alegnagik	12	20	17	16	10	18	24	26
Clarks Point	3	4	4	11	6	6	3	5
Dillingham	277	327	310	353	308	362	392	407
Ekwok	9	18	31	30	37	24	39	41
Koliganek	8	19	35	35	23	29	37	48
Manokotak	1	2	0	2	4	3	3	8
New Stuyahok	20	48	36	41	35	44	45	57
Portage Creek	1	2	2	3	1	3	7	6
Togiak	7	37	42	38	46	42	40	55
Twin Hills	0	2	2	3	3	2	0	2
Subtotal	338	479	479	532	473	533	590	655
GMU 9B:								
Igiugig	3	1	0	5	4	3	5	6
Iliamna	4	3	9	6	6	3	4	9
Kokhanok	1	3	2	1	0	0	0	0
Levelock	0	1	0	2	3	1	0	1
Newhalen							0	0
Nondalton	3	6	3	6	2	4	2	1
Pedro Bay	2	3	3	2	2	3	3	4
Pope Vannoy Landing	1	8	0					
Port Alsworth	13	15	9	14	10	10	7	9
Subtotal	27	40	26	36	27	24	21	30
Total	365	519	505	568	500	557	611	685

Source: ADF&G 2004

Table 27. Number of Moose Harvested, Communities of GMU 17 and 9B, based on Harvest Ticket Returns, 1996 - 2003

	1996	1997	1998	1999	2000	2001	2002	2003
GMU 17:								
Alegnagik	5	11	6	9	3	7	7	8
Clarks Point	1	2	3	4	0	2	2	2
Dillingham	114	118	143	165	103	126	165	139
Ekwok	6	7	11	15	10	14	20	15
Koliganek	4	7	9	19	8	12	13	18
Manokotak	0	0	0	1	2	2	2	2
New Stuyahok	8	17	18	17	17	12	19	25
Portage Creek	1	0	2	1	0	2	3	4
Togiak	1	15	9	10	10	6	12	9
Twin Hills	0	1	2	1	0	0	0	0
Subtotal	140	178	203	242	153	183	243	222
GMU 9B:								
Igiugig	1	0	0	3	2	1	3	1
Iliamna	1	2	5	1	1	1	1	3
Kokhanok	0	1	0	0	0	0	0	0
Levelock	0	0	0	1	3	1	0	1
Newhalen							0	0
Nondalton	2	1	0	0	0	1	0	0
Pedro Bay	2	1	1	0	0	1	0	1
Pope Vannoy Landing	1	6	0					
Port Alsworth	2	4	3	3	2	1	0	2
Subtotal	9	15	9	8	8	6	4	8
Total	149	193	212	250	161	189	247	230

Source: ADF&G 2004

Table 28. Estimated Harvests of Moose, Study Communities, 1973/74

Community[1]	Number of HHs	Number of People	Moose Percent Harvesting	Moose Number Harvested	Moose No. Per Person
Communities of GMU 9B					
Igiugig	8	39	33.3%	4	0.10
Iliamna	17	62	22.2%	4	0.06
Kokhanok	13	81	66.7%	14	0.18
Levelock	17	79	62.5%	20	0.26
Newhalen	16	72	63.6%	13	0.18
Nondalton	29	151	53.8%	28	0.18
Pedro Bay	10	40	50.0%	8	0.19
Total, GMU 9B	110	524	51.4%	91	0.17
Communities of GMU 17					
Aleknagik	21	105	43.8%	9	0.09
Clarks Point	14	77	27.3%	6	0.08
Dillingham	229	979	25.0%	79	0.08
Ekwok	21	102	52.9%	19	0.18
Koliganek	20	113	60.0%	31	0.27
Manokotak	37	220	42.1%	33	0.15
New Stuyahok	31	194	69.2%	68	0.35
Total, GMU 17	373	1790	35.0%	245	0.14

[1] Port Alsworth, Portage Creek, Togiak, and Twin Hills were not included in this survey

Source: Gasbarro and Utermohle 1974

Table 29 reports estimated moose harvests for the study communities from previous rounds of Division of Subsistence household surveys. Table 30 illustrates estimated moose harvests for each study community by year, and Table 31 gives estimates of number of moose harvested per person in these study years.

It is not possible to identify subsistence moose harvest trends at the GMU or regional level because comprehensive data for most years are lacking. Observations from survey data about harvests and possible trends at the community levels can be made, however.

Particularly notable in 2001/2002 was the estimated harvest of 95 moose by Nondalton hunters. This was three times as high as any previous harvest estimate for the community. The per capita harvest of 0.62 moose for Nondalton in 2001/2002 was, by far, the highest ever recorded for a Bristol Bay community (the next highest of 0.35 moose per person at New Stuyahok in 1973/74). Reasons for this relatively large moose harvest at Nondalton are discussed in Chapter Seven.

Overall, in 2001/02 hunting and harvesting of moose was one of the most important subsistence activities in the western Bristol Bay area. Most households used moose, many area residents hunted moose, and sharing of moose meat was commonplace. Annual harvest ticket returns underestimate the number of moose hunters in the communities of GMU 9B and 17, and consequently underestimate the subsistence harvest of moose in these game management units.

Table 29. Harvests and Uses of Moose, Study Communities

		Percentage of Households					Number Harvested		Average Pounds	
	Year	Use	Hunt	Harvest	Receive	Give	Number	+/-%	Per HH	Per Capita
Aleknagik	1989	86.80	63.20	50.00	76.30	63.20	24	12	305.53	90.00
Clarks Point	1989	76.50	47.10	23.50	70.60	47.10	4	0	127.06	38.57
Dillingham	1984	61.40	32.00	16.30	49.00	12.40	113	31	88.24	29.87
Ekwok	1987	82.80	75.90	51.70	51.70	34.50	22	13	372.41	111.34
Koliganek	1987	83.30	57.10	52.40	61.90	54.80	48	14	540.00	139.14
Manokotak	1985	94.40	66.70	33.30	79.60	50.00	22	13	200.00	38.30
Manokotak	1999	80.20	44.40	32.10	66.70	56.80	47	14	280.00	63.70
New Stuyahok	1987	82.50	60.00	55.00	57.50	50.00	54	24	391.50	81.99
Igiugig	1983		66.70	33.30	0.00		4	150	180.00	28.42
Igiugig	1992	90.00	60.00	50.00	60.00	60.00	8	25	378.00	96.92
Iliamna	1983		25.00	10.00	10.00		4	75	54.00	13.85
Iliamna	1991	65.20	43.50	30.40	43.50	39.10	16	37	281.74	86.40
Kokhanok	1983		36.80	31.60	52.60		14	42	284.21	53.47
Kokhanok	1992	91.70	55.60	41.70	86.10	58.30	43	16	600.00	135.00
Levelock	1988	92.60	59.30	59.30	74.10	74.10	24	16	400.00	121.35
Levelock	1992	83.30	56.70	46.70	66.70	63.30	27	22	378.00	133.41
Newhalen	1983		27.30	0.00	0.00		0		0.00	0.00
Newhalen	1991	80.80	34.60	30.80	65.40	26.90	16	31	270.00	54.84
Nondalton	1980			50.00			25		366.00	76.48
Nondalton	1981			53.00			31		483.16	85.00
Nondalton	1983		71.40	38.10	9.50		33	54	334.29	64.41
Pedro Bay	1982		29.40	17.60	41.20		4	50	95.29	32.40
Pedro Bay	1996	84.60	46.20	23.10	69.20	15.40	4	65	124.62	37.67
Port Alsworth	1983		61.50	38.50	15.40		11	45	290.77	80.42
Togiak	1999	43.50	31.80	18.90	36.10	24.30	48	32	145.90	35.30
Twin Hills	1999	83.30	58.30	50.00	83.30	66.70	12	46	270.00	90.00

blank cells = data not collected

Source: Scott et al. 2001, Kenner et al. 2003

Table 30. Estimated Harvests of Moose, Study Communities, 1973 - 2001

Community	Estimated Harvest of Moose																						
	1973	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GMU 9B																							
Igiugig	4				4									8									2
Iliamna	4				4								16										9
Kokhanok	14				14									43									26
Levelock	20									24				27									16
Newhalen	13				0																		9
Nondalton	28	25	31		33																		95
Pedro Bay	8			4														4					2
Port Alsworth					11																		1
GMU 17																							
Aleknagik	9										24												24
Clarks Point	6										4												12
Dillingham	79					113																	208
Ekwok	19								22														16
Koliganek	31								48														29
Manokotak	33						22														47		25
New Stuyahok	68								54														82
Portage Creek																							5
Togiak																					48		18
Twin Hills																					12		1

Source: Scott et al. 2001

Table 31. Estimated Percapita Harvests of Moose, Study Communities, 1973 - 2001

	Estimated Number of Moose Harvested per Capita																						
Community	1973	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
GMU 9B																							
Igiugig	0.10				0.05									0.18									0.07
Iliamna	0.06				0.03								0.16										0.10
Kokhanok	0.18				0.10									0.25									0.20
Levelock	0.26									0.22				0.25									0.26
Newhalen	0.18				0.00								0.10										0.06
Nondalton	0.18	0.14	0.16		0.12																		0.62
Pedro Bay	0.19			0.06														0.07					0.04
Port Alsworth					0.15																		0.01
GMU 17																							
Aleknagik	0.09										0.17												0.15
Clarks Point	0.08										0.07												0.20
Dillingham	0.08					0.06																	0.07
Ekwok	0.18								0.21														0.15
Koliganek	0.27								0.26														0.16
Manokotak	0.15						0.07														0.12		0.07
New Stuyahok	0.35								0.15														0.17
Portage Creek																							0.14
Togiak																					0.07		0.03
Twin Hills																					0.17		0.02

Source: Scott et al. 2001

CHAPTER FIVE: BEARS

BACKGROUND & LOCAL OBSERVATIONS

Population and Range

Brown bears are generally present throughout GMU 17 and 9B. The range of black bears is more limited. They are found in forested areas in the northern portions of GMU 17 and 9B. Very little information about the black bear populations in these unit is available because there have been no research activities conducted. For Unit 17, incidental observations by ADF&G biologists during caribou surveys and reports by local residents suggest a decline in the black bear population of the upper Nushagak River drainage over the last several years (Woolington 2001b:205).

General Subsistence Use Patterns

Benke (1981) provides background on subsistence uses of brown bears in western Bristol Bay. Other community specific reports in the Division of Subsistence *Technical Paper Series* also provide brief overviews (e.g. Schichnes and Chythlook 1988, Schichnes and Chythlook 1991).

Additional background information about subsistence uses of black bears focusing mostly on GMU 17, is based primarily on a "Customary and Traditional Use Worksheet" prepared by the Division of Subsistence for the Alaska Board of Game in March 1994.[1] In addition to information from previous technical papers and published sources, the worksheet drew from interviews with six long-term, Yup'ik speaking residents of GMU 17, conducted in early 1991 (Chythlook 1991). For more details on subsistence uses of black bears in GMU 9B, see Ellanna and Balluta (1992). Information gathered during key respondent interviews for this project will be addressed in the following section.

Traditionally, black bears were hunted for food and raw materials by the Iliamna and Lake Clark Dena'ina Athabascans in present-day GMU 9B and portions of GMU 17B (Townsend 1981:626). Although black bears are not specifically mentioned in the list of traditional resources for the Yup'ik people of the region, these people traditionally hunted in the upper drainages of the Nushagak system and it is likely that black bear were taken during this hunting (VanStone 1984:232).

Black bears are presently a valued source of meat within their range in the Bristol Bay region (Morris 1986:55). In addition, black bear skins are valued in some villages, such as Manokotak (Schichnes and Chythlook 1988:152). In villages of the Nushagak River, black bear meat is considered a "very tasty food" and the skins are used as well (Schichnes and Chythlook 1991).

The 1991 interviews provided a great deal of information on use of both black and brown bears in GMU 17. Most respondents confirmed that brown bears are more common than black bears in this area, but both have been used regularly for a long time. Accordingly, a person living in Aleknagik reported seeing more black bears in the late 1980s and early 1990s around the upper Wood River lakes, but "it's still news when someone harvests a black bear now" (Chythook 1991).

[1] Although considerable evidence was presented about traditional uses of black bears in portions of GMU 17, the Alaska Board of Game made a negative customary and traditional use finding at its March 1994 meeting, primarily because of the small numbers of black bears being harvested for subsistence uses in the GMU. The Alaska Board of Game has not made a customary and traditional use finding for the black bear population in GMU 9B. Federal subsistence regulations provide subsistence hunting opportunities for black bears in both GMU 17 and GMU 9B.

An elderly man living in Aleknagik, retired from hunting in 1991, said that people have hunted and harvested bears (mostly brown, but black were taken when encountered) “as long as he can remember.” He hunted bears along the Wood River lake system with his hunting partners, especially in early spring. He said (translated from Yup’ik):

> When we left our village to hunt bear we would go to hunt any species of bear we could find . . . We’d leave early in the morning (in early spring) when it was *qetraq* (hard snow crust) and return after the snow crusts in late evening. . . We use to travel long ways to find bears in the mountains. We’d use our dog team to track bears. We would find the freshest tracks to follow and also sized our bears by their tracks.

An older man in Aleknagik summed up the value of black bear by saying that, while not many have been taken over the years, “It’s great news whenever black bear is harvested.”

In the Iliamna Lake area, black bears are generally hunted in April and May and again in August, September, and early October (Morris 1986:54; Behnke 1982:27). A middle-aged respondent reports for Aleknagik that black bears (and brown bears) are harvested for food in early spring as they leave their dens. Fall bears were also used for dog food and the hides were saved for sleeping mats.

For the Nushagak drainage, hunting for black bears resumes in late March. This hunting occurs “every spring” according to a middle-aged man who, when interviewed in 1991, had hunted black bears all his life. He said that villagers look forward to hunting black bears every spring. Another Aleknagik man said that while bear hunting in fall was primarily opportunistic, taking place while men were looking for moose, in spring men were more likely to plan their hunt mainly for bears.

A life-long resident of Nushagak River villages, living at Koliganek in 1991, who had hunted black bears all his life and still hunted them when interviewed reported the following pattern. Black bear hunters from Nushagak villages must travel to the mountains at the headwaters of the Nushagak River. He only deliberately hunted black bears in the spring. However, if moose hunters encounter black bears in fall, they will harvest them. In spring, black bear hunters (three or four) travel with snow machines. He added [translated from Yup’ik],

> Some days we’ll run into [black bear] hunters from New Stuyahok and Ekwok in the field. . . Most of my age group [30s - 50s] still hunt bears in the spring with snow machines. We climb mountains to reach our game and to track bears. . . One has to be quick and young enough to handle a snow machine in the steep mountains. . . I used to hunt bear with my grandfather and have learned most of my skills from him and later from my father. . . We also learn techniques from each other as hunting parties.

He added that older men hunt from skiffs in the fall. In fall, bear meat is considered “sweeter tasting” after bears have been eating berries rather than fish.

In the fall black bears are generally taken opportunistically while hunters are looking for other game, such as moose or caribou. There is no documentation of the use of baiting stations. Generally, spring hunting occurs in the mountains, while fall hunting for bears takes place along rivers and lakes before freeze-up.

A man originally from Togiak and living at Aleknagik in 1991 said that in the past black and brown bears were hunted in the spring with dog teams. "We'd leave our teams and hike up the mountains at Togiak and Aleknagik to reach [the bear's] dens; the dogs were too noisy." He added that fall bears were taken while men were hunting for moose or harvesting spawned-out salmon. Another man living in Aleknagik also described hunting for bears using dog teams in the spring. He added that, "Now people use snow machines (in spring)." In fall, boats and motors are used to travel along rivers and lakes.

Most of the black bear is used. Hides are used for skin bedding, especially those taken in the spring. At Koliganek, the hide belongs to the one who shot the bear. One respondent reported that he gives the hides of black bears he shoots to his grandmother who "stretches it for use later when dried."

Bear meat (either species) is highly valued at Aleknagik. An elderly man reported that, "Black bear harvested in late fall is (the) best. . . It is better than caribou meat and has a richer taste and it does not dry out like caribou meat." Others report that meat from bears taken just after they come out of hibernation is tender and milder tasting.

Because bear meat must be cooked thoroughly, it was never dried for human use. An elder at Aleknagik reported that, "Black bear fat is nice and white in appearance and has a wide variety of uses." "Black bear fat makes the best pie crust." Therefore, "People were happy whenever black bear was harvested."

At Koliganek, the best part of the black bear is considered to be the legs, hind quarters, and ribs. Fresh bear meat is pot roasted and fried. Black bear meat is also half-dried and cooked. It is also eaten with seal or bear fat.

During interviews with bear hunters, most described hunting with partners who were also their relatives. An elderly woman originally from Kulukak and now living in Manokotak explained in a 1991 interview that because black bears were relatively scarce, hunters are considered *nukalpiaq* ("prime harvester") if they harvest one. As with brown bears, people speak about black bears with respect, including using special, respectful names.

An elder in Aleknagik reported (Chythlook 1991) that bear meat was shared equally among hunters in the field so each sled would have an equal load to take back to the village. In the village, each harvester shared with his own relatives and friends. Another elder said that black bear were widely shared in Aleknagik. Hunters butcher the bear in the field and the successful harvester would instruct his partners to take whatever amount they wanted.

Key Respondent Knowledge of Bears in GMU 9B

The following details information gathered during key respondent interviews conducted for this project in Kvichak Watershed communities (GMU 9B). Knowledge and use of the resources have been broken down by bear species.

Brown Bear

Brown bears have a long history in the memory of people who inhabit the Lake Clark - Iliamna Lake area of Alaska. On Lake Clark a resident reports that "there's been quite a few bears in this area, from the time I could remember, from the time I was young until now." Although members of many area communities do not currently hunt brown bears on a regular basis, the residents of Igiugig still do. A

couple, both elders of Igiugig, speaking in Yup'ik, who used to hunt often said, "In April month, a long time ago before there used to be moose or caribou, we used to eat bears. We would eat the meat and the fat." One hunter said that early spring "is the only time we like the bear, in the spring (this was in April), they are out right now." When brown bears are taken he uses everything on the brown bear including the meat, fat, hide, and guts.

Brown bears are not hunted regularly in Newhalen and Iliamna. The population of brown bears has also grown in recent years. Hunters have observed that brown bear populations seem to have grown while black bear populations have diminished. One hunter related that in the past they never saw brown bears near the communities, but in the last five years their numbers have grown considerably, and they are seeing them right in the village. Hunters in Newhalen and Iliamna blame the prevalence of brown bears in the village and its environs on the accessibility of garbage. Most hunters will not eat these bears because of the refuse they may be feeding on at the municipal dump near Newhalen.

During this study it soon became apparent that there are two aspects of traditional ecological knowledge pertaining to brown bears in the Kvichak Watershed that are of critical importance. The first is brown bear population numbers in recent years and how this affects the brown bear – human interaction. This is directly related to the abundance of salmon in the rivers and lakes where more interaction between humans and brown bears is occurring. As salmon populations decline brown bears are more frequently entering fish camps to find readily available food.

The loss of salmon escapement in this important watershed is another reason for human – brown bear interaction. Biologists find that conflict between humans and bears has drastically increased the number of bears that are killed. This conflict can be especially intense when there is minimal escapement of salmon, or a poor berry crop because brown bears and humans both are dependant on the same population of caribou and moose. Many moose and caribou hunters get permits for bears too, in case conflict occurs while hunting. This was especially evident during the 1996-1997 hunting season in the Kvichak drainage when resources available for bears were scarce, and encounters between humans and brown bears were frequent (Hicks 1998b).

The second critical observation concerns the timing of brown bear harvests for human consumption. Brown bears are only considered to be good for human use during two periods of the year: 1) in the spring when they come out of the dens and their muscles are still soft, and 2) in the fall just before hibernation when they are fat. In the spring there is no fat on them to eat but their meat is tender and in the fall hunters eat the fat and avoid the meat as the bear meat "tastes like rotten fish."

The time to hunt brown bears depends on whether meat or fat is needed. Resident hunters report that brown bear is best taken in the spring when the animals are right out of the den and before their muscles get too tense. After May the bears are too skinny and their muscles are sinewy. One hunter said of the spring brown bear, "you can almost eat anything, ribs, meat. Not in the fall. When they get into the rotten fish they are no good." Brown bear fat is good for spreading on the dry fish that is caught in the summer. One hunter says regarding brown bear usage, "fat in the fall-time, meat in the spring-time."

In many communities today the major harvesting of brown bears occurs at fish camps when brown bears get into smoke houses or they come too close to the village. As a hunter in Nondalton says, "there are more bears," and laughs, and "They are too lazy to hunt, living off people's fish camps." Another Nondalton hunter relates, "you're more likely to run into a bear now days then 10-15 years ago. The population of bears came up quite a bit, the last 3-4 summers. They must have shot over 20 bears just in this area down at fish camp. We never used to have that problem before." [2]

A resident of Pedro Bay relates that brown bears tear down his smoke house each year, and each year he must rebuild the smoke house. In Igiugig a brown bear was killed at a fish camp on the mouth of the Newhalen River in the summer. Most brown bears in 2001-2002 were killed at fish camps where they have become a nuisance. People say that if you do not kill them they just keep coming back. Near Igiugig, brown bears have become more numerous and aggressive than ever before. The brown bears now get into the fishnets in the Kvichak River near the community, and they have come into the village and killed dogs.

According to biologists, GMU 9, which encompasses the Alaska Peninsula and the Lake Clark/Iliamna Lake area, is an area with a large brown bear population (Hicks 1998b). Residents of the area take few bears, and over 70 % of bears were taken during guided hunts, with nonresidents taking 75% of the harvest. However, brown bear densities in GMU 9 are lowest in Subunit 9B, the focus of this large land mammal subsistence survey. The most recent population count for GMU 9B is from a 1992 report that finds 879 brown bears inhabiting the game management area. However, residents find that brown bear populations have been growing in the area, especially in the past 4 – 5 years. They credit the growth of the caribou and moose populations as driving up the numbers of brown bears as a predator species.

In GMU 17, which encompasses the western part of this area, there has been little or no research conducted on brown bear populations. One report does list brown bears as being seasonally abundant along the Nushagak, Mulchatna, Togiak, and Kulukak Rivers, streams where sustainable runs of salmon occur, and annual reported harvests in GMU 17 for brown bears rarely exceeds 50 bears per year (Hicks 1998b). With the dramatic increase in the Mulchatna caribou herd in recent years, the fall harvest of brown bears has increased. This is due, however, to more hunters being in the field pursuing the growing caribou herd and coming into conflict with brown bears, or taking them opportunistically.

The lowest level of increase of bears is in Subunit 17B. This is due to bears being killed while coming into closer contact with hunters taking caribou and moose along the Nushagak and Mulchatna Rivers, popular hunting locations. This report by biologists is consistent with reports from local subsistence hunters in the area. However, the major interaction between hunters and brown bears occurs in fish camps along salmon streams and rivers. Until salmon escapement numbers increase in the Kvichak watershed potentially violent interaction between humans and brown bears will continue.

Black Bear

Of the two available bear species in the Lake Clark - Iliamna Lake Region local hunters prefer black bear for meat. In Nondalton a hunter reported when discussing black bear, we "will go out of our way to find" one. Brown bears, he says, are only killed because they come into the fish camps and then only

[2] As bears are eating fish during the time when they would be killed at fish camps, and therefore their meat would taste like "rotten fish," residents note that only the fat would be harvested.

the fat is harvested. Black bears on the other hand are considered a delicacy and will be taken whenever they can be found. Hunters report that they use "everything" from a black bear. This is consistent with the hunting effort reported by Nondalton residents for black bears the past years, and one hunter reported that the only hunting he did during the study year of 2001-2002 was specifically for black bear. Other hunters report that they will look for black bears while out hunting moose.

Hunters report that black bears are scarce, but they are starting to make a comeback and they hope to hunt this species more in coming years as their numbers grow. At the present time, however, some local subsistence hunters do not hunt black bears as they want the population to increase. A biological report states that the total amount of black bears reported harvested for the 1997-1998 survey was 18. Non-resident hunters took 89% of the total reported harvest (Hicks 1999). One remark was made by a resident who reported that brown bears have been seen killing black bears, further depressing black bear population numbers.

In Pedro Bay residents' answers varied for black bears; as black bears are not a common resource. A few local residents report they would eat black bear if they could get one, and once in awhile a black bear will be spotted and someone will go out and hunt the bear, sharing the meat with the rest of the community. Most residents of the area do state that there are more black bears now, but the black bears were skinny last year.

Consistent with brown bear harvest timing preferences, black bears too are taken in the early spring and fall. The spring bears are preferred as that is when their meat is tender. In the fall the meat of black bears is eaten as well as the fat, whereas the fat of brown bears is the only thing consumed in the autumn.

According to biologists very little is known about the black bear population in Unit 9B, as there has been no research conducted recently (Hicks 1999). There is only a report for Unit 17, and this lists most bears as inhabiting the Mulchatna and Nushagak River Valleys, areas not normally hunted by area residents except for extended hunts. As black bears are difficult to count, most of the evidence of population numbers is 'anecdotal'[3] and suggests a decline in bear numbers in recent years. Local residents too report that black bears are scarce in the area.

Hunting Regulations: Bears, 2001/2002 Regulatory Year

In GMU 9, state general hunting regulations in effect during the study year allowed an annual harvest of three black bears for residents and nonresidents. There was no closed season and no sealing requirement. Federal subsistence regulations were identical in GMU 9.

For GMU 17, state general hunting regulations included an annual limit of two black bears for residents and one black bear for nonresidents. The season was August 1 through May 31. Sealing was required within 30 days of the harvest. Federal subsistence regulations allowed an annual harvest of two black bears with an August 1 through May 31 season.

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[3] The term 'anecdotal' utilized in biological reports is referred to here as local or traditional ecological knowledge.
[4] The Western Alaska Brown Bear Management Area includes all of GMU 9B and 17, in addition to portions of 9D, 9E, 18, 19A, 19B, 21D, 22, 23, 24, and 26A (See ADF&G Regulations for further detail).

In GMU 17 and 9B, regulations for the Western Alaska Brown Bear Management Area allow for the subsistence hunting of brown bears for food for residents only.[4] State subsistence hunting regulations required a registration permit for taking one brown bear per regulatory year. The season was September 1 through May 31. Federal subsistence regulations required that subsistence hunters obtain a state registration permit. Federal seasons and annual limits were the same as those of the state.

HARVESTS AND USES OF BEARS IN 2001/2002

Participation in the Subsistence Harvest and Use of Bears

An estimated 89 study community residents hunted black bears during the 2001/2002 study year, and 21 were successful. Most black bear hunters (61 of 89; 68.5 percent) lived in communities of GMU 9B, as did all the successful hunters (Table 32).

Table 32. Estimated Number of Hunters and Successful Hunters of Black Bears by Community and Area, 2001/2002.

Communtiy	Total Hunters	Successful Hunters	Percentage Successful
Igiugig	0	0	0.0%
Illiamna	5	1	25.0%
Kokhanok	0	0	0.0%
Levelock	6	0	0.0%
Newhalen	6	3	60.0%
Nondalton	32	15	46.2%
Pedro Bay	1	0	0.0%
Port Alsworth	11	1	12.5%
GMU 09 (B) Subtotal	61	21	34.1%
Togiak	3	0	0.0%
Twin Hills	0	0	0.0%
GMU 17 (A) Subtotal	3	0	0.0%
Koliganek	4	0	0.0%
GMU 17 (B) Subtotal	4	0	0.0%
Aleknagik	0	0	0.0%
Clark's Point	1	0	0.0%
Dillingham	15	0	0.0%
Ekwok	4	0	0.0%
Manokotak	0	0	0.0%
New Stuyahok	1	0	0.0%
Portage Creek	0	0	0.0%
GMU 17 (C) Subtotal	22	0	0.0%
GMU 17 (C) Subtotal without Dillingham	7	0	0.0%
Grand totals	89	21	23.2%
Grand totals without Dillingham	74	21	28.0%

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

Use of black bears was most frequent in communities of GMU 9B, where 19.0 percent of all households used black bear in the study year (Table 33). By far, Nondalton was the community with the most households using black bear, at 60.6 percent of the community. Households from Nondalton also provided the most comments on subsistence uses of black bears. Some examples are:

> We use black bears always. We usually get one a year and keep up the tradition of using black bear.
>
> We get one or two black bears every year. We do go out and hunt black bears.
>
> We eat black bear meat all the time.
>
> We eat black bear and use it whenever we get it.
>
> In the past we used the hide, meat, and fat (of black bear). Today we only use the meat and fat.
>
> In the past, we had little black bear but now there is more, so we use more black bear meat.
>
> We hunt less because of more modern things we use. Long ago we used to run around looking for bear holes to get at them, and we did eat a lot of black bear then. Nowadays there is not too much. We would have to go a long way to hunt now.

No households in the communities of GMU 17A or 17B used black bear in 2001/02, although there were unsuccessful black bear hunters in Togiak and Koliganek. A few households in GMU 17C communities (1.3 percent, excluding Dillingham) used black bear; in all cases, this use was the result of sharing of black bear by other households.

An estimated 84 study community residents hunted brown bears during the 2001/2002 study year and 35 were successful. There were brown bear hunters in every community but Pedro Bay, Twin Hills, Manokotak, and Portage Creek (Table 34).

Excluding Dillingham (for which comprehensive data are lacking), 9.1 percent of the households in the study communities used brown bear during the 2001/2002 study year (Table 35). Every community had households that used brown bear except Pedro Bay, Twin Hills, Ekwok, and Portage Creek. Communities in GMU 9B had the largest percentage of households using brown bear, at 21.4 percent. There were seven communities where 10 percent or more of households used brown bear: Kokhanok (43.8 percent), Igiugig (27.3 percent), Newhalen (26.5 percent), Levelock (23.5 percent), Nondalton (21.2 percent), Koliganek (13.0 percent), and Port Alsworth (10.0 percent).

Table 33. Levels of Participation in the Use and Harvest of Black Bear and Black Bear Harvest Levels, 2001/02 Regulatory Year.

	Percentage of Households					Black Bear Harvest							
Community	Used Black Bear (%)	Hunted Black Bear (%)	Harvested Black Bear (%)	Received Black Bear (%)	Gave Black Bear (%)	Total	Per Household	Per Person	Per Hunter	Per Successful Hunter	95% Confidence Limit of Total Harvest %	Low*	High
Residents of GMU 09B													
Igiugig	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Illiamna	9.5	9.5	4.8	9.5	4.8	1.3	0.0	0.0	0.3	1.0	104.3%	1.0	2.7
Kokhanok	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Levelock	11.8	23.5	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Newhalen	20.6	11.8	5.9	14.7	5.9	3.4	0.1	0.0	0.6	1.0	53.6%	3.0	5.3
Nondalton	60.6	51.5	36.4	39.4	36.4	18.2	0.5	0.1	0.6	1.3	23.2%	15.0	22.4
Pedro Bay	5.3	5.3	0.0	5.3	5.3	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Port Alsworth	15.0	25.0	5.0	10.0	5.0	1.4	0.1	0.0	0.1	1.0	111.9%	1.0	3.0
Subtotal	19.0	18.4	8.6	13.7	9.1	24.4	0.1	0.0	0.4	1.2	20.0%	20.0	29.2
Residents of GMU 17A													
Togiak	0.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Twin Hills	0.0	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	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Residents of GMU 17B													
Koliganek	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Subtotal	0.0	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Residents of GMU 17C													
Aleknagik	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Clark's Point	4.8	4.8	0.0	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Dillingham **	n/a	1.7	0.0	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Ekwok	0.0	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Manokotak	1.7	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
New Stuyahok	1.6	1.6	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Portage Creek	0.0	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	n/a	1.7	0.0	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Subtotal without Dillingham	1.3	1.6	0.0	1.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Grand total	n/a	4.3	1.2	n/a	n/a	24.4	0.0	0.0	0.3	1.2	19.9%	20.0	29.2
Grand total without Dillingham	6.5	7.3	2.7	4.8	3.0	24.4	0.0	0.0	0.3	1.2	19.9%	20.0	29.2

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

Table 34. Estimated Number of Hunters and Successful Hunters of Brown Bears by Community and Area, 2001/2002.

Communtiy	Total Hunters	Successful Hunters	Percentage Successful
Igiugig	2	0	0.0%
Illiamna	4	0	0.0%
Kokhanok	7	4	66.7%
Levelock	7	3	40.0%
Newhalen	8	1	14.3%
Nondalton	6	4	60.0%
Pedro Bay	0	0	0.0%
Port Alsworth	11	3	25.0%
GMU 09 (B) Subtotal	45	15	33.0%
Togiak	3	3	100.0%
Twin Hills	0	0	0.0%
GMU 17 (A) Subtotal	3	3	100.0%
Koliganek	7	5	75.0%
GMU 17 (B) Subtotal	7	5	75.0%
Aleknagik	3	3	100.0%
Clark's Point	1	1	100.0%
Dillingham	23	8	33.3%
Ekwok	1	0	0.0%
Manokotak	0	0	0.0%
New Stuyahok	1	0	0.0%
Portage Creek	0	0	0.0%
GMU 17 (C) Subtotal	29	11	39.0%
GMU 17 (C) Subtotal without Dillingham	6	4	59.9%
Grand totals	84	35	41.1%
Grand totals without Dillingham	62	27	43.9%

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

Table 35. Levels of Participation in the Use and Harvest of Brown Bear and Brown Bear Harvest Levels, 2001/02 Regulatory Year.

	Percentage of Households					Brown Bear Harvest					95% Confidence Limit of Total Harvest		
Community	Used Brown Bear (%)	Hunted Brown Bear (%)	Harvested Brown Bear (%)	Received Brown Bear (%)	Gave Brown Bear (%)	Total	Per Household	Per Person	Per Hunter	Per Successful Hunter	%	Low*	High
Residents of GMU 09B													
Igiugig	27.3	18.2	0.0	27.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Illiamna	9.5	9.5	0.0	9.5	9.5	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Kokhanok	43.8	18.8	12.5	31.3	12.5	4.4	0.1	0.0	0.7	1.0	107.3%	2.0	9.1
Levelock	23.5	23.5	11.8	11.8	5.9	2.9	0.1	0.0	0.4	1.0	82.1%	2.0	5.4
Newhalen	26.5	5.9	2.9	23.5	2.9	1.1	0.0	0.0	0.1	1.0	72.8%	1.0	2.0
Nondalton	21.2	15.2	9.1	12.1	6.1	3.6	0.1	0.0	0.6	1.0	47.6%	3.0	5.4
Pedro Bay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Port Alsworth	10.0	30.0	10.0	0.0	0.0	2.8	0.1	0.0	0.3	1.0	77.0%	2.0	5.0
Subtotal	21.4	14.9	6.6	14.8	5.3	14.9	0.1	0.0	0.3	1.0	37.7%	10.0	20.5
Residents of GMU 17A													
Togiak	2.0	2.0	2.0	0.0	2.0	3.1	0.0	0.0	1.0	1.0	82.1%	2.0	5.6
Twin Hills	0.0	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	1.7	1.7	1.7	0.0	1.7	3.1	0.0	0.0	1.0	1.0	81.8%	2.0	5.6
Residents of GMU 17B													
Koliganek	13.0	13.0	13.0	0.0	4.3	5.5	0.1	0.0	0.8	1.0	76.8%	3.0	9.7
Subtotal	13.0	13.0	13.0	0.0	4.3	5.5	0.1	0.0	0.8	1.0	76.8%	3.0	9.7
Residents of GMU 17C													
Aleknagik	8.3	5.6	5.6	5.6	2.8	2.7	0.1	0.0	1.0	1.0	70.7%	2.0	4.6
Clark's Point	9.5	4.8	4.8	4.8	4.8	1.0	0.0	0.0	1.0	1.0	0.0%	1.0	1.0
Dillingham **	n/a	2.6	0.9	n/a	n/a	7.6	0.0	0.0	0.3	1.0	118.3%	2.0	16.5
Ekwok	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Manokotak	1.7	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
New Stuyahok	1.6	1.6	0.0	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Portage Creek	0.0	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	n/a	2.5	1.0	n/a	n/a	11.2	0.0	0.0	0.4	1.0	81.3%	5.0	20.4
Subtotal without Dillingham	3.1	2.2	1.3	2.3	0.8	3.7	0.0	0.0	0.6	1.0	49.7%	3.0	5.5
Grand total	n/a	4.4	2.2	n/a	n/a	34.7	0.0	0.0	0.4	1.0	33.7%	23.0	46.4
Grand total without Dillingham	9.1	6.7	3.7	5.5	2.7	27.1	0.0	0.0	0.4	1.0	27.7%	19.6	34.6

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

Bear Harvest Quantities

The estimated total harvest of black bears by study community residents in 2001/2002 was approximately 24 animals. All of these were harvested in GMU 9B. Nondalton hunters took about 18 black bears, 75 percent of the area total. Hunters from three other communities harvested black bears: Iliamna (one bear), Newhalen (three bears), and Port Alsworth (one bear) (Table 33).

The estimated total harvest of brown bears by study community residents in 2001/2002 was approximately 35 animals. Of these, about 15 (43 percent) were harvested by residents of communities in GMU 9B, about 3 (9 percent) in GMU 17A, about 6 (16 percent) by GMU 17B residents, and about 11 (32 percent) by residents of GMU 17C. Communities with the largest brown bear harvests were Dillingham (about 8 brown bears), Koliganek (about 6), Kokhanok (about 4), Nondalton (about 4), Togiak (about 3), Levelock (about 3), and Aleknagik (about 3) (Table 35).

Parts of Bears Used

Table 36 provides information on the parts of black bears used in each community and the percentage of households in each community that used these parts. All households that used black bears used the meat. Black bear fat was used by residents of Iliamna, Newhalen, and Nondalton. Other parts that were used by residents include hides, feet, claws, bones, gall bladders, kidneys, intestines, and skulls. Table 37 reports the parts of brown bears used in each community and the percentage of households in each community that used these parts. Most households that used brown bears used either the meat or the fat or both. Many used the hides. A few used the feet, claws, bones, gall bladders, kidneys, intestines, and skulls.

Timing of Bear Harvests

As reported in Table 38 and shown in Figure 6, during the 2001/2002 study year, most black bear harvest occurred in August (44.7 percent) and September (24.8 percent). Harvests also took place in June, July, October, and November.

The largest percentage of the harvest of brown bears took place in April (26.7 percent) (Table 39, Figure 7), followed by July (19.0 percent), August (18.8 percent), October (12.0 percent), and March (11.0 percent). Generally, brown bear meat is considered most palatable in the spring. Bears are fattest in late fall/early winter just before hibernation, so these months are preferred for hunting by those whose primary use of brown bears is the fat (see Behnke 1981; for comparable information for communities of the Chignik Area of the Alaska Peninsula, see Fall and Hutchinson-Scarbrough 1996).

Table 36. Parts of Black Bear Used, Study Communities, 2001/2002

Community[1]	Percentage of Households: Using Black Bear	Parts of Black Bear Used: Data Missing	Percentage of Households that Used Black Bear for Which Data Available: Hide	Meat	Fat	Feet	Claws	Bones	Gall Bladder	Kidney	Intestines	Skull
Clarks Point	4.8%	100.0%										
Iliamna	9.5%	0.0%	50.0%	100.0%	100.0%	50.0%	50.0%	50.0%	50.0%	100.0%	100.0%	50.0%
Levelock	11.8%	100.0%										
Manokotak	1.7%	100.0%										
New Stuyahok	1.6%	100.0%										
Newhalen	20.6%	0.0%	28.6%	100.0%	71.4%	57.1%	0.0%	28.6%	0.0%	0.0%	0.0%	0.0%
Nondalton	60.6%	15.0%	23.5%	100.0%	88.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pedro Bay	5.3%	0.0%	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Port Alsworth	15.0%	33.3%	50.0%	100.0%	0.0%	0.0%	50.0%	0.0%	50.0%	0.0%	0.0%	0.0%

[1] Only listed are those communities in which at least one household used black bear during the study year

Source: ADF&G Division of Subsistence household surveys 2002

Table 37. Parts of Brown Bear Used, Study Communities, 2001/2002

Community[1]	Percentage of Households											
	Using Brown Bear	Parts of Brown Bear Used										
		Data Missing	Percentage of Households that Used Brown Bear for Which Data Available									
			Hide	Meat	Fat	Feet	Claws	Bones	Gall Bladder	Kidney	Intestines	Skull
Aleknagik	8.3%	33.3%	50.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Clarks Point	9.5%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Dillingham[2]	1.8%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Igiugig	27.3%	0.0%	66.7%	100.0%	100.0%	100.0%	0.0%	0.0%	0.0%	33.3%	0.0%	0.0%
Iliamna	9.5%	0.0%	0.0%	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Kokhanok	43.8%	14.3%	0.0%	66.7%	100.0%	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Koliganek	13.0%	0.0%	100.0%	66.7%	100.0%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Levelock	23.5%	25.0%	0.0%	33.3%	33.3%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manokotak	1.7%	100.0%										
New Stuyahok	1.6%	0.0%	0.0%	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Newhalen	26.5%	0.0%	0.0%	44.4%	77.8%	44.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Nondalton	21.2%	14.3%	66.7%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Port Alsworth	10.0%	0.0%	50.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Togiak	2.7%	0.0%	0.0%	100.0%	100.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	0.0%

[1] Only listed are those communities in which at least one household used brown bear during the study year

[2] Only pertains to households with members who held hunting licenses.

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

Figure 6. Timing of Black Bear Harvests by Month, 2001/2002, Communities of GMU 17 and 9B

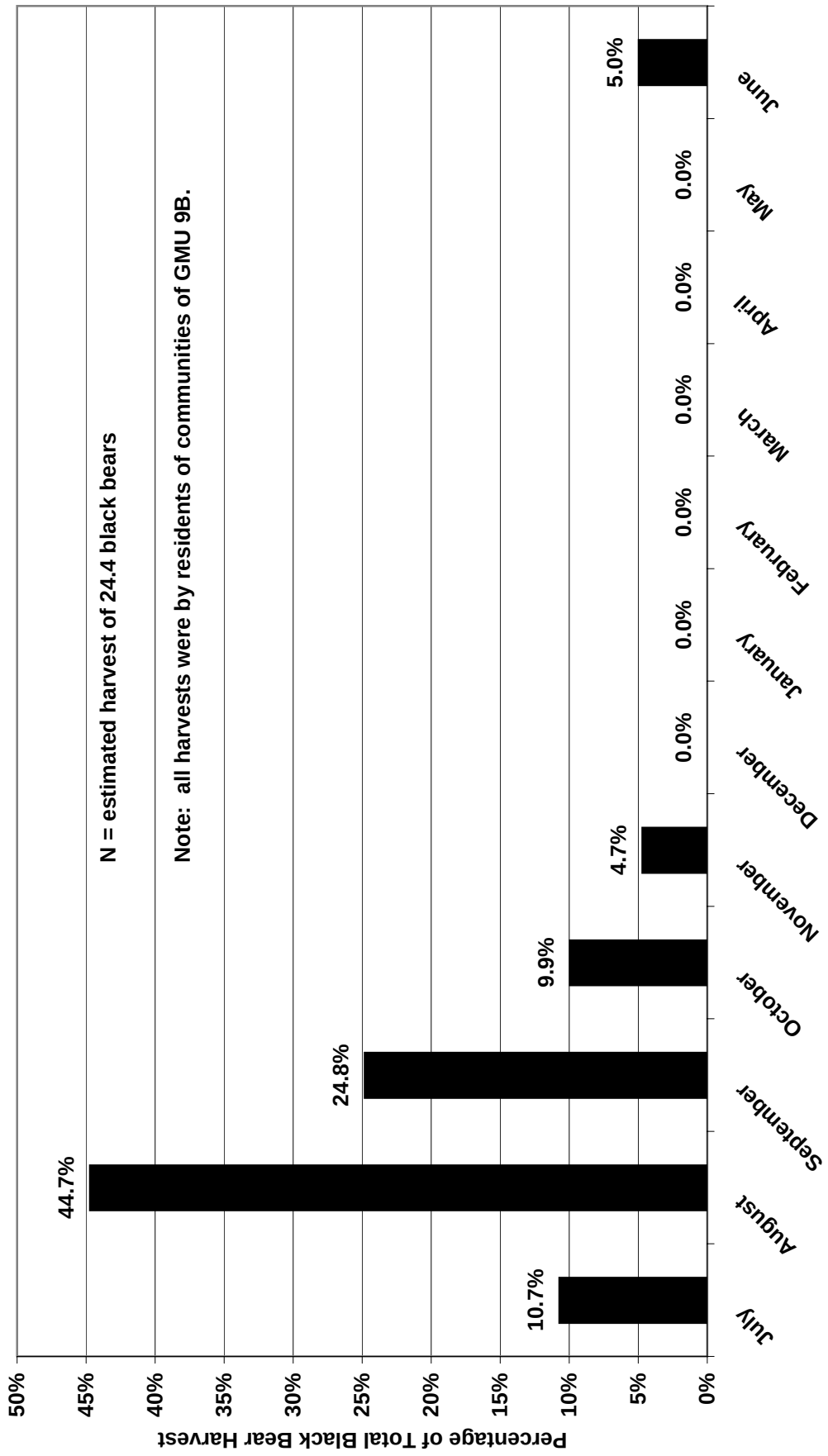


Figure 7. Timing of Brown Bear Harvests by Month, 2001/2002, Communties of GMU 17 and 9B

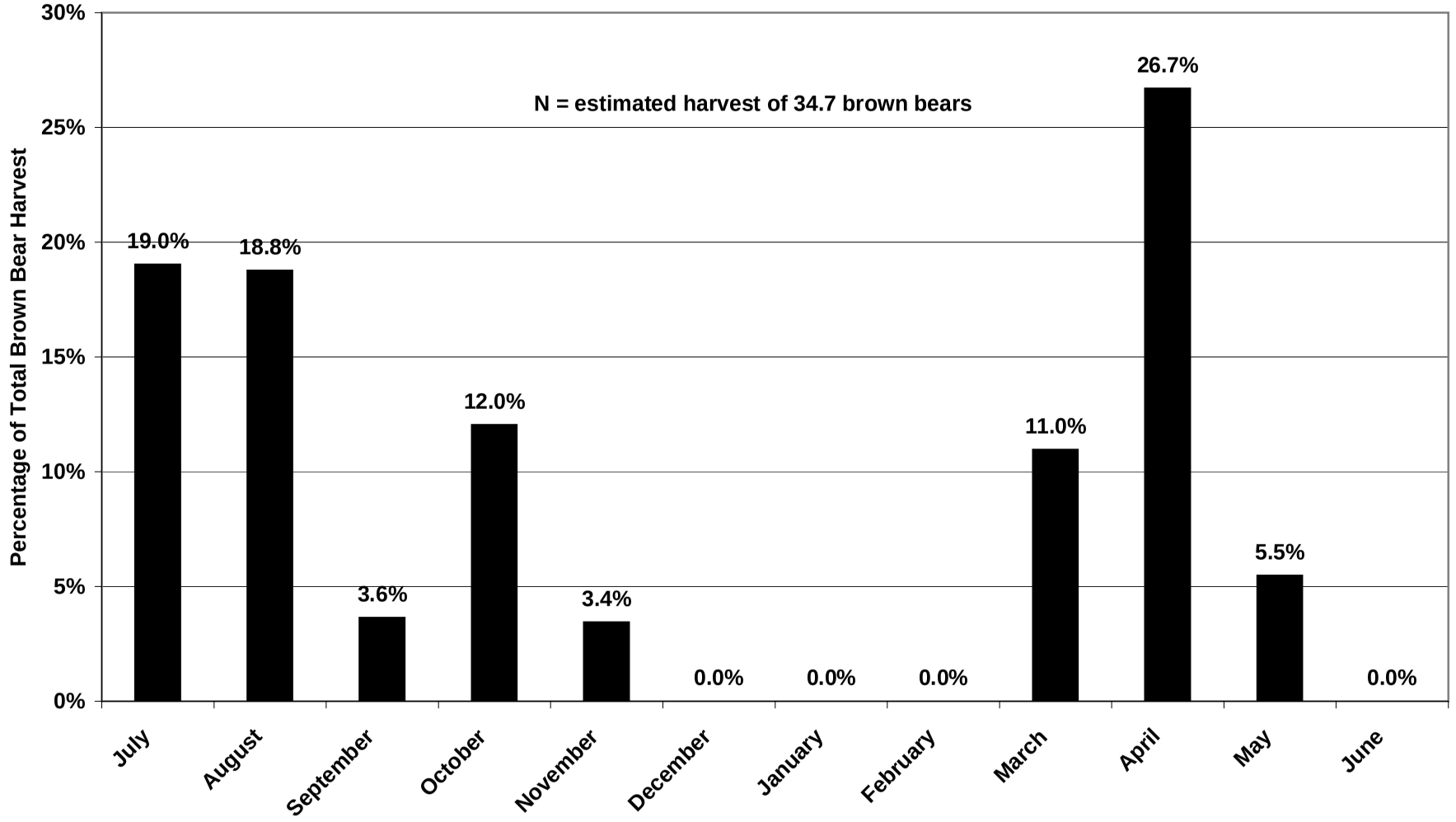


Table 38. Estimated Black Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
GMU 09 (B)	Igiugig	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Illiamna	All	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.4	104.3%
		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	0.0	0.0%
		Male	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	1.4	104.3%
		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	0.0	0.0%
	Kokhanok	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Levelock	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Newhalen	All	0.0	0.0	2.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	1.8	53.6%
		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	0.0	0.0%
		Male	0.0	0.0	2.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	1.8	53.6%
		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	0.0	0.0%
	Nondalton	All	1.2	10.9	2.4	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	18.2	4.2	23.2%
		Female	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	85.2%
		Male	1.2	10.9	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	15.8	3.6	22.9%
		Unknown	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	85.2%
	Pedro Bay	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	0.0	0.0%
		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	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	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	0.0	0.0%

Table 38. Estimated Black Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
	Port Alsworth	All	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.6	111.9%
		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	0.0	0.0%
		Male	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.6	111.9%
		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	0.0	0.0%
	GMU 09 (B)	All	2.6	10.9	6.1	2.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	24.4	4.9	20.0%
		Female	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	82.6%
		Male	2.6	10.9	3.6	2.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	21.9	4.4	20.1%
		Unknown	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	82.6%
GMU 17 (A)	Togiak	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Twin Hills	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	0.0	0.0%
		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	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	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	0.0	0.0%
	GMU 17 (A)	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	0.0	0.0%
		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	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	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	0.0	0.0%
GMU 17 (B)	Koliganek	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	0.0	0.0%
		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	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	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	0.0	0.0%
	GMU 17 (B)	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	0.0	0.0%
		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	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	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	0.0	0.0%

Table 38. Estimated Black Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
GMU 17 (C)	Aleknagik	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Clark's Point	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Dillingham**	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Ekwok	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Manokotak	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	0.0	0.0%
		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	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	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	0.0	0.0%
	New Stuyahok	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Portage Creek	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	0.0	0.0%
		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	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	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	0.0	0.0%
	GMU 17 (C)	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	0.0	0.0%

Table 38. Estimated Black Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
		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	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	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	0.0	0.0%
	GMU 17 (C) without Dillingham	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	0.0	0.0%
		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	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	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	0.0	0.0%
Grand totals	Grand totals	All	2.6	10.9	6.1	2.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	24.4	4.8	19.9%
		Female	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	82.0%
		Male	2.6	10.9	3.6	2.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	21.9	4.4	19.9%
		Unknown	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	82.0%
Grand totals without Dillingham	Grand totals without Dillingham	All	2.6	10.9	6.1	2.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	24.4	4.8	19.9%
		Female	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	82.0%
		Male	2.6	10.9	3.6	2.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	21.9	4.4	19.9%
		Unknown	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	1.0	82.0%

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence household survey 2002

Table 39. Estimated Brown Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
GMU 09 (B)	Igiugig	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Illiamna	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Kokhanok	All	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.4	4.7	107.3%
		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	0.0	0.0%
		Male	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	3.4	157.0%
		Unknown	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	3.4	157.0%
	Levelock	All	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.9	2.4	82.1%
		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	0.0	0.0%
		Male	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	119.9%
		Unknown	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	119.9%
	Newhalen	All	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.8	72.8%
		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	0.0	0.0%
		Male	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.8	72.8%
		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	0.0	0.0%
	Nondalton	All	1.2	0.0	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	1.7	47.6%
		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	0.0	0.0%
		Male	1.2	0.0	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.6	1.7	47.6%
		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	0.0	0.0%
	Pedro Bay	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	0.0	0.0%
		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	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	0.0	0.0%

Table 39. Estimated Brown Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
		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	0.0	0.0%
	Port Alsworth	All	0.0	0.0	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.8	2.2	77.0%
		Female	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.6	111.9%
		Male	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.6	111.9%
		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	0.0	0.0%
	GMU 09 (B)	All	6.3	2.2	1.2	4.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.9	5.6	37.7%
		Female	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.5	105.5%
		Male	2.7	2.2	1.2	2.6	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	4.3	43.7%
		Unknown	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	3.6	97.9%
GMU 17 (A)	Togiak	All	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	2.5	82.1%
		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	0.0	0.0%
		Male	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	117.5%
		Unknown	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	117.5%
	Twin Hills	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	0.0	0.0%
		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	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	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	0.0	0.0%
	GMU 17 (A)	All	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1	2.5	81.8%
		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	0.0	0.0%
		Male	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	117.1%
		Unknown	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.8	117.1%
GMU 17 (B)	Koliganek	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	1.8	0.0	0.0	5.5	4.2	76.8%
		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	0.0	0.0%
		Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	1.8	0.0	0.0	5.5	4.2	76.8%
		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	0.0	0.0%
	GMU 17 (B)	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	1.8	0.0	0.0	5.5	4.2	76.8%
		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	0.0	0.0%
		Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	1.8	0.0	0.0	5.5	4.2	76.8%
		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	0.0	0.0%

Table 39. Estimated Brown Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
GMU 17 (C)	Aleknagik	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3	2.7	1.9	70.7%
		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	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	0.0	0.0%
		Unknown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3	2.7	1.9	70.7%
	Clark's Point	All	0.0	1.0	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	0.0%
		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	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	0.0	0.0%
		Unknown	0.0	1.0	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	0.0%
	Dillingham **	All	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0	0.0	0.0	7.6	9.0	119.6%
		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	0.0	0.0%
		Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0	0.0	0.0	7.6	9.0	119.6%
		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	0.0	0.0%
	Ekwok	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Manokotak	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	0.0	0.0%
		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	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	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	0.0	0.0%
	New Stuyahok	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	0.0	0.0%
		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	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	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	0.0	0.0%
	Portage Creek	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	0.0	0.0%
		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	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	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	0.0	0.0%
	GMU 17 (C)	All	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	0.0	0.0	1.3	11.2	9.1	81.3%

Table 39. Estimated Brown Bear Harvest By Sex and Month, 2001-2002 Regulatory Year

Game Mangement Unit	Community	Sex	Harvest By Month														95% Confidence Limit	
			July	August	September	October	November	December	January	February	March	April	May	June	Unknown	Total	+/-	%
		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	0.0	0.0%
		Male	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0	0.0	0.0	7.6	8.9	118.3%
		Unknown	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3	3.7	1.8	49.7%
	GMU 17 (C) without Dillingham	All	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3	3.7	1.8	49.7%
		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	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	0.0	0.0%
		Unknown	0.0	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3	3.7	1.8	49.7%
Grand totals	Grand totals	All	6.3	6.3	1.2	4.0	1.1	0.0	0.0	0.0	3.7	8.9	1.8	0.0	1.3	34.7	11.7	33.7%
		Female	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.5	104.8%
		Male	2.7	3.7	1.2	2.6	1.1	0.0	0.0	0.0	3.7	7.6	1.8	0.0	0.0	24.4	10.8	44.3%
		Unknown	3.7	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3	8.9	4.4	49.3%
Grand totals without Dillingham	Grand totals without Dillingham	All	6.3	6.3	1.2	4.0	1.1	0.0	0.0	0.0	3.7	1.3	1.8	0.0	1.3	27.1	7.5	27.7%
		Female	0.0	0.0	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.5	104.8%
		Male	2.7	3.7	1.2	2.6	1.1	0.0	0.0	0.0	3.7	0.0	1.8	0.0	0.0	16.9	6.1	36.2%
		Unknown	3.7	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0	1.3	8.9	4.4	49.3%

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.
Source: ADF&G Division of Subsistence and BBNA household survey 2002

Bear Hunting and Harvest Areas

Prior to this study, the division had not systematically mapped black bear hunting areas in GMU 17. Residents of Aleknagik had reported harvesting black bears in the upper Wood River lakes region, although they said that black bears have generally been rare there. Nushagak River community residents reported traveling to areas on the upper Nushagak River with snow machines to hunt black bears in the spring time. If black bears were encountered in the fall while hunters were searching for moose along river corridors, they were sometimes harvested (Chythlook 1991; Schichnes and Chythlook 1991:195). Areas used for hunting bears by residents of the GMU 9B communities of Nondalton and Pedro Bay for the period from the early 1960s to the early 1980s appear in the Alaska Habitat Management Guide Reference Map series (ADF&G 1985; Wright et al. 1983).

Maps of black bear hunting areas for Aleknagik, Dillingham, Iliamna, Koliganek, Levelock, Newhalen, Nondalton, Pedro Bay, Portage Creek, and Port Alsworth are included in this report as part of the CD in Appendix E. Included are maps of areas used during the study year as well as hunting areas for the last 20 years.

Households' Assessments of Meeting Needs in 2001/2002

Because black bears are rarely used, and are difficult to locate, a very large percentage of households in most of the study communities did not report that they did not get enough during the study year (Table 40; Fig. 8). The exceptions were five communities near black bear range in GMU 9B: Igiugig (40 percent not meeting needs), Port Alsworth (80.0 percent), Iliamna (85.7 percent), and Newhalen (94.1 percent) and Kokhanok (100 percent).[5] Most households did not provide a reason for why their black bear needs were not met; for the few that did, resource scarcity and personal reasons were most frequently mentioned (Table 41).

Table 40. Black Bear: Were household's needs met during 2001/2002 Hunting Season?

	Resource needs met during 2001/2002 hunting season			
	Yes		No	
	Count	Row %	Count	Row %
Aleknagik	36	100.0%		
Clark's Point	18	94.7%	1	5.3%
Dillingham	99	90.8%	10	9.2%
Ekwok	31	100.0%		
Igiugig	6	60.0%	4	40.0%
Illiamna	3	14.3%	18	85.7%
Kokhanok			16	100.0%
Koliganek	20	87.0%	3	13.0%
Levelock	14	93.3%	1	6.7%
Manokotak	60	100.0%		
New Stuyahok	59	92.2%	5	7.8%
Newhalen	2	5.9%	32	94.1%
Nondalton	30	90.9%	3	9.1%
Pedro Bay	19	100.0%		
Port Alsworth	4	20.0%	16	80.0%
Portage Creek	6	85.7%	1	14.3%
Togiak	75	100.0%		
Twin Hills	22	100.0%		

[5] It should be noted that past surveys have rarely recorded use of black bears in Kokhanok.

Figure 8. Percentage of Households Not Meeting Black Bear Needs, 2001/02

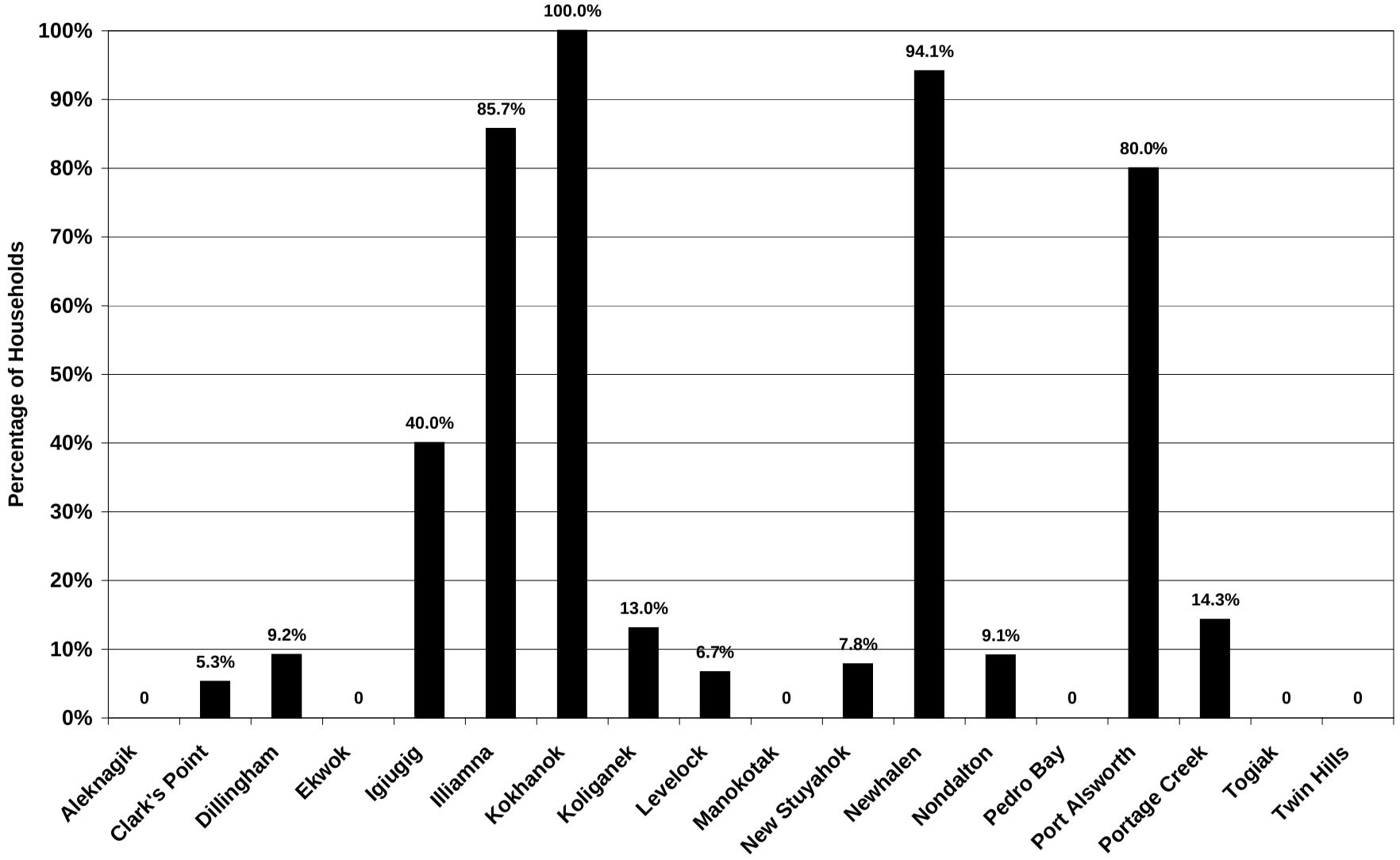


Table 41. Reasons Given by Households for Not Meeting Black Bear Needs in 2001/2002.

				Percentage of Households Not Meeting Needs[1]						
		Households Not Meeting Needs								
Community	Total Households	Number	Percent	Resource Scarcity	Competition	Personal Reasons	Did Not Receive Enough	Did Not Have Enough, Unspecified	Regulations	Missing/ not given
Aleknagik	48	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Clark's Point	21	1	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Ekwok	34	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Igiugig	11	4	36.4%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	75.0%
Illiamna	28	24	85.7%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	94.4%
Kokhanok	35	35	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Koliganek	42	5	13.0%	0.0%	33.3%	33.3%	33.3%	0.0%	0.0%	0.0%
Levelock	25	1	5.9%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manokotak	79	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Stuyahok	89	7	7.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Newhalen	39	37	94.1%	3.1%	0.0%	3.1%	6.3%	3.1%	0.0%	84.4%
Nondalton	40	4	9.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Pedro Bay	21	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Port Alsworth	28	22	80.0%	12.5%	0.0%	12.5%	6.3%	0.0%	0.0%	68.8%
Portage Creek	7	1	14.3%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Togiak	154	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Twin Hills	25	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% of all households	726	142	19.5%	5.5%	1.3%	4.8%	3.9%	0.8%	0.0%	83.7%
Dillingham[2]	416	38	9.1%	0.0%	0.0%	70.0%	0.0%	0.0%	0.0%	30.0%

[1] Households could give more than one reason.

[2] In Dillingham, only households with at least one member holding a hunting license were interviewed. Of the 416 such households in Dillingham, 110 were interviewed for this project. Data in this table may not be representative of the entire community of Dillingham.

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

In all but five of the study communities, few households reported not meeting brown bear needs in the study year (Table 42; Fig. 9). The exceptions were all communities in GMU 9B: Igiugig (60 percent not meeting needs), Kokhanok (68.8 percent), Iliamna (71.4 percent), Port Alsworth (80.0 percent), and Newhalen (88.2 percent). As with black bears, the few households that provided reasons for not meeting their brown bear needs cited resource scarcity or personal reasons (Table 43).

Table 42. Brown Bear: Were household's needs met during 2001/2002 Hunting Season?

	Resource needs met during 2001/2002 hunting season			
	Yes		No	
	Count	Row %	Count	Row %
Aleknagik	34	97.1%	1	2.9%
Clark's Point	18	94.7%	1	5.3%
Dillingham	99	90.8%	10	9.2%
Ekwok	32	100.0%		
Igiugig	4	40.0%	6	60.0%
Illiamna	6	28.6%	15	71.4%
Kokhanok	5	31.3%	11	68.8%
Koliganek	21	91.3%	2	8.7%
Levelock	16	94.1%	1	5.9%
Manokotak	60	100.0%		
New Stuyahok	59	92.2%	5	7.8%
Newhalen	4	11.8%	30	88.2%
Nondalton	25	75.8%	8	24.2%
Pedro Bay	16	84.2%	3	15.8%
Port Alsworth	4	20.0%	16	80.0%
Portage Creek	7	100.0%		
Togiak	75	100.0%		
Twin Hills	22	100.0%		

Figure 9. Percentage of Households Not Meeting Brown Bear Needs, 2001/02

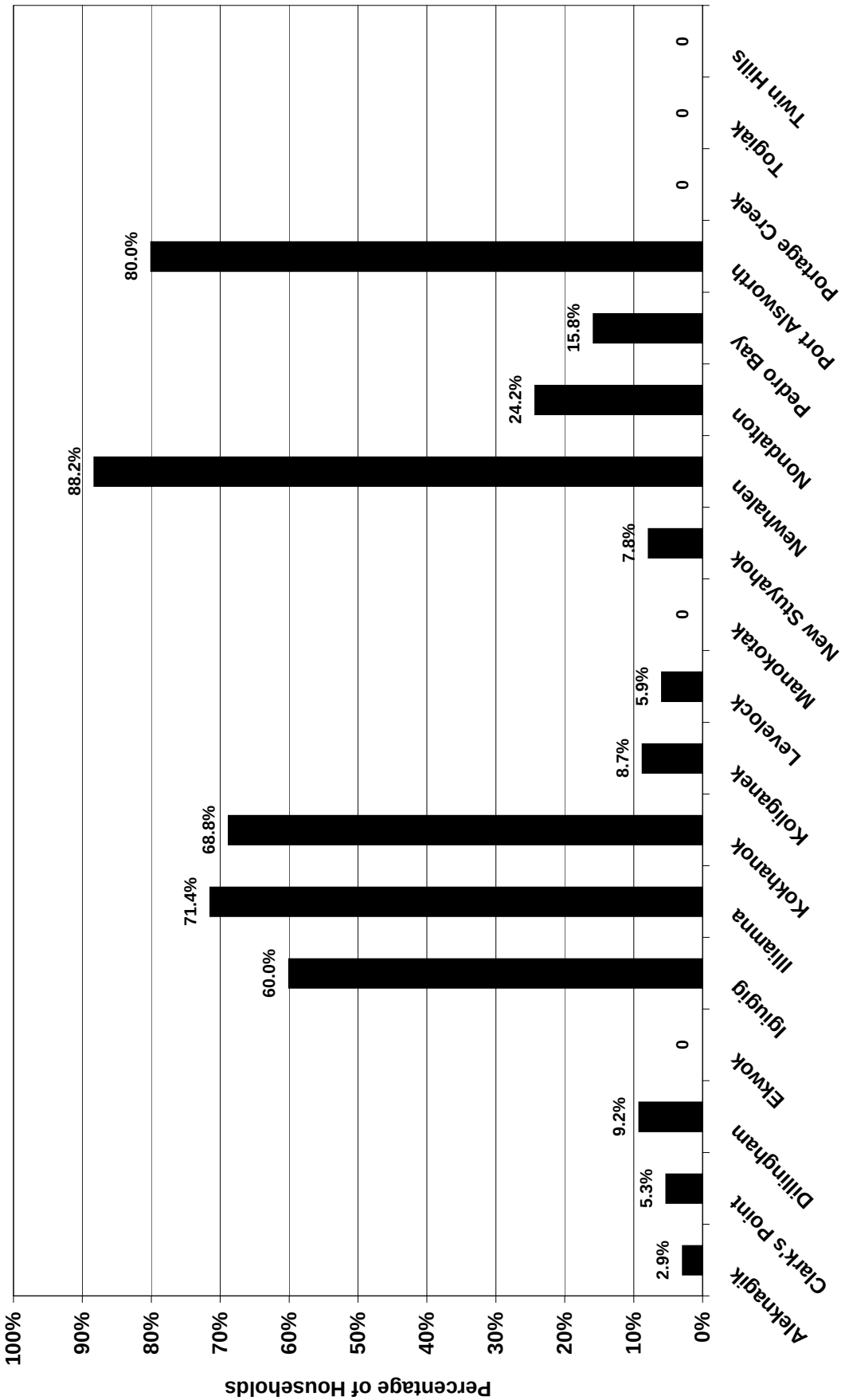


Table 43. Reasons Given by Households for Not Meeting Brown Bear Needs in 2001/2002.

				Percentage of Households Not Meeting Needs[1]						
		Households Not Meeting Needs								
Community	Total Households	Number	Percent	Resource Scarcity	Competition	Personal Reasons	Did Not Receive Enough	Did Not Have Enough, Unspecified	Regulations	Missing/ not given
Aleknagik	48	1	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Clark's Point	21	1	4.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Ekwok	34	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Igiugig	11	6	54.5%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Illiamna	28	20	71.4%	6.7%	0.0%	0.0%	0.0%	0.0%	0.0%	93.3%
Kokhanok	35	24	68.8%	0.0%	0.0%	9.1%	0.0%	0.0%	9.1%	90.9%
Koliganek	42	4	8.7%	0.0%	0.0%	0.0%	50.0%	0.0%	0.0%	50.0%
Levelock	25	1	5.9%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manokotak	79	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Stuyahok	89	7	7.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Newhalen	39	34	88.2%	3.3%	0.0%	3.3%	0.0%	0.0%	0.0%	93.3%
Nondalton	40	8	21.2%	0.0%	14.3%	14.3%	0.0%	0.0%	0.0%	71.4%
Pedro Bay	21	3	15.8%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	66.7%
Port Alsworth	28	22	80.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	93.8%
Portage Creek	7	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Togiak	154	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Twin Hills	25	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% of all households	726	171	23.5%	6.1%	0.9%	3.4%	1.4%	0.0%	2.7%	87.2%
Dillingham[2]	416	38	9.1%	0.0%	0.0%	70.0%	0.0%	0.0%	0.0%	30.0%

[1] Households could give more than one reason.

[2] In Dillingham, only households with at least one member holding a hunting license were interviewed. Of the 416 such households in Dillingham, 110 were interviewed for this project. Data in this table may not be representative of the entire community of Dillingham.

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

DISCUSSION: COMPARISONS WITH OTHER YEARS AND OTHER ESTIMATES

The University of Alaska study pertaining to 1973/74 provided an estimate of 16 black bears and 16 brown bears taken by the communities of GMU 9B (except Port Alsworth, which was not included in the study) (Table 44). This compares with 23 black bears and 12 brown bears in the 2001/2002 study year.

For the communities of GMU 17 (except Portage Creek, Togiak, and Twin Hills), the estimated harvest of brown bears in 1973/74 was 20, with most of these (14) taken by Dillingham hunters and the remainder by residents of Koliganek (4 brown bears) and Manokotak (2 brown bears). Only one black bear was harvested, by a resident of Koliganek (Table 44).

Table 44. Estimated Harvests of Black Bears and Brown Bears, Study Communities, 1973/74[1]

	Number of		Black Bear			Brown Bear		
Community[2]	HHs	People	Percent Harvesting	Number Harvested	No. Per Person	Percent Harvesting	Number Harvested	No. Per Person
Communities of GMU 9B								
Igiugig	8	39	0.0%	0	0.00	33.3%	4	0.10
Iliamna	17	62	22.2%	4	0.06	11.1%	2	0.03
Kokhanok	13	81	22.2%	3	0.04	44.4%	12	0.14
Levelock	17	79	0.0%	0	0.00	0.0%	0	0.00
Newhalen	16	72	0.0%	0	0.00	9.1%	1	0.02
Nondalton	29	151	23.1%	9	0.06	3.8%	1	0.01
Pedro Bay	10	40	0.0%	0	0.00	25.0%	6	0.16
Communities of GMU 17								
Aleknagik	21	105	0.0%	0	0.00	0.0%	0	0.00
Clarks Point	14	77	0.0%	0	0.00	0.0%	0	0.00
Dillingham	229	979	0.0%	0	0.00	6.3%	14	0.01
Ekwok	21	102	0.0%	0	0.00	0.0%	0	0.00
Koliganek	20	113	6.7%	1	0.01	20.0%	4	0.04
Manokotak	37	220	0.0%	0	0.00	5.3%	2	0.01
New Stuyahok	31	194	0.0%	0	0.00	0.0%	0	0.00

[1] Data not collected for Dall sheep

[2] Port Alsworth, Portage Creek, Togiak, and Twin Hills were not included in this survey

Source: Gasbarro and Utermohle 1974

Table 45 reports estimated uses and harvests of black bears from previous Division of Subsistence household surveys. Findings for the 2001/2002 study year are generally consistent with previous study findings. Nondalton has been the Bristol Bay community with the largest black bear harvests (10 in 1973, 17 in 1981, and 18 in 1983). Although no black bears were harvested by interviewed GMU 17 households, previous surveys have recorded small harvests in Koliganek (5 black bears in1987), Manokotak (1 in 1985 and 1 in 1999), and New Stuyahok (2 in 1987).

Table 46 reports results of Division of Subsistence household harvest surveys regarding harvests and uses of brown bears in they study communities. These surveys have recorded relatively low levels of use of brown bears in most communities of GMUs 9B and 17, consistent with the findings for the 2001/02 study year. The highest estimated harvest was 15 brown bears by Kokhanok hunters in 1992.

In summary, compared to moose and caribou, subsistence harvests of bears are relatively low in most western Bristol Bay communities. However, small numbers of black bears are used by the communities within their range. Of all western Bristol Bay communities, black bears are most important in Nondalton. There are low levels of use of brown bears in most western Bristol Bay communities. Subsistence use of brown bears within this area appears especially significant in Kokhanok.

Table 45. Historic Harvests and Uses of Black Bear, Study Communities

Community	Year	Percentage of Households					Number Harvested		Average Pounds	
		Use	Hunt	Harvest	Receive	Give	Number	+/-%	Per HH	Per Capita
Igiugig	1983		0.00	0.00	0.00		0		0.0	0.0
Igiugig	1992	0.00	0.00	0.00	0.00	0.00	0		0.0	0.0
Iliamna	1983		0.00	0.00	0.00		0		0.0	0.0
Iliamna	1991	21.70	4.30	4.30	17.40	8.70	1	100	2.5	0.8
Kokhanok	1983		0.00	0.00	0.00		0		0.0	0.0
Kokhanok	1992	5.60	5.60	2.80	2.80	0.00	2	50	3.2	0.7
Levelock	1988	0.00	0.00	0.00	0.00	0.00	0		0.0	0.0
Levelock	1992	0.00	0.00	0.00	0.00	0.00	0		0.0	0.0
Newhalen	1983		0.00	0.00	0.00		0		0.0	0.0
Newhalen	1991	11.50	7.70	7.70	3.80	7.70	2	50	4.5	0.9
Nondalton	1981			32.00			17		47.4	8.3
Nondalton	1983		28.60	23.80	0.00		18	66	33.3	6.4
Pedro Bay	1982		5.90	0.00	5.90		0		0.0	0.0
Pedro Bay	1996	0.00	0.00	0.00	0.00	0.00	0	0	0.0	0.0
Port Alsworth	1983		7.70	0.00	0.00		0		0.0	0.0
Aleknagik	1989	0.00	0.00	0.00	0.00	0.00	0		0.0	0.0
Clark's Point	1989	0.00	0.00	0.00	0.00	0.00	0		0.0	0.0
Ekwok	1987	3.40	0.00	0.00	3.40	0.00	0		0.0	0.0
Koliganek	1987	9.50	9.50	9.50	0.00	9.50	5	39	5.5	1.4
Manokotak	1985	3.70	3.70	1.90	1.90	3.70	1	100	1.1	0.2
Manokotak	1999	6.20	1.20	1.20	4.90	0.00	1	63	0.0	0.0
New Stuyahok	1987	5.00	2.50	2.50	2.50	2.50	2	100	1.5	0.3
Togiak	1999	0.00	0.00	0.00	0.00	0.00	0		0.0	0.0
Twin Hills	1999	0.00	0.00	0.00	0.00	0.00	0		0.0	0.0

Blank cells = data not collected

Source: Scott et al. 2001, Kenner et al. 2003

Table 46. Historic Harvests and Uses of Brown Bear, Study Communities

Community	Year	Percentage of Households					Number Harvested		Average Pounds	
		Use	Hunt	Harvest	Receive	Give	Number	+/-%	Per HH	Per Capita
Igiugig	1983		33.30	33.30	0.00		4	150	33.33	5.27
Igiugig	1992	30.00	10.00	0.00	30.00	10.00	0		0.00	0.00
Iliamna	1983		0.00	0.00	0.00		0		0.00	0.00
Iliamna	1991	8.70	8.70	4.30	4.30	4.30	1	100	4.35	1.33
Kokhanok	1983		0.00	0.00	15.80		0		0.00	0.00
Kokhanok	1992	47.20	27.80	22.20	41.70	27.80	15	19	38.89	8.75
Levelock	1988	22.20	7.40	7.40	14.80	14.80	4	50	11.11	3.37
Levelock	1992	6.70	10.00	3.30	6.70	3.30	1	100	3.33	1.18
Newhalen	1983		9.10	9.10	0.00		2	200	9.09	1.88
Newhalen	1991	15.40	11.50	11.50	3.80	7.70	4	50	11.54	2.34
Nondalton	1981			21.00			9		26.32	4.63
Nondalton	1983		4.80	0.00	0.00		0		0.00	0.00
Pedro Bay	1982		11.80	5.90	5.90		1	100	5.88	1.99
Pedro Bay	1996	7.70	0.00	0.00	7.70	0.00	0	0	0.00	0.00
Port Alsworth	1983		0.00	0.00	0.00		0		0.00	0.00
Aleknagik	1989	10.50	15.80	7.90	5.30	5.30	3	33	3.95	1.16
Clark's Point	1989	0.00	0.00	0.00	0.00	0.00	0		0.00	0.00
Dillingham	1984	2.00	0.00	0.00	2.00	0.00	0		0.00	0.00
Ekwok	1987	0.00	0.00	0.00	0.00	0.00	0		0.00	0.00
Koliganek	1987	7.10	7.10	7.10	0.00	4.80	6	50	11.90	3.07
Manokotak	1985	5.60	5.60	1.90	3.70	3.70	1	100	1.85	0.35
Manokotak	1999	4.90	2.50	2.50	2.50	1.20	8	55	1.20	0.30
New Stuyahok	1987	5.00	2.50	0.00	5.00	0.00	0		0.00	0.00
Togiak	1991						12			
Togiak	1992						6			
Togiak	1993						5			
Togiak	1999	4.00	4.00	4.00	0.00	3.30	8	31	4.70	1.10
Twin Hills	1991						0			
Twin Hills	1999	0.00	0.00	0.00	0.00	0.00	0		0.00	0.00

Blank cells = data not collected

Source: Scott et.al. 2001

CHAPTER SIX: DALL SHEEP

BACKGROUND

Population and Range

The study area is on the southwestern edge of the range of Dall sheep in Alaska. ADF&G includes GMU 9B and 17B, along with 16B, 19B, and 19C, within the Alaska Range West Dall sheep population, with an estimated population of 4,000-5,000 animals for the entire range. From Lake Clark west habitat is less suitable for Dall sheep, thus most of the sheep population lies in the Alaska Range west and south of Denali National Park and Preserve (Szepanski and Lenart 2002).

Historic Subsistence Use Patterns

Small numbers of Dall sheep inhabit portions of the upper-most Mulchatna River drainage of GMU 17B within the Lake Clark National Park and Preserve. There is no documented use of these sheep by the Central Yup'ik people whose descendents now live in GMU 17. For example, the major source on pre-contact subsistence activities for the Yup'ik population of the area, VanStone (1967), does not mention sheep. Hunters in Koliganek have reported to Division of Subsistence researchers that they have never seen sheep in their traditional use areas and do not hunt them.

The upper Mulchatna River portion of GMU 17B was traditionally used by Dena'ina Athabascan Indians, who formerly lived in villages on the Mulchatna River and whose descendents now live in Lime Village (in GMU 19A) and Nondalton (in GMU 9B). Ellanna and Balluta (1992:142,147,154,162) provide information about the Dena'ina's use of sheep in the upper Mulchatna drainage including areas around Turquoise Lake and Twin Lakes. The Telaquana Trail, linking Lake Clark with Telaquana Lake, passed through this area. Two Dena'ina hunting camps were located here (Ellanna and Balluta 1992: 142). People from the Nondalton/Lake Clark area used the Turquoise Lake/Twin Lakes area in the fall for hunting and late fall fishing for spawned-out sockeye salmon. In October, "fall fish camps" (*naqeli nuch'etdeh*) were bases for fishing, brown bear hunting, and sheep hunting (Ellanna and Balluta 1992: 147, 154, 162).

Kari (1983) also documents former hunting of sheep in upper GMU 17B by Dena'ina hunters from Lime Village. Kari (1983:88) reports that, "Lime people have traditionally hunted Dall sheep in the Alaska Range in the fall and spring for their meat, hides, and horns . . . Although sheep hunting is not as common as it was earlier in the century, it has continued into recent times with people still traveling to hunting grounds by boat and on foot as was traditionally done." Kari also notes (p. 89) that, "While sheep is not an important food for Lime people today in terms of quantity, it is a delicacy as well as an alternative resource to be turned to if game animals heavily depended upon were to become scarce." Maps included in Kari (1983) show that the upper Mulchatna area now in GMU 17B was used "within the life span of Lime Villagers (i.e. hunting, trapping, fishing and gathering)." Specific hunting areas for particular resources such as sheep are not depicted. Kari (1983:89) describes recent (1970s) sheep hunting by Lime Village residents in the headwaters of the Swift River in GMU 19, but does not mention any recent activity in the Upper Mulchatna area. [1]

[1] Although there was evidence of past subsistence uses of sheep in GMU 17B, in April 1997 the Alaska Board of Game made a negative customary and traditional use finding for this sheep population. The BOG has made no finding regarding the customary and traditional use status of sheep in GMU 9B. As noted below, both populations are open to subsistence hunting under federal rules.

Sheep inhabit the mountainous portions of GMU 9B, much of which is within the Lake Clark National Park and Preserve. Regarding subsistence uses of sheep in GMU 9B, Behnke (1978:7-8) noted the importance of sheep to Nondalton and other Dena'ina communities in the past, especially when caribou and moose populations were low. Concerning use in the 1970s, he wrote that sheep "are occasionally taken by Nondalton hunters who hike into canyons in the mountains along Little Lake Clark and the upper end of Lake Clark." Behnke noted too that the only areas with sheep populations accessible to Dena'ina hunters are in the park. Ellanna and Balluta (1992:160) also describe sheep hunting by Nondalton residents in areas now within GMU 9B in the late fall. They note that sheep hunts at this time of the year lasted four or five days. Specific locations included Sheep Canyon (*Tsayeh Ka'ahtnu*), Kontrashibuna Lake (*Qenlghishi Vena*), or *Ch'kentalqeyitnu* (a creek north of Currant Creek). About four sheep per "domestic group" were harvested.

Dena'ina inhabitants of this region (GMUs 19ABCD, 17B, and 9B) traditionally took sheep in the fall and the spring (Kari 1983:88). Ellanna and Balluta (1992:160) specifically mention October as a primarily month for sheep hunting for Nondalton residents. In the 1980s, residents of GMU 9B communities hunted sheep in August and September (Morris 1986:54).

Dena'ina reached traditional sheep hunting areas in GMU 9B using boats and on foot. In Nondalton, Ellanna and Balluta (1992:160) note that:

> While women and older girls were processing the [spawned-out] salmon, men and older boys from the Lake Clark area initially went by boat to the head of the lake and climbed into the mountains in search of Dall sheep. During these four or five day trips, hunters camped in tents and harvested sheep on the slopes of mountains.

In 1981, hunters from local GMU 9B communities mapped areas they used for hunting sheep (ADF&G 1985b). Nondalton hunters use several areas on the southeast side of upper Lake Clark and Little Lake Clark within the Lake Clark National Park in GMU 9B. Pedro Bay residents hunt for sheep north of upper Iliamna Lake, including the drainages of the Chekok Creek, Tazimina River, Canyon Creek, and others, again all in GMU 9B. Maps in Behnke (1979) for Nondalton show similar use areas.

Kari (1983:89) reports smoking of sheep meat as a means of preservation used in Lime Village in the 1970s. For Nondalton, Ellanna and Balluta (1992:1992) note that:

> Sheep pelts were used for winter clothing, such as mittens and socks; sleeping bags or blankets; and linings for coats. Dall sheep meat was a highly valued food item as well. Because the weather was cold during this time of the year [October], sheep meat was merely hung for immediate consumption.

There is no specific information available for use of sheep by residents of other communities. In the pre-contact period, sheep meat was preserved by drying. The horns were carved into spoons and other items.

Kari (1983:88-89) summarizes some traditions about sheep hunting in general for Lime Village. Ellanna and Balluta (1992:160) provide sheep hunting traditions for Nondalton. Also, it should be noted that use of sheep figures in some traditional Dena'ina stories about hunting in the mountains.

Current use of Dall Sheep by Residents of GMU 9B

Although residents of GMU 9B (Kvichak Watershed) hunt extensively to feed their families and relatives, very few hunt sheep. When asked if they hunt sheep most residents laugh and tell you "sheep hunting is a lot of work." Even so residents in the Kvichak Watershed who have hunted sheep state, "sheep is heavy meat. It's good eating." Quite simply most residents do not have the resources and time to dedicate to sheep hunting when moose and caribou are readily available. Of the seven communities surveyed within GMU 9B, only Nondalton and Port Alsworth, both close to the mountains, reported using sheep in the past. Sheep is not used in the present, and there was no reported harvest of sheep for the study year 2001-2002. Recreational hunters are the primary harvesters of sheep. Although subsistence laws may provide a priority for subsistence hunting of sheep over sport hunting, in practice,

> The Alaska Board of Game, acting in compliance with these subsistence laws has found historic human use of Dall sheep rarely meets present definitions of subsistence use. Consequently, diversified human recreation is the predominant use of Dall sheep in Alaska. The major use of Dall sheep then is the opportunity to hunt under aesthetically pleasing conditions, and opportunity to harvest unusually large rams as trophies (Hicks 1996).

The Dall sheep population is estimated as 4000-5000 animals for Units 9, 16, 17, and 19. From Lake Clark west, habitat is less suitable for Dall sheep, thus most of the sheep population lies in the Alaska Range west and south of Denali National Park and Preserve. From 1994 to 1996, of the 132 successful hunts only 4 were local residents, 76 were non-residents, and 51 were non-local residents.

Dall Sheep Hunting Regulations: 2001/2002 Regulatory Year

Under state regulations for GMU 9, there was an August 10 to September 20 season for hunting Dall sheep with a seasonal limit of one ram with a full curl horn or larger. Federal subsistence regulations allowed hunting of Dall sheep within the Lake Clark National Park and Preserve from August 10 through October 10. There was a seasonal limit of one ram with a 7/8 curl horn by federal registration permit. For the remainder of the GMU, federal regulations included an August 10 through September 20 season with a seasonal limit of one ram with a 7/8 curl.

In 2001/2002, there was no state open season for Dall sheep hunting in GMU 17. Federal subsistence regulations allowed hunting from August 10 to September 20 with a seasonal limit of one ram with a full curl horn or larger.

HARVESTS AND USES IN 2001/2002

Participation in the Subsistence Harvest and Use of Dall Sheep

An estimated 25 residents of the study communities hunted Dall sheep in the 2001/2002 study year (Table 47). All were residents of communities of GMU 9B. None of these hunters was successful in harvesting a sheep in the study year. In three communities, a small number of households reported using sheep that they had received as gifts: 10 percent of households in Port Alsworth, 9.1 percent of households in Nondalton, and 4.8 percent of households in Iliamna (Table 48).

Hunters from four study communities (Iliamna, Newhalen, Nondalton, and Port Alsworth) mapped areas they used to hunt sheep during the study year. Hunters from these four communities and Igiugig also mapped areas used for sheep hunting over the last 20 years. All of these areas are within the Lake Clark National Park and Preserve. For other maps of subsistence Dall sheep hunting areas with GMU 9B, see Ellanna and Balluta (1992), Behnke (1978), and ADF&G's Habitat Guide Atlas (ADF&G 1985).

Table 47 Estimated Number of Hunters and Successful Hunters of Dall Sheep by Community and Area, 2001/2002.

Communtiy	Total Hunters	Successful Hunters	Percentage Successful
Igiugig	0	0	0.0%
Illiamna	8	0	0.0%
Kokhanok	0	0	0.0%
Levelock	0	0	0.0%
Newhalen	3	0	0.0%
Nondalton	10	0	0.0%
Pedro Bay	0	0	0.0%
Port Alsworth	4	0	0.0%
GMU 09 (B) Subtotal	25	0	0.0%
Togiak	0	0	0.0%
Twin Hills	0	0	0.0%
GMU 17 (A) Subtotal	0	0	0.0%
Koliganek	0	0	0.0%
GMU 17 (B) Subtotal	0	0	0.0%
Aleknagik	0	0	0.0%
Clark's Point	0	0	0.0%
Dillingham	0	0	0.0%
Ekwok	0	0	0.0%
Manokotak	0	0	0.0%
New Stuyahok	0	0	0.0%
Portage Creek	0	0	0.0%
GMU 17 (C) Subtotal	0	0	0.0%
GMU 17 (C) Subtotal without Dillingham	0	0	0.0%
Grand totals	25	0	0.0%
Grand totals without Dillingham	25	0	0.0%

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

Table 48. Levels of Participation in the Use and Harvest of Dall Sheep and Dall Sheep Harvest Levels, 2001/02 Regulatory Year.

	Percentage of Households					Dall Sheep Harvest					95% Confidence Limit of Total Harvest		
Community	Used Dall Sheep (%)	Hunted Dall Sheep (%)	Harvested Dall Sheep (%)	Received Dall Sheep (%)	Gave Dall Sheep (%)	Total	Per Household	Per Person	Per Hunter	Per Successful Hunter	%	Low*	High
Residents of GMU 09B													
Igiugig	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Illiamna	4.8	14.3	0.0	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Kokhanok	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Levelock	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Newhalen	0.0	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Nondalton	9.1	21.2	0.0	9.1	3.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Pedro Bay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Port Alsworth	10.0	10.0	0.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Subtotal	3.4	7.7	0.0	3.4	1.1	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Residents of GMU 17A													
Togiak	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Twin Hills	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Residents of GMU 17B													
Koliganek	0.0	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	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Residents of GMU 17C													
Aleknagik	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Clark's Point	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Dillingham **	n/a	0.0	0.0	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Ekwok	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Manokotak	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
New Stuyahok	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Portage Creek	0.0	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	n/a	0.0	0.0	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Subtotal without Dillingham	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Grand total	n/a	1.1	0.0	n/a	n/a	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Grand total without Dillingham	1.1	2.4	0.0	1.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence and BBNA household survey 2002

Households' Assessments of Meeting Needs in 2001/2002

In most communities, few households reported not meeting needs for sheep, most likely because sheep are not regularly used nor used in large quantities. But most households in Port Alsworth (80.0 percent), Iliamna (90.5 percent), Newhalen (97.1 percent), and Kokhanok (100 percent), as well as 44.4 percent in Igiugig and 15.2 percent in Nondalton, said their Dall sheep needs were not met (Table 49; Fig. 10). This likely reflects the high value placed on sheep meat rather than an expectation of large harvests. Less than 20 percent of the households that reported not meeting their Dall sheep needs in the study year provided an explanation as to why their needs were not met. Of those who provided a reason, most noted the scarcity of sheep in their hunting areas (Table 50).

Table 49. Dall Sheep: Were household's needs met during 2001/2002 Hunting Season?

	Sheep needs met during 2001/2002 hunting season?			
	Yes		No	
	Count	Row %	Count	Row %
Aleknagik	36	100.0%		
Clark's Point	17	100.0%		
Dillingham	94	85.5%	16	14.5%
Ekwok	29	93.5%	2	6.5%
Igiugig	5	55.6%	4	44.4%
Illiamna	2	9.5%	19	90.5%
Kokhanok			16	100.0%
Koliganek	23	100.0%		
Levelock	17	100.0%		
Manokotak	60	100.0%		
New Stuyahok	60	95.2%	3	4.8%
Newhalen	1	2.9%	33	97.1%
Nondalton	28	84.8%	5	15.2%
Pedro Bay	19	100.0%		
Port Alsworth	4	20.0%	16	80.0%
Portage Creek	6	85.7%	1	14.3%
Togiak	73	100.0%		
Twin Hills	22	100.0%		

Source: ADF&G Division of Subsistence and BBNA household survey 2002

Figure 10. Percentage of Households Not Meeting Dall Sheep Needs, 2001/02

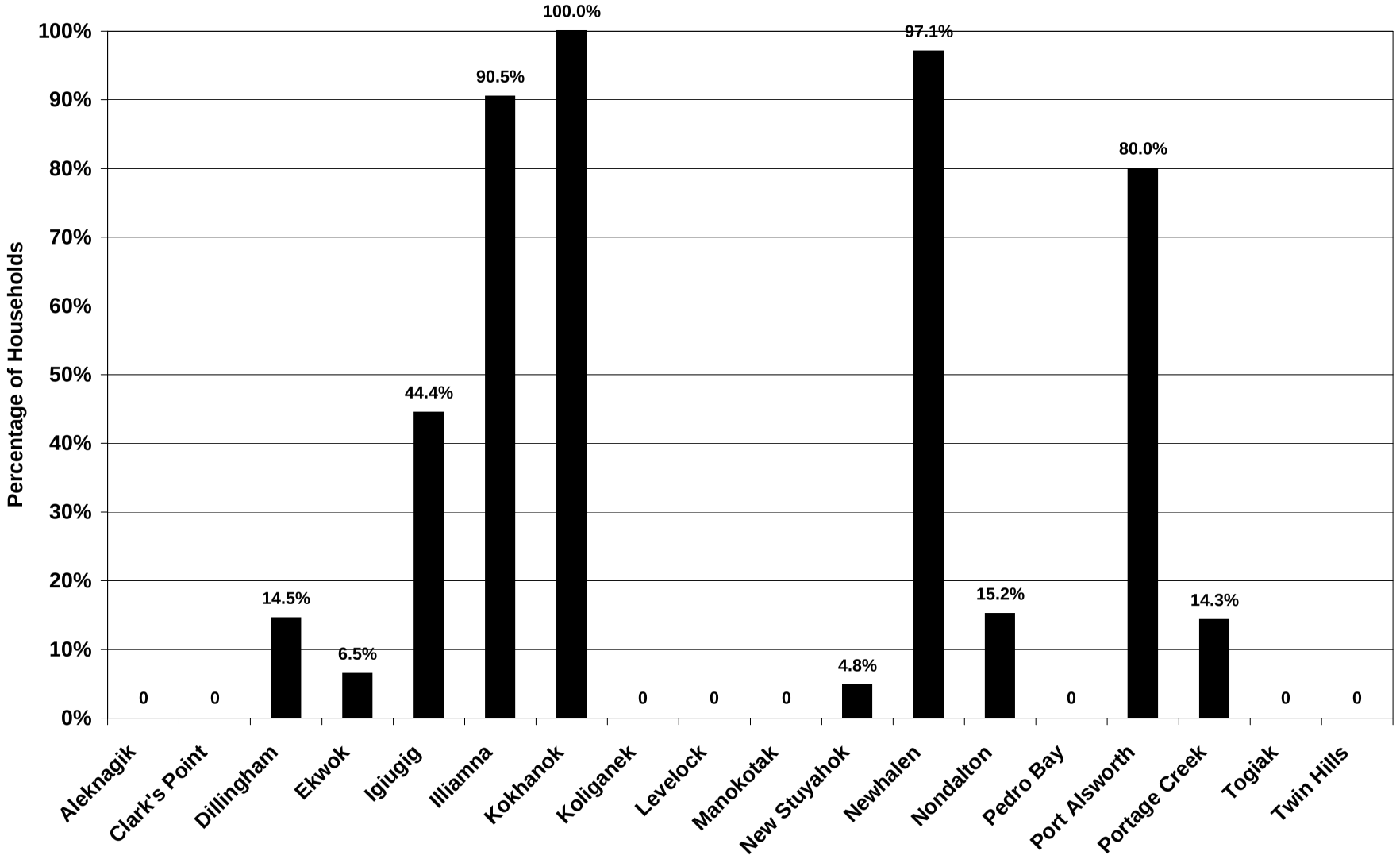


Table 50. Reasons Given by Households for Not Meeting Dall Sheep Needs in 2001/2002.

				Percentage of Households Not Meeting Needs[1]						
		Households Not Meeting Needs								
Community	Total Households	Number	Percent	Resource Scarcity	Competition	Personal Reasons	Did Not Receive Enough	Did Not Have Enough, Unspecified	Regulations	Missing/ not given
Aleknagik	48	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Clark's Point	21	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Ekwok	34	2	6.3%	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	50.0%
Igiugig	11	4	36.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Illiamna	28	25	90.5%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	94.7%
Kokhanok	35	35	100.0%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	93.8%
Koliganek	42	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Levelock	25	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Manokotak	79	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
New Stuyahok	89	4	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%
Newhalen	39	38	97.1%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	93.9%
Nondalton	40	6	15.2%	60.0%	0.0%	20.0%	0.0%	0.0%	40.0%	20.0%
Pedro Bay	21	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Port Alsworth	28	22	80.0%	25.0%	0.0%	25.0%	12.5%	0.0%	18.8%	43.8%
Portage Creek	7	1	14.3%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Togiak	154	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Twin Hills	25	0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
% of all households	726	138	19.0%	12.4%	0.0%	4.9%	2.0%	0.0%	4.8%	81.6%
Dillingham[2]	416	61	14.5%	6.3%	0.0%	50.0%	0.0%	0.0%	6.3%	37.5%

[1] Households could give more than one reason.

[2] In Dillingham, only households with at least one member holding a hunting license were interviewed. Of the 416 such households in Dillingham, 110 were interviewed for this project. Data in this table may not be representative of the entire community of Dillingham.

Source: ADF&G Division of Subsistence and BBNA household surveys 2002

DISCUSSION: COMPARISON WITH OTHER YEARS AND OTHER ESTIMATES

According to ADF&G records, no hunting effort or harvest of Dall sheep was reported for GMU 17B for 1986, 1987, 1989, or 1992 through 1995. In 1988, one non-resident hunter killed a sheep in GMU 17B. There was no other reported hunting effort. For GMU 9B, ADF&G harvest ticket data indicate that two Port Alsworth residents hunted sheep in 1986/87 and in 1987/88. In 1988/89, there was one sheep hunter from Port Alsworth and one from Pedro Bay. In 1989/90, there was one sheep hunter from Port Alsworth and one from Nondalton in GMU 9B.

The University of Alaska survey for 1973/74 did not gather info on harvests of Dall sheep. Previous division household surveys have documented Dall sheep harvests only in Port Alsworth (2 sheep in 1983). Past surveys have documented hunting effort by residents of Levelock, Nondalton, and Port Alsworth (Table 51). Szepanski and Lenart (2002:14) report that since 1995, the federal subsistence permit hunt for 9B has recorded a harvest of from 0 to 3 sheep.

Table 51. Harvests and Uses of Dall Sheep, Study Communities

		Percentage of Households					Number Harvested		Average Pounds	
Community	Year	Use	Hunt	Harvest	Receive	Give	Number	+/-%	Per HH	Per Capita
Igiugig	1983		0.00	0.00	0.00		0.00		0.00	0.00
Igiugig	1992	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
Iliamna	1983		0.00	0.00	0.00		0.00		0.00	0.00
Iliamna	1991	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
Kokhanok	1983		0.00	0.00	0.00		0.00		0.00	0.00
Kokhanok	1992	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
Levelock	1992	0.00	3.30	0.00	0.00	0.00	0.00		0.00	0.00
Newhalen	1983		0.00	0.00	0.00		0.00		0.00	0.00
Newhalen	1991	3.80	0.00	0.00	3.80	0.00	0.00		0.00	0.00
Nondalton	1983		4.80	0.00	0.00		0.00		0.00	0.00
Pedro Bay	1982		0.00	0.00	0.00		0.00		0.00	0.00
Pedro Bay	1996	0.00	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00
Port Alsworth	1983		7.70	7.70	0.00		2.00	100	6.15	1.70

Blank cells = data not collected.
Note: communities not listed had no uses or hunting activity for sheep in the study year.

Source: Scott et al. 2001

CHAPTER SEVEN: FACTORS AFFECTING CONTEMPORARY SUBSISTENCE HUNTING

This chapter summarizes observations provided by key respondents about factors that are affecting subsistence hunting in their communities. They described four classes of factors; the effects of 1) predators on game populations, 2) recreational hunting 3) State and Federal regulatory regimes, and 4) changing weather and climate. Key respondent interviews were conducted in the GMU 9B communities of Port Alsworth, Pedro Bay, Nondalton, Newhalen, Iliamna, Kokhanok, and Igiugig.

THE EFFECTS OF PREDATORS ON LARGE LAND MAMMALS IN THE KVICHAK WATERSHED

Predators such as wolves play an important role in the complex web of interaction between all species in the region. There were many comments made regarding wolves, a species that is both revered and disliked by local residents.

Local residents report a rise in the wolf population due to the growth of the Mulchatna Caribou Herd and the spread of moose populations across the Lake Clark – Iliamna Lake Region. The other major predator species, brown bears, was also discussed extensively by local residents. Residents wondered if there were really more brown bears in the area, or if brown bears are more noticeable as they are competing with humans for food due to the low return of salmon in the Kvichak River system. However, most discussion of predators is related to wolves.

A Newhalen resident sees a rise in the wolf population and relates this to the rise in the number of caribou. He also sees a rise in the brown bear and moose population and understands how each species is interconnected with the other. He says there are a lot of

> Wolves of course, a lot of wolves, a lot of caribou, there is a lot more moose then there used to be. Bear, I think bears are getting spoiled from being fed, going to where ever there is food resources, garbage. Somebody will be out there throwing garbage away and the bears are right there eating it, really looking for a handout. I think that is what makes the bears come around. Years ago you never see bears in any village at all, they were afraid. They went and got their own. Now we start feeding them and have everything handy for them so I think that is what is making the bears come around. Right now, these days, more people that gather in one place fishing, sport fishing or whatever you want to call it, there is more bears.

The same is true for human interaction with wolves. One resident of Lake Clark relates that he would like to see a reasonable approach to wolf control. He says that in the past, when the wolf populations were lower, he saw that both the wolves and the prey populations were lower. He understands the cycling of animal populations, how the decline of the caribou or moose population will be followed by the decline of predators. However, he does not want to wait for the cycle to come full circle. The wolves, he said, are not as shy as they used to be and will now come up to the house and try to get into his chicken coop. This lack of shyness by the wolves in the Lake Clark area could be caused by fewer caribou in this area during the past 3 years and lower population of moose. He says the wolf population is doing considerable damage to the local prey. There are not enough moose calves surviving to propagate the species. According to the same hunter, after the calving season it is possible to see the calves and the mothers together for a few weeks, and then the calves disappear. He does a lot of flying in the area, and in the past he saw the carcass of an animal that had been killed lying out on the tundra

for days while the wolves slowly picked it clean. Now, he says, the carcass can be stripped clean in a matter of hours, with up to 40 wolves converging on the same area. Most residents of Port Alsworth know of two wolf packs that are located on the lake, the eastern and western packs. They used to be one pack, but as the pack grew in numbers it split to become two packs. Many residents speculate that the wolves will eventually starve out or migrate to other areas, as caribou have not been observed in the area in significant numbers recently.

Although the residents of Port Alsworth report fewer moose in their hunting area due to a larger predator population, on the other side of the lake the residents of Nondalton are utilizing the Chulitna River Valley for moose hunting. Hunters related this area is especially productive area for moose hunting. The wolves are concentrating on the Port Alsworth stretch of the lake and may not be as active near Nondalton. This area, however, may hold a larger brown bear population. Brown bear interaction with humans was the major topic of discussion among Nondalton hunters, and wolves were rarely referred to.

As around Lake Clark, the numbers of wolves near Iliamna Lake has grown following the trend of the caribou. However, the caribou did not make it up Iliamna Lake past Igiugig during 2002. Most hunters travel south in order to find caribou to hunt and in doing so encounter wolves. Some hunters believe, however, that the wolf populations are not as high as others claim. According to a resident of Iliamna,

> I fly and I haven't seen a pretty good rise other than what people say. But I have never seen wolves here, and we have been seeing them here, you know a couple at a time, and I have never seen wolves here… They are pretty elusive and they got to be around wreaking havoc on moose and whatever. Not only them but bears. I think since the fish have not been coming I haven't seen as many [brown bears]. I used to fly down past that Lower Talarik and one evening I counted 70 bears on one creek, that's mother, cubs, and the bigger bear.

A resident of neighboring Newhalen agrees, "yes there are a lot more bears and a lot more wolves."

In Nondalton most residents related that brown bears were the major problem, although they are also concerned about growing wolf populations. Residents state that humans and wolves are competing for the same resource, moose. A Nondalton resident describes the evidence of the growth of the wolf population:

> I made a trip from here to Lime Village this year. From on top of the mountain (Hoknede Mountain) here to Lime Village, that's 140 miles and in that 140 miles there was not a ¼ of a mile that I didn't run over a wolf track. That's the most wolf tracks I've ever seen in my life, from all the way from here to up there. And bears too, I don't know why, they want to regulate this moose and caribou so much, why don't they do something about these bears.

According to local observations, growth of the brown bear population is also having a detrimental affect on the number of black bears, especially in the Lake Clark area. One hunter relates that the black bear population, which is the preferred species of bear for consumption, is down considerably because there are more brown bears. He said that the population of brown bears and wolves has exploded in the past 3-4 years. There are too many predators for prey animals now in the area according to local residents.

Local hunters have watched both the caribou-moose and brown bear-wolf populations rise and fall in the past, and at the present time there is another boom underway with a bust segment of the cycle soon

to occur. They say wolves, usually an elusive species, are taking more chances and interacting more frequently with humans just as bears now wander into villages for food. According to key respondents these observations of uncharacteristic behavior could foretell to the decline of predator species. Unless the Mulchatna caribou herd returns to the Iliamna Lake – Lake Clark area in significant numbers soon and unless the Kvichak River salmon run grows stronger, wolves and bears in the region will continue to threaten human competitors for food.

LOCAL OBSERVATIONS OF RECREATIONAL HUNTER IMPACTS ON LARGE LAND MAMMALS AND HABITAT

Waste

> After the sport hunter had finished gutting the caribou and had taken the meat the subsistence hunter said he went over to the pile of what was left over and started removing parts. The sport hunters asked him what he was doing and he replied, "I'm getting my supper."
>
> Newhalen Resident ~ Spring 2002

Key respondents in GMU 9B communities drew a sharp distinction between themselves as subsistence hunters and others who travel to GMU 9B to hunt as "sport hunters." Non-local hunters are widely conceptualized by subsistence hunters as wasting resources by only using select portions of what they harvest. The use of caribou is a good example of this. According to local hunters, when the Mulchatna caribou herd arrived at Iliamna Lake a few years ago, almost immediately subsistence hunters viewed a storm of planes landing on the lake to shoot the caribou en masse. Later, local hunters found that only the legs of most of the animals had been taken. Of sport hunters one subsistence hunter said, "they throw everything away," while another local subsistence hunter added, "we bring everything back." Many local subsistence hunters wondered why not all available meat including the ribs and back strap, which local residents think are some of the best parts to eat, were not harvested.[1] To local hunters this is a waste of good meat and disrespectful to the animal.

Pollution

According to local residents, lodges in the area are responsible for changes in animal behavior mainly due to how waste is disposed of. During one afternoon residents at Gram's Café in Iliamna discussed their views on local sport hunting and fishing establishments. The lodges, the person said, leave their fish scraps lying on the beach and this attracts bears. Their sewage also runs off into creeks and pollutes the lakes. People in the village put partial blame for the decline of fish on the sewage runoff. To them why would a salmon want to return to a polluted lake? The salmon, they say, would just go elsewhere to spawn. The community is trying to get the lodge owners who only come out in the summer to help pay for the dump and sewer. Local residents want lodge owners to help keep the environment clean because this is where they all must live.

[1] Alaska State hunting regulations require salvage of ribs, neck, brisket, front quarters as far as the distal joint of the radius-ulna (knee), hindquarters as far as the distal joint of the tibia-fibula (hock), and meat along the backbone between the front and hind quarters(5AAC 92.990(17)).

Changing Animal Behavior

Local residents in the Kvichak Watershed have observed behavioral changes in animals and ascribe these changes to the sport hunting and fishing activities carried out in their traditional hunting areas. An example of this is the growth of brown bear populations near and within the community of Igiugig. One hunter blames this on the number of floatplanes that land nearby to fish. He also blames the lodges near the village on Iliamna Lake and the Kvichak River. He says the sport fishermen clean there fish near the village, which in turn attracts bears. "When the lodges open up," he says, "is when we see bears. There are lots [of bears] on the river. We see lots now."

According to key respondents' reports, the distribution of caribou is changing due to the growing presence of sport hunters in the area. A Newhalen resident is one local subsistence hunter who believes that the caribou population in the area has moved due to the presence of sport hunters. He says, "This area has been hunted real hard in the last 10 years. That might make them (the caribou) move."

In Nondalton a hunter described what he sees when he flies over a pass through which the caribou migrate. From the plane he sees camps of sport hunters set up every few miles, and he wonders why the caribou do not come that way any more. It seems to him that sport hunters are contributing to the decline in the presence of wildlife in the region. One hunter added:

> In the past the caribou were always around the Mulchatna area. It's hard to hunt now. They [sport hunters] are driving them up in the hills, which is harder for us subsistence hunters to get them. We don't have the money to pay for airplane fare; we just want to walk a lot.

Another hunter of Nondalton says, "The moose are driven up in the hills [by the sport hunters]." Of moose, which are an important resource because caribou are not always available, he added, "Now there is moose all over the place, until the sport season. Sport hunters came in and now they are getting less again."

One hunter in Nondalton reports that in recent years on Lake Clark he has observed female moose swimming across the water to the islands in order to have their calves. He suspects this is due to pressure put on them by predators; wolves, brown bears, and people. In autumn the moose are scarce in the high country during the hunting season due to the pressure of outside hunters. A hunter comments that the caribou will be present "after the season closes, [that's when] they'll be here." In other words, after all the non-resident and non-local caribou hunters leave the mountain passes, the caribou return and are then available for subsistence hunters.

IMPACT OF REGULATORY REGIMES ON TRADITIONAL SUBSISTENCE

> "Subsistence regulations kind of tie your hands behind your back sometimes, if you really had to go by it. Out here you just kind of have to overlook that. It's there, and we respect it as a law, but sometimes we have to work around it, because of the subsistence lifestyle that we live."
>
> Nondalton Hunter ~ Spring 2002

In GMU 9B, State-regulated caribou seasons are the closest match to traditional subsistence patterns allowing a wide time frame for hunting caribou. However, due to the erratic migration pattern of caribou, hunters find that moose have to be more heavily relied upon. But state-regulated moose seasons less amenable to traditional subsistence patterns in their short breadth of time (see Figure 11). Angry that the hunting season does not match his subsistence calendar, one subsistence hunter said,

> I kill a moose a month; I give it to everyone, my grandma; the whole village. I can't go to the grocery store down the street for a piece of meat.

He is one of the hunters who harvest meat for the whole village, no matter what time of year it is. He says that in "the fall season the meat tastes bad" due to the rut. To him "the best time of year to get a moose is June – July when they [the moose] are the best."

Hunting on State Lands

According to State regulations, on State lands the moose hunting season is open in GMU 9B for non-residents from September 5 - 15. Resident hunters can hunt from September 1 – 15, and also from December 15 to January 15.

During this period the limit is one bull per resident hunter or one bull with 50-inch antlers for non-resident hunters. Between 1994 and 2000 the average harvest by all hunters was 215 moose with 239 moose taken during 1999, of these 228 were bull moose (Hicks 2000).

Moose go into rut in late September. The infusion of hormones into the meat causes it to taste 'gamey,' as most residents will attest. However, during the rut, the moose antlers are large, hence the desire among trophy hunters for moose during this part of the year. The rut usually occurs during the first days of the regulatory hunting season. Some residents assert that if they take a moose just as the season opens, they are able to get the meat before it has become tainted by the rut. The December hunt works well as the moose have come out of rut and the meat returns to its normal flavor. The meat is easily transported during December by snow machine, and hunters can travel further to find moose. It is, however, more difficult during the fall hunt to find a moose in the short period of time before they go into rut. This poses an obvious problem for subsistence hunters.

According to one Nondalton resident,

> Regulations don't go along with our subsistence lifestyle, their bag limits and regulations. It's mostly for the sport hunters… Moose, after September, they are rutting and no subsistence user would get a bull that is rutting. Even if the sport hunter tries to give that one, they [subsistence users] are going to take it (the meat), but it is not edible… We take it, the meat, when it is the most prime, the most edible, and I would like to see [game management], you know, do something that will address our needs.

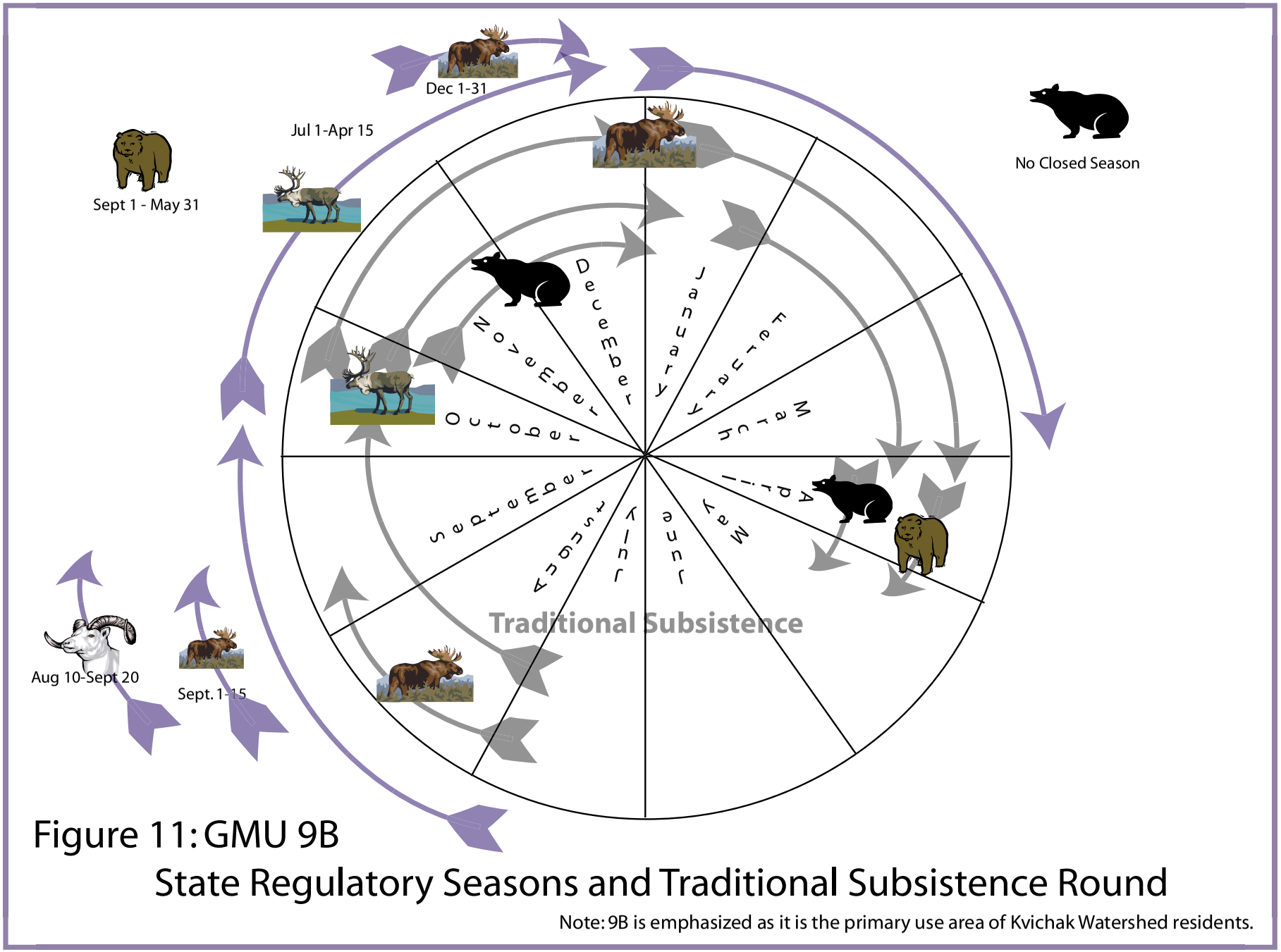


Figure 11: GMU 9B

State Regulatory Seasons and Traditional Subsistence Round

Note: 9B is emphasized as it is the primary use area of Kvichak Watershed residents.

Another resident of Nondalton says the seasons,

> Do not match up with the times that we want to hunt and we want to gather. We have certain times of the year that we want to gather stuff, the moose and the animals and the berries; the fish is right for getting. I mean like when the fish first come up they hurry up and get it and later on in the fall they get it again, after it turns red.

As he relates above subsistence users traditionally had a season when each species was harvested. Ideally the animal, fish, berry, or bird is taken during the time when the meat was the most prime. The subsistence season for large land mammals as part of the overall equation of resources has been altered by regulations governing hunting. Figure 11 contrasts the traditional subsistence round with state regulatory seasons.

One of the questions asked during this study was whether hunting seasons matched what was actually being practiced by local residents. Key respondent interviewees were asked whether regulations make it more or less difficult to access subsistence resources. A Newhalen resident says,

> It does [make it more difficult] in a way, of course right now we can't subsistence hunt even if we run out of meat, then we can't subsistence hunt unless we get a special permit. We have to go to a special ceremony or something before we can even get a permit. We have to have some kind of burial or something before we can get a special permit to go hunting. Which it wasn't that way years ago, we used to, if we were out of meat, the whole village was out of meat somebody would go hunting, get game, and share it with everybody. It's not that way anymore, you have to have a license, you have to have a permit, [and] you have to go to a special people to do all this.

Special permit requirements do not necessarily address the need to take a moose in the spring because residents have run out of meat. In many of the communities surveyed moose hunting seasons as defined by State regulations are not entirely adhered to. This was most evident lately due to the decreased numbers of caribou.

Few hunters expressed reluctance to take moose when needed for the village. Meat is too expensive in the stores and as food resources dwindled men were sent out to get meat for the village. Only one person said he was too worried about hunting out of season to go; most are willing to take the chance if necessary to provide for the village. Most hunters do not fly to hunt, but will go up the lake a ways, or in the case of a few hunters, they just walk out behind the village and get a moose. Moose is always shared, and not one subsistence hunter interviewed does not share their meat, even if they know that it is the only meat they may get for the year.

Residents in these communities would like to see the moose regulatory season more closely match their traditional subsistence cycle. Meat is not wasted or hoarded, but shared by all. There were no moose or caribou racks on walls, the only thing subsistence hunters are after is meat to feed their families, relatives, and neighbors. One hunter interviewed killed close to thirty moose during the study year 2001/2002. He hunts for the entire village – this is his job. All the meat is given away. Resource availability and need govern hunting effort and timing. The regulatory hunting seasons are generally ignored. As one informant said "when we need meat we go get [it], our seasons don't correspond to fish and game seasons."

Not all residents are apathetic to the regulatory seasons and restriction. One resident of Nondalton discussed the increased pressure on resources and why regulations are important for conservation. However, his comments were aimed at sport and non-local hunters, not local subsistence hunters. He has spent his lifetime hunting and fishing for subsistence. He recognizes the value of regulations to control outside hunters. He says, "Alaska is being ganged up on. People [are] taking all our resources." He would like to see more regulations to protect resources from outside hunters and fishermen. "It's technology," he says, "that has created the pressure." He uses the word "modernization" to describe the pressure on resources today. He relates you can get to the resource quickly, and this creates more pressure on animals. "The guides," he says, "can take off here and be in Mulchatna in maybe 15, 20 minutes, instantly. On foot you couldn't move around much, so there is a big difference. What is fair and what is not fair? We are on foot and they have airplanes with the big tires that can land on tundra. Bristol Bay Region is the ideal condition for a super cub to land." There are lots of creeks and tundra that make good landing. "If there is 100 feet of a good landing place," he says, "if there is moose or caribou, that moose doesn't have a chance." They spot the animals from the air he states, and there is "too much greediness."

A Nondalton elder wants to see more regulations for sport hunters. He believes that the regulations set up by the State of Alaska are to control sports hunters. Why else he says would you have a moose season when the animals are the largest with big antlers, are in rut, and the meat is inedible. He knows that people in the village don't follow the regulatory seasons; they get moose when it is most prime. A season that more closely matches the caribou season, which is open all winter, would be more realistic.

Sport hunters offer the meat that they take to villages in the area. However, most of the meat often goes bad before it can be distributed. One hunter says, "I don't take meat from sport hunters." He added, "they don't take care of the meat."

The moose regulatory seasons do not match the traditional subsistence season. The rut during the moose season makes the meat inedible and many hunters will not eat the meat. This makes the moose only good for the antlers, which you cannot eat so it would be a waste for a subsistence hunter to take the animal during this time. Seasons and care of meat by sport hunters is of great concern to residents of communities like Nondalton. One resident of Nondalton wrote the following letter after being surveyed by Division of Subsistence staff.

> I am a resident of Nondalton, and lived here all my life and totally rely on subsistence for my family. I have a lot of concern on the 'sport hunters' and 'sport fishermen' that come from all parts of the world and hunt and fish on our land. I don't like expecting meat from sport hunters because they don't take care of the meat the proper way. I'm sure this would be different if they depend on the game to survive and feed their families, if they are giving the meat to people they need to take care of the animal right away and don't try to give meat away that is stinky and full of hair and tundra, they need to be monitored more closely or let Tribes take care of the hunting and fishing permits.

> My other concern is our hunting and fishing rights, I agree that there is need for control or monitoring of game, but again we should have the right to get meat when we need it, and not when the Federal and State laws say we can, usually the season is open wide for us when animals are in rut, and we don't eat the meat at that time because it is very stinky, and skinny.
>
> April 18, 2002 ~ Nondalton Resident

One example of incorrect processing is to remove the meat from the bone before carrying it out. Although regulations require meat to remain on the bone until it is removed from the field, hunters note that this rule is not always adhered to. Subsistence hunters know that the meat stays fresher longer left on the bone. They bring it back to the community quickly after the animal is killed, and then hang it in drying shacks on the bone or freeze it immediately. Once in the drying shack, the meat will remain edible all winter, and is removed from the bone just prior to cooking.

A few residents of the region are able to obtain what they need for subsistence. A hunter in Iliamna, who has a plane and is able to get to where the resources are, says that regulations do not restrict him as much as others because he has a plane and can get to the resources more quickly and can cover more territory.

> We get what we need. We try to get one [moose] before they get stink[y] in September, you know when they first open; that is probably the best time… because they start the rut and then they stink so you don't want to shoot them then because then you are just defeating the purpose of shooting. No sense of shooting when you can't use it.

He finds that the season is adequate for moose, and he can usually get one at the very beginning of the season before the moose go into rut. Then they will wait until the end of the season when the meat doesn't "stink" anymore. While he is able to fly to where he can find a moose, many residents are not able to do this, and hunting takes up more time than can be adequately allowed for. In the fall many men who should be out hunting during the early, season just before the moose go into rut, must work on summer projects to earn money to carry them throughout the winter. Money is necessary for gas and other supplies in order to participate in a subsistence way of life.

Hunting on Federal Lands

Hunting on Federal lands has many perceived drawbacks according to residents in the region. A comment that was often heard during the harvest was that the possibility of shooting tranquilized moose jeopardized the fall subsistence hunt. This hunt directly affects the residents of Port Alsworth who border the Wrangell-St. Elias National Park and Preserve. According to hunters, the National Park Service tranquilized moose in the area for a study. The tranquilization of moose renders the meat inedible for a period of time, and this just happened to coincide with the subsistence moose hunt.[2] No

[2] Park Service biologist Buck Mangipane (personal communication 2002) confirmed the timing of the tranquilization of the moose. "The capture took place on the 26 & 27 of November 2001. Ten bulls were radio-collared and one was not (injured neck prevented collaring). Flyers were placed locally describing the capture and recommending that the meat from these animals should not be consumed if they were harvested within the 30 days following capture. Essentially making them un-harvestable during the late season due to the capture and use of immobilizing drugs."

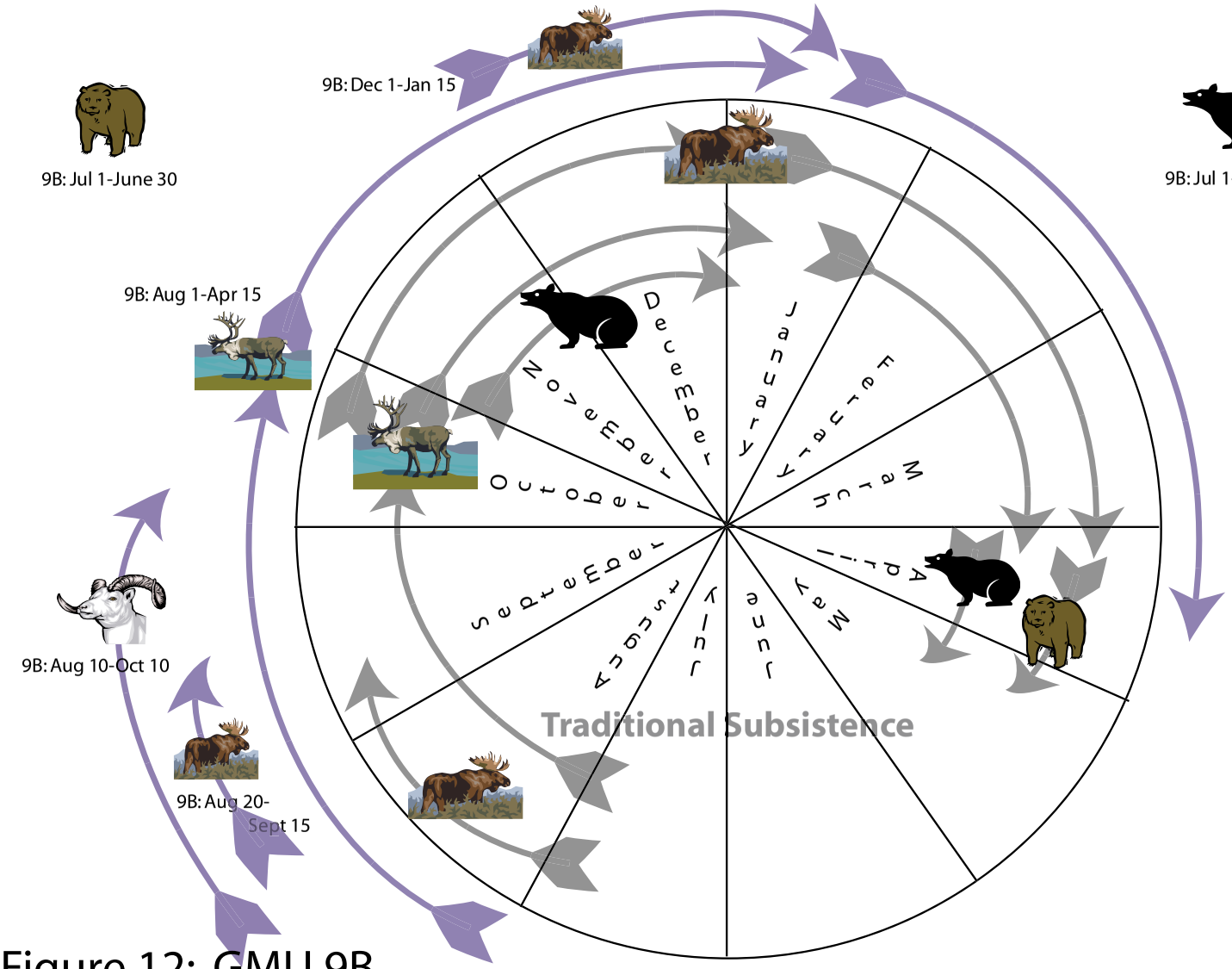


Figure 12: GMU 9B

Federal Regulatory Seasons and Traditional Subsistence Round

Resident Communities of Lake Clark National Wildlife Refuge (Unit 9B) Include: Nondalton, Iliamna, Newhalen, Pedro Bay, & Port Alsworth

one interviewed in Port Alsworth bothered to hunt in the area during the subsistence season in the study year 2001/2002 for fear of shooting a moose that had been tranquilized, and thus rendered unfit for human consumption.

Lake Clark marks the boundary between Federal and state land. This creates confusion for local hunters. One hunter in Port Alsworth who traps and hunts for a living lives on a hill overlooking Lake Clark, says he is able to see bears from the house so that he can hunt them, but the boundaries of the park are so ambiguous that he no longer hunts there. He recounted a story of when he had shot a bear below mean water line, yet the park service was going to fine him. According to regulations the mean water line is state land and hunting was legal on state land. A trooper was eventually called to resolve the issue, but it was so unnerving that the hunter is afraid to hunt anymore, because he doesn't know exactly where he can and cannot hunt. He says that he has been hunting for a living for many years in the area and receives conflicting information on land designation so he doesn't bother to hunt much anymore. The misalignment of Federal and state seasons for the hunting of brown bear, a species that has grown in numbers over the past few years, is of concern to this hunter. He says the conflicting seasons and confusing boundary information make that way of life difficult if not impossible. He would like to see the alignment of regulations for brown bear between the state and Federal governments. The open hunting season for brown bears in GMU 9B for subsistence is September 1 – May 31. Between 1994-1996 hunters took approximately 5.5 percent of the total population of 5679 bears in GMU 9B. This percentage includes estimates of unreported bear harvests. The limit for subsistence hunters is one bear per year. Traditional hunting practices are compared to Federal regulatory seasons in Figure 12.

ENVIRONMENTAL CHANGES IMPACTING TRADITIONAL SUBSISTENCE PATTERNS

"A lot has changed – environment, everything has changed"
Andrew Balluta ~ Spring 2002

The above statement reflects not only the environmental change that is occurring but also the affects that a changing environment is having on the culture of the people of the Kvichak Watershed. This section will review the observed changes by Kvichak Watershed residents that are occurring in the environment and will conclude with how these changes are affecting the ability for cultural continuation of a traditional subsistence lifestyle. Some of these changes include warmer weather, melting permafrost, unstable ice condition, and lack of snowfall. The greatest impediment to subsistence hunting is that all of these changes are coupled with the unpredictability of weather.

Warmer Weather

There is a general consensus in the Kvichak Watershed that the weather has been changing in recent years. Winters are shorter and not as cold. Winter arrives suddenly and then in the spring break-up occurs rapidly; there is no gradual transition. In addition winter comes later and leaves earlier. A resident of Iliamna has noticed the tundra is drying up and more vegetation is growing. A similar phenomenon has been observed in the arctic where due to extreme cold conditions climate change is

most pronounced. Jolly et al. (2002) found

- "increased *variability*; more sudden and intense changes in weather
- changes are most noticeable in the transition months (spring and fall)
- isolated events or anomalies are becoming more frequent; there are more *extreme events*
- and there is increase *unpredictability*; changes are quick, not gradual, and the rate of change appears to be accelerating" (Jolly et al. 2002: 107).

More than any other state in the U.S., Alaska has experienced the largest regional warming. Since the 1960s the average temperature has increased 5° F and 8° F in the winter (ARAG 1999). Documented changes include a reduction in snow cover, shorter seasons of river and lake ice, melting of glaciers, and a thawing of permafrost (ARAG 1999).

Regarding these climatic changes an Iliamna resident relates that

> It doesn't get cold [in the fall], and then all of a sudden it just drops off. We used to have until the end of August and through September we would get these little cold snaps. In the morning cool and then warm up. Not so, it just stays warm and buggy all the way up until it gets cold and then, [it gets cold]. And that is unusual. [This is] "the past four to five years I think… I don't know if that is affecting the game or what."

The elders in the community of Iliamna have also noticed these changes. The Iliamna resident continues that the older people,

> Know the weather for sure, weather has definitely changed. Like last winter it was weird. It just stayed warm all the way up until it got cold and then it got cold all the way until May something. It just warmed up suddenly and stayed pretty warm for a long time. We did get a lot of snow, so the river is a lot higher than it normally is right now; the lake has come up quite a bit.

Recently, the glaciers have been melting rapidly. This coupled with high amounts of rainfall has, at times, led to flooding. One resident of Iliamna related how everything in the area flooded, an occurrence that she does not remember in her lifetime. Recently, however, a low snow fall has led to a decrease in water levels in the spring and summer.

Low water levels have been documented elsewhere as well. In the Canadian Arctic, Fox found that among residents who spent time on the land, the lowering water level was a matter of grave concern. According to Fox "shallow water in lakes and rivers is having an impact on community life primarily by restricting travel and access to hunting areas…since the 1960's , many people have noticed that the water has been getting slightly shallower (with variability) but never reaching the extremes that have been occurring since the 1990s. In the last four years, usual travel routes along rivers have been completely blocked due to shallow water" (Fox 2002: 39).

In the Iliamna region, snowfall often varies during the winter. According to one resident there was a lot of snow this past year, but in the past greater amounts of snow were the norm. A resident of Nondalton says,

> From what I recall a long time ago, the snow we have now days is nothing compared to what the snow was a long time ago. There used to be drifts higher than the houses around

here. It just seems to decline, there is hardly any snow.

Snow levels are important from a subsistence hunter's point of view because the changes in snow levels affect which species make their way up into the high country. In the Nondalton area, less snow according to one resident "makes better hunting, but then, we're in an area where it holds snow and most of the caribou go down that way (Southwest) so all we are stuck with is moose these last 5-6 years." In short, as snow levels have dropped, caribou have become scarce near Nondalton.

The warmer temperatures also affect travel in the winter. Depending on the terrain it can be easier or more difficult to move in search of game. During the winter of 2002 Lake Clark never entirely froze over, half the lake was open water. There was too much ice to use a boat and too little ice to use a snow machine. One resident of the area commented that the partial freeze of Lake Clark made it difficult for them to hunt this past year.
In contrast, the lack of snow can make it easier to travel by four-wheeler during the winter. Snow machines are the normal mode of transport during winter, but on barren frozen ground a four-wheeler can travel much more rapidly and if there is a small layer of snow a snow machine can also travel rapidly.

Erratic weather and snowfall can influence subsistence hunting greatly as regulatory hunting seasons are fixed and do not shift with the weather. For the communities of the area, the best place to hunt caribou is near Igiugig at the outlet of the Kvichak River, the far southeastern hunting territory for lake residents. The trek that residents would have to make to harvest caribou near Igiugig is quite far and cannot be accomplished in one day by snow-machine or four-wheeler. Also the caribou appeared near Igiugig in April during the study year, which is a dangerous month to travel because creeks and rivers were starting to break up and the snow cover was getting thin. Four-wheelers would work, but during the heat of the day they bog down on soft snow. Travel during this period presents a problem for both types of transportation. The caribou were still around in late April when four-wheelers could be used, however, the regulatory subsistence-hunting season for caribou closes on April 15.

Some predators are having an easier time traveling on barren ground. One resident mentioned that in the Lake Clark area there are more frequent sighting of large numbers of wolves and their tracks.

> I think they have grown in population because of this weather up here. It's just been so… it hasn't been a bad year you know. Those wolves, they can travel a long ways, they get around better than we do.

There are many observations on changes occurring in the weather; however, there are few observations on changes occurring on the land. There is a belief that you cannot change the land. When asked if the land has changed one resident responds, "Well, the weather has changed. The land itself, it's pretty hard to change the land." The land is as it was and the belief is that it will not be able to be changed by human influence. People, however, are at a loss to explain the weather.

While technology has enabled better weather prediction, and local residents have been happy to incorporate new technology into their own knowledge system, modern methods of meteorology do not eclipse knowledge accumulated over the course of many generations of subsistence hunting. For example, one evening at Gram's Café in Iliamna over dinner one resident commented on the weather forecast which was predicting a high-pressure system was moving down from the north. The hunter said that this would give them three good days of sunny weather, good weather for subsistence hunting. The

TV weather person did not mention what the weather would be like, only that there was a high-pressure system moving in. The hunter decided for himself how many days of sun we would have. The hunter was right, there followed three days of glorious sun, and everyone went out fishing.

Changes in Land

The village of Nondalton has no reliable land or water transportation. Heating oil is an important concern every year as it is difficult to transport in. Consequently, burning wood for heat is quite common. While conducting research in the community in the spring of 2002 the heating oil ran low and men were out looking for wood. Most of the trees cut down were birch and some spruce. Researchers learned later that more spruce would have been collected had there not been a recent forest fire. Throughout the day when most interviews were conducted, men were returning to the village on snow machines with sled loads of wood. As the nearby forest is used, residents have to go further and further away for wood.

> A lot of wood is being cut out. Forest fires dried out the trees and nothing has replaced them. If you take all the dead wood [from the land] it will take longer for the trees to come back, maybe 30 or 40 years.

However, according to one elder, the clearing of the land by forest fire near the community of Nondalton has had a positive affect. According to the findings of a mapping component of this project conducted in the community of Nondalton, most moose can be and are taken right near the village. This is due to a fire that swept through the area. The subsequent re-growth of birch and alder provides excellent browse for the moose.

Local residents describe how fires have a positive affect on the environment. One Nondalton resident observes that fire ameliorates habitat for moose.

> I don't know about caribou. I notice moose if there was a big fire, even right after the fire the moose gets into that fire [zone]. It seems like they like that fresh grown vegetation.

Another resident of Nondalton notes that a "fire in the 1950's in Tanalian, and on either side of the village, made more food for moose." Fire destroying habitat, which in turn permits new habitat to grow, occurs in regular cycles. Currently, in addition to fire wiping out spruce and other coniferous tree species and brush, the permafrost is melting. This is creating an environment where species that grow better on unfrozen ground, such as birch, can flourish. Scientists note that as permafrost melts, the forest will change composition. This can be seen especially as ecosystems that contain tundra and brush are replaced by boreal forest (ARAG 1999). The latter habitat is conducive to moose rather than caribou, and this could cause an out-migration of caribou to other areas. Indeed this is corroborated by local observations.

Moose, once a rare resource in the Kvichak Watershed now are common. A few caribou still make their way into the area; however, the larger herd is now found further to the west. An Iliamna resident relates that due to changes in the environment the ground is warmer now and there is not as much permafrost. This means that all the fish and meat has to be dried or frozen to keep it through the winter; people can no longer use underground caches. Also "there is a lot more brush than when I was younger," creating a habitat more conducive for moose instead of caribou."

In the community of Pedro Bay a group of residents related that the moose population has declined in the past ten years. When asked why, one resident replied that it could be due to two reasons: more non-local hunters in the area; and after a nearby volcano erupted 10 years ago he noticed that moose started moving south. A longtime resident, who has been hunting for over seventy years, was asked if brown bears or wolves could be a factor in the decline of the local moose population. He looked over with a knowing glance and replied, "they don't have anything to do with the moose disappearing. It has to be something else." He was then asked whether he has seen a noticeable change in the climate over his lifetime, and whether the composition of the tree species had changed, a factor that could affect the habitat for moose. He responded that it is noticeably warmer now than in the past. The land is changing he said, "there is more dirt." He clarified this by saying the ground had become less rocky and that the rock had been covered with soil. The land was thawing and allowing soil to build up. In his retirement, he earns money by getting wood for others. In the past 10 years he has seen the birch start to dry and become harder. There is more alder growing he said, and the spruce trees are starting to disappear.

Decline of Salmon

In the Lake Clark – Iliamna Lake Region salmon form the foundation of the food web. Local residents shared their observations of the detrimental effects that the declining salmon population has had on large land mammal populations. The loss of salmon is weakening the food web of which humans in the area are a part.

On the drive from the airport into Iliamna, one resident discussed the fishing on Iliamna Lake, and how the stock has declined. People rely on the salmon as a staple of their diet, and there wasn't any salmon coming into Iliamna Lake at that time. During their research at Nondalton, Stickman et al. (2002) found that both observed environmental change and human influence could be responsible for low salmon returns. Hypothesized reasons include:

- Possible farmed salmon entering the watershed.
- Beaver damming the rivers and spawning streams.
- Increase in sport fishing, especially damage from catch and release fishing.
- The use of jet boats which are generally viewed as destructive to salmon spawning habitat especially in smaller streams.
- Over-fishing in Bristol Bay.
- Pollution.

The loss of fish in Iliamna Lake is of great concern to local residents. It is not only the salmon that are disappearing but other species of freshwater fish as well. According to scientists, the declining salmon stocks in lakes creates an environment deficient in nutrients (including nitrogen), making a lake into poor habitat for other fish species and in turn a poor nursery lake. Commercial fishing and climate change can lead to a reduction of salmon derived nutrients (SDN), which are higher in nitrogen than terrestrial species, thus decreasing the productivity of a lake (Finney et al. 2000).

[3] Curiously brown bear numbers have increased, not declined, even as their food sources have dwindled This is supposition as brown bears are difficult to count. There are more sightings of brown bears as there is increasing interaction with humans. Sightings include bears breaking into fish camps or meeting humans on streams or trails. The bears are hungry, and as residents explain, both are predators. Humans and brown bears are competing for food.

One local resident said that “everything is connected to the salmon, the bears everything. Salmon is second to water for survival, first you need water, then salmon.” He went on to say the freshwater fish are disappearing from other lakes in the area too.

During a group discussion in Pedro Bay a group of residents discussed if the creation of marsh near the community is displacing water to new ecological patches, and if this is linked to the above woodsman’s report of the disappearance of spruce and the birch drying up. The loss of tree species such as birch could directly affect the moose populations in the area. It has become an ecological issue that local residents understand. The whole system is linked together, the moose, salmon, trees, and bears. The brown bears are now looking for other sources of food as the moose have moved out of the area. There is an increase in the numbers of fox that has become noticeable, and the group wondered if foxes are competing with the bears for food. There are less salmon so the bears are forced to look elsewhere for food.[3]

CONCLUSION

In conclusion, environmental and climatic change is a concern to residents of the Kvichak Watershed. With such a dynamic and variable weather system coupled with poor salmon runs, it is increasingly difficult for hunters and fishermen to follow a traditional seasonal round; nature has become unpredictable. New ways of dealing with the environment including incorporating new means of hunting and fishing will have to be included in their evolving ecological knowledge system.

CHAPTER EIGHT: DISCUSSION AND CONCLUSIONS

STUDY FINDINGS OVERVIEW

General Study Findings

In 2002, representatives of 622 households in the 18 communities of Game Management Units 9B and 17 provided information about their harvests and uses of caribou, moose, bears, and sheep during the 2001/2002 regulatory year. Subsistence hunting was an extremely common activity in these Bristol Bay communities in 2001/2002: 41 percent of all households hunted moose and 37 percent hunted caribou. Also, with the exception of Dillingham, for which use data were not collected, most households used moose (73.4 percent) and caribou (81.1 percent) that they harvested themselves or received from other households.

As noted in Chapter Three residents of the 18 communities continue to be interested in caribou hunting and caribou continue to make an important contribution to subsistence harvests and use patterns in the communities of the western Bristol Bay area. Large numbers of community residents hunt caribou. In general, subsistence harvests of caribou are conditioned largely by caribou movements and travel conditions for hunters.

Overall, as noted in Chapter Four, in 2001/02 subsistence hunting and harvesting of moose were also key activities in the western Bristol Bay area. Most households used moose, many area residents hunted moose, and sharing of moose meat was common.

Compared to moose and caribou, subsistence harvests and uses of bears are relatively low in most western Bristol Bay communities. However, small numbers of black bears are used by the communities within their range such as Kokhanok, Iliamna, and Nondalton. Of all Bristol Bay communities, black bears are most important in Nondalton. There are low levels of use of brown bears in most western Bristol Bay communities. Use of brown bears is especially significant in Kokhanok.

Subsistence harvests of Dall sheep have been low over the past several decades and no harvests were reported for the study year. No sheep hunting traditions were reported by the Central Yup'ik communities of GMU 17. Traditionally, Dena'ina Athabascan communities hunted sheep in the upper portions of GMU 17B and in GMU 9B. This customary and traditional use is recognized by federal subsistence hunting regulations, which allow subsistence sheep hunting for qualified rural residents within the Lake Clark National Park and Preserve.

Harvests of Large Land Mammals in Usable Pounds

Table 52 provides information on estimated harvests of moose, caribou, black bears, and brown bears in pounds usable weight for each study community in 2001/2002. As illustrated in Figure 13, there was a wide range of harvests, with a low of 16 pounds of large land mammals harvested per person in Port Alsworth to a high of 369 pounds per person in Nondalton; communities that are geographically close together. Harvests in most communities (10 of the 18) were in the 100 to 200 pounds per person range. For the study area overall, the harvest was 82.6 pounds of large land mammals per person in the 2001/2002 study year. Excluding the regional center of Dillingham, harvests averaged 113.2 pounds per person.

As estimated in usable pounds, moose made the largest contribution to the large land mammal harvest in the combined study communities in 2001/2002, at 51.9 pounds per person, 62.9 percent of the total (Table 52). The area-wide harvest of caribou was 29.8 pounds per person, 36.1 percent of the total. Bears contributed about 1.0 percent of the total and about 0.8 pounds per person area-wide. Moose provided the largest portion of the large land mammal harvests for all the game management subunits but GMU 17A, where caribou contributed 61.9 percent.

Table 53 reports estimated large land mammal harvests in pounds usable weight from the 1973/1974 University of Alaska Study (Gasbarro and Utermohle 1974). Table 54 reports estimated usable pounds harvested for large land mammals from previous Division of Subsistence studies (Scott et al. 2001; Kenner et al. 2003). As illustrated in Figure 14, as expressed in usable pounds per person, harvests of large land mammals have varied between communities and study years. For several communities, including Ekwok, Koliganek, New Stuyahok, Pedro Bay, Port Alsworth, Togiak, and Twin Hills, estimated per capita harvests in the 2001/2002 were the lowest among the study years for which data are

Figure 13. Estimated Harvests of Large Land Mammals, Pounds Usable Weight per Capita, Study Communities, 2001/2002

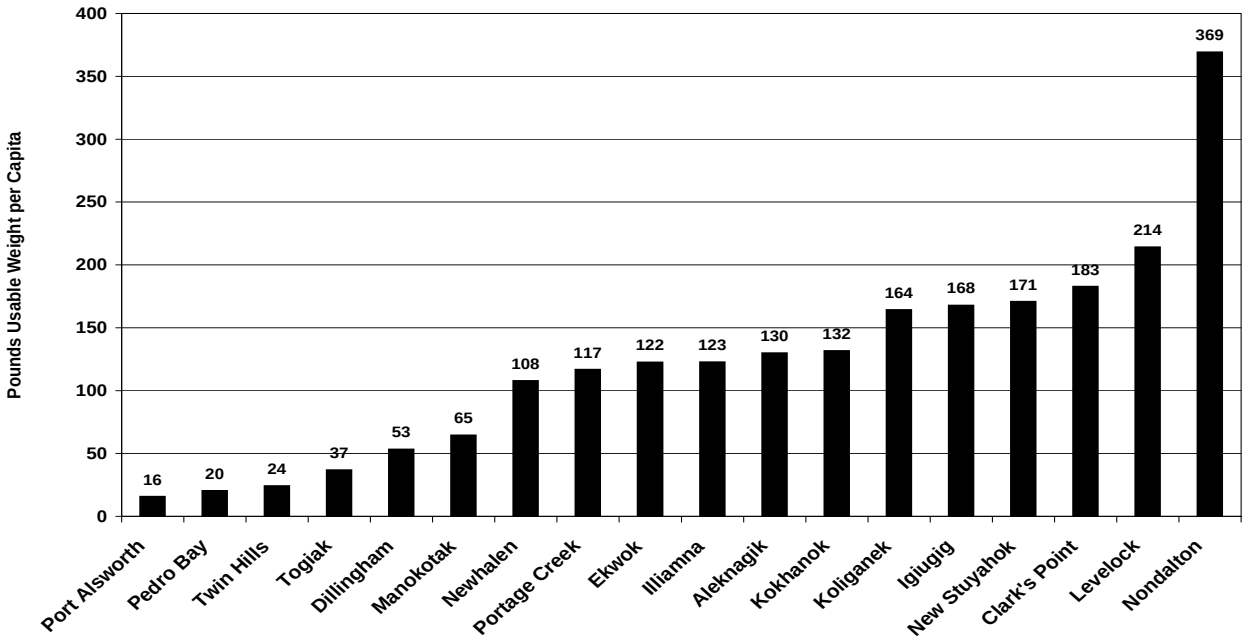


Table 52 . Estimated Harvests of Large Land Mammals in Usable Pounds Harvested, Study Communities, 2001/2002

Community	estimated population	Caribou			Moose			black bear			brown bear			Per Capita Total Pounds	Percentage of total			
		No. Per Person	Total Pounds	Pounds per person	Per Person	Total Pounds	Pounds per person	Per Person	Total Pounds	pounds per person	Per Person	Total Pounds	pounds per person		caribou	moose	blk bear	brwn bear
Residents of GMU 09B																		
Igiugig	27	0.852	3,450	127.8	0.074	1,080	40.0	0.000	0	0.0	0.000	0	0.0	167.8	76.2%	23.8%	0.0%	0.0%
Illiamna	91	0.441	6,000	66.2	0.103	5,040	55.6	0.015	77	0.9	0.000	0	0.0	122.6	54.0%	45.3%	0.7%	0.0%
Kokhanok	133	0.148	2,953	22.1	0.197	14,175	106.2	0.000	0	0.0	0.033	438	3.3	131.6	16.8%	80.7%	0.0%	2.5%
Levelock	62	0.452	4,191	67.9	0.262	8,735	141.4	0.000	0	0.0	0.048	294	4.8	214.0	31.7%	66.1%	0.0%	2.2%
Newhalen	148	0.481	10,668	72.1	0.062	4,955	33.5	0.023	200	1.3	0.008	115	0.8	107.7	66.9%	31.1%	1.3%	0.7%
Nondalton	152	0.152	3,455	22.8	0.624	51,056	337.0	0.120	1,055	7.0	0.024	364	2.4	369.1	6.2%	91.3%	1.9%	0.7%
Pedro Bay	59	0.000	0	0.0	0.038	1,194	20.4	0.000	0	0.0	0.000	0	0.0	20.4	0.0%	100.0%	0.0%	0.0%
Port Alsworth	112	0.038	630	5.6	0.013	756	6.8	0.013	81	0.7	0.025	280	2.5	15.6	36.1%	43.3%	4.6%	16.0%
Subtotal	783	0.267	31,347	40.0	0.206	86,991	111.1	0.031	1,413	1.8	0.019	1,490	1.9	154.9	25.9%	71.8%	1.2%	1.2%
Residents of GMU 17A																		
Togiak	700	0.151	15,839	22.6	0.025	9,558	13.7	0.000	0	0.0	0.004	307	0.4	36.7	61.6%	37.2%	0.0%	1.2%
Twin Hills	72	0.106	1,141	15.9	0.015	587	8.2	0.000	0	0.0	0.000	0	0.0	24.1	66.0%	34.0%	0.0%	0.0%
Subtotal	771	0.147	16,981	22.0	0.024	10,145	13.2	0.000	0	0.0	0.004	307	0.4	35.6	61.9%	37.0%	0.0%	1.1%
Residents of GMU 17B																		
Koliganek	184	0.505	13,969	75.7	0.158	15,777	85.5	0.000	0	0.0	0.030	548	3.0	164.3	46.1%	52.1%	0.0%	1.8%
Subtotal	184	0.505	13,969	75.7	0.158	15,777	85.5	0.000	0	0.0	0.030	548	3.0	164.3	46.1%	52.1%	0.0%	1.8%
Residents of GMU 17C																		
Aleknagik	157	0.305	7,200	45.8	0.153	12,960	82.4	0.000	0	0.0	0.017	267	1.7	129.8	35.2%	63.4%	0.0%	1.3%
Clark's Point	59	0.475	4,200	71.2	0.203	6,480	109.8	0.000	0	0.0	0.017	100	1.7	182.7	39.0%	60.1%	0.0%	0.9%
Dillingham **	2,443	0.111	40,814	16.7	0.067	88,805	36.4	0.000	0	0.0	0.002	598	0.2	53.3	31.3%	68.2%	0.0%	0.5%
Ekwok	104	0.265	4,144	39.8	0.153	8,607	82.7	0.000	0	0.0	0.000	0	0.0	122.4	32.5%	67.5%	0.0%	0.0%
Manokotak	369	0.186	10,270	27.9	0.068	13,509	36.6	0.000	0	0.0	0.000	0	0.0	64.5	43.2%	56.8%	0.0%	0.0%
New Stuyahok	488	0.533	39,007	79.9	0.168	44,305	90.8	0.000	0	0.0	0.000	0	0.0	170.7	46.8%	53.2%	0.0%	0.0%
Portage Creek	36	0.278	1,500	41.7	0.139	2,700	75.0	0.000	0	0.0	0.000	0	0.0	116.7	35.7%	64.3%	0.0%	0.0%
Subtotal	3,656	0.183	100,212	27.4	0.086	170,682	46.7	0.000	0	0.0	0.003	954	0.3	74.4	36.9%	62.8%	0.0%	0.4%
Subtotal without Dillingham	1,213	0.364	66,321	54.7	0.135	88,561	73.0	0.000	0	0.0	0.003	367	0.3	128.0	42.7%	57.0%	0.0%	0.2%
Grand total	5,395	0.199	160,941	29.8	0.096	280,194	51.9	0.004	1,261	0.2	0.006	3,096	0.6	82.6	36.1%	62.9%	0.3%	0.7%
Grand total without Dillingham	2,952	0.290	128,617	43.6	0.126	201,471	68.3	0.008	1,413	0.5	0.009	2,711	0.9	113.2	38.5%	60.3%	0.4%	0.8%

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

** In Dillingham, only households with members holding hunting licenses were interviewed. It is assumed that other Dillingham households did not hunt.

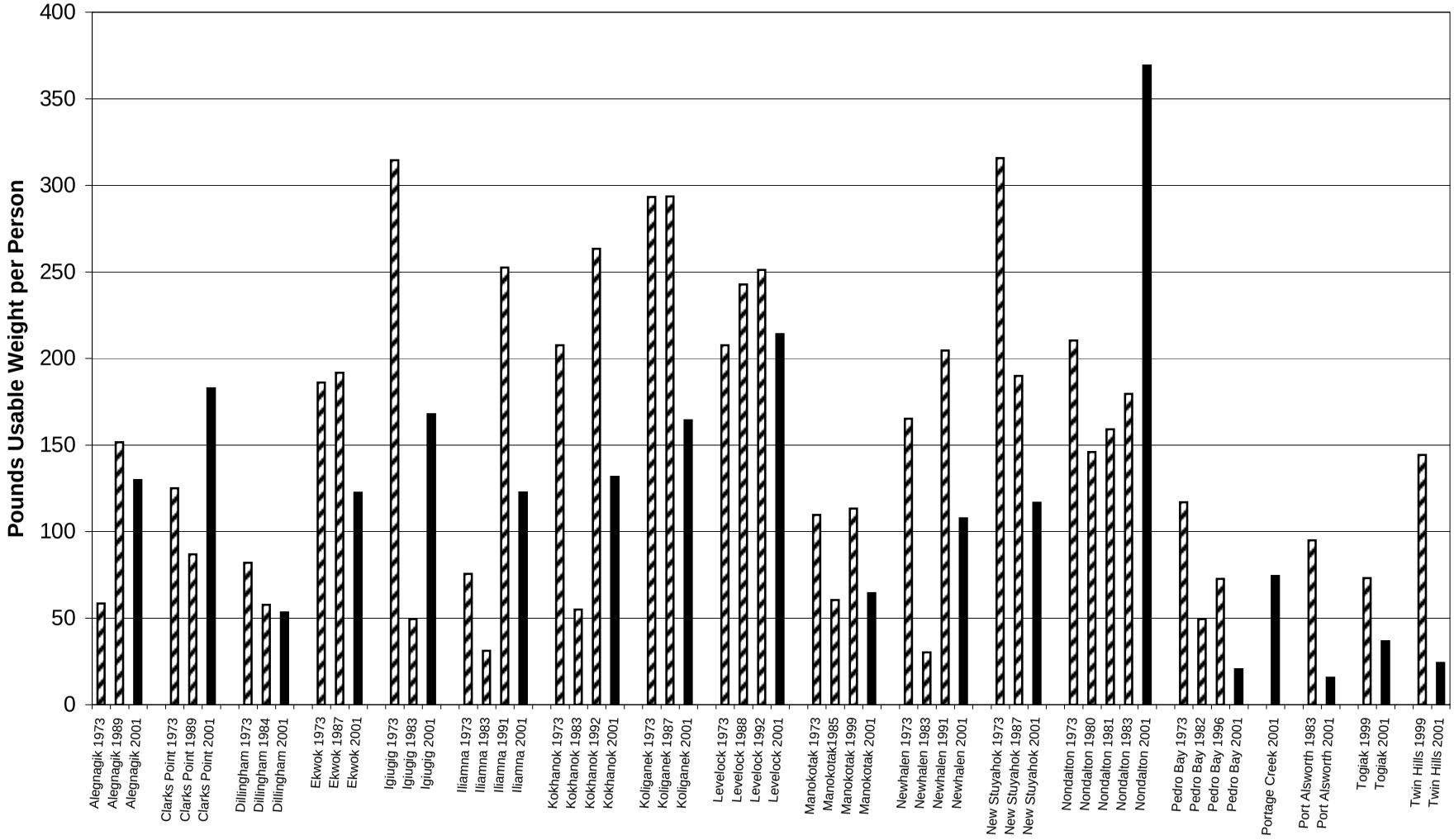
Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

Table 53. Estimated Pounds of Large Land Mammals Harvested, Study Communities, 1973/74

Community	Caribou			Moose			Black Bear			Brown Bear				Percentage of Total			
	Total Lbs	Lbs Per HH	Lbs per Capita	Total Lbs	Lbs Per HH	Lbs per Capita	Total Lbs	Lbs Per HH	Lbs per Capita	Total Lbs	Lbs Per HH	Lbs per Capita	Per Capita Total Lbs	Caribou	Moose	Black Bear	Brown Bear
Communities of GMU 17																	
Aleknagik	1,184	56.3	11.3	4,974	236.3	47.3	0	0.0	0.0	0	0.0	0.0	58.5	19.2%	80.8%	0.0%	0.0%
Clarks Point	6,154	436.4	80.0	3,462	245.5	45.0	0	0.0	0.0	0	0.0	0.0	125.0	64.0%	36.0%	0.0%	0.0%
Dillingham	36,429	159.4	37.2	42,429	185.6	43.4	0	0.0	0.0	1,429	6.3	1.5	82.0	45.4%	52.8%	0.0%	1.8%
Ekwok	9,074	432.4	88.6	10,000	476.5	97.6	0	0.0	0.0	0	0.0	0.0	186.1	47.6%	52.4%	0.0%	0.0%
Koliganek	16,200	810.0	142.9	16,560	828.0	146.1	77	3.9	0.7	400	20.0	3.5	293.3	48.7%	49.8%	0.2%	1.2%
Manokotak	5,882	157.9	26.8	18,000	483.2	82.0	0	0.0	0.0	196	5.3	0.9	109.6	24.4%	74.8%	0.0%	0.8%
New Stuyahok	24,643	796.2	127.0	36,643	1,183.8	188.8	0	0.0	0.0	0	0.0	0.0	315.8	40.2%	59.8%	0.0%	0.0%
Communities of GMU 9B																	
Igiugig	9,600	1,200.0	248.3	2,160	270.0	55.9	0	0.0	0.0	400	50.0	10.3	314.5	78.9%	17.8%	0.0%	3.3%
Iliamna	2,264	133.3	36.4	2,038	120.0	32.7	219	12.9	3.5	189	11.1	3.0	75.6	48.1%	43.3%	4.6%	4.0%
Kokhanok	1,739	133.3	21.4	7,826	600.0	96.4	168	12.9	2.1	1,159	88.9	14.3	134.2	16.0%	71.8%	1.5%	10.6%
Levelock	5,426	318.8	68.9	10,915	641.3	138.6	0	0.0	0.0	0	0.0	0.0	207.6	33.2%	66.8%	0.0%	0.0%
Newhalen	4,783	300.0	66.0	7,043	441.8	97.2	0	0.0	0.0	145	9.1	2.0	165.2	40.0%	58.8%	0.0%	1.2%
Nondalton	16,167	559.6	107.0	15,000	519.2	99.3	516	17.8	3.4	111	3.8	0.7	210.4	50.8%	47.2%	1.6%	0.3%
Pedro Bay	0	0.0	0.0	4,050	405.0	101.3	0	0.0	0.0	625	62.5	15.6	116.9	0.0%	86.6%	0.0%	13.4%

Source: Gasbarro and Utermohle 1974

Figure 14. Harvests of Large Land Mammals, Pounds Usable Weight per Capita, Study Communities, All Study Years



available. On the other hand, in some other communities, including Aleknagik, Clarks Point, Levelock, and Nondalton, harvests were near or above previous highs. It is difficult to discern any area-wide trends based on the available household survey data.

Table 54. Uses and Harvests of Large Land Mammals, Study Communities, Previous Study Years

Community	Study Year	Percentage of Households					Usable Pounds		
		Use	Hunt	Harvest	Receive	Give	Total	Per HH	Per Capita
Aleknagik	1989	86.8	68.4	63.2	78.9	65.8	21,619	514.7	151.6
Clarks Point	1989	82.4	58.8	47.1	82.4	58.8	4,860	285.9	86.8
Dillingham	1984	77.1	39.9	28.1	66.7	20.9	117,878	170.6	57.7
Ekwok	1987	93.1	79.3	65.5	62.1	48.3	20,524	641.4	191.8
Igiugig	1983		100.0	100.0	66.7		3,447	313.3	49.5
Igiugig	1992	100.0	100.0	100.0	70.0	90.0	13,896	1,158.0	296.9
Iliamna	1983		35.0	25.0	15.0		4,374	121.5	31.2
Iliamna	1991	95.7	69.6	69.6	78.3	65.2	24,702	823.4	252.5
Kokhanok	1983		36.8	31.6	57.9		7,887	292.1	55.0
Kokhanok	1992	97.2	69.4	66.7	88.9	72.2	45,658	1,170.7	263.4
Koliganek	1987	95.2	76.2	76.2	71.4	69.0	54,699	1,139.6	293.6
Levelock	1988	100.0	77.8	74.1	88.9	85.2	26,400	800.0	242.7
Levelock	1992	100.0	80.0	76.7	73.3	73.3	27,742	711.3	251.1
Manokotak	1985	96.3	75.9	48.1	83.3	64.8	18,610	315.4	60.4
Manokotak	1999	90.1	64.2	55.6	74.1	67.9	44,811	497.9	113.3
New Stuyahok	1987	100.0	82.5	82.5	65.0	62.5	67,096	906.7	189.9
Newhalen	1983		63.6	45.5	0.0		3,782	145.5	30.2
Newhalen	1991	100.0	88.5	84.6	84.6	73.1	32,229	1,007.2	204.6
Nondalton	1980						24,435	698.1	145.9
Nondalton	1981						31,647	904.2	159.1
Nondalton	1983		95.2	85.7	14.3		50,323	931.9	179.5
Pedro Bay	1982		29.4	23.5	47.1		3,051	145.3	49.4
Pedro Bay	1996	92.3	46.2	30.8	84.6	30.8	4,560	240.0	72.6
Port Alsworth	1983		76.9	46.2	23.1		7,205	343.1	94.9
Togiak	1999	73.3	58.9	50.1	51.8	46.6	53,139	301.9	73.1
Twin Hills	1999	91.7	91.7	91.7	83.3	66.7	9,948	432.5	144.2

Data not available for blank cells.

Source: Scott et al. 2001; Kenner et al. 2003

Reasons for Changing Harvests: Nondalton Case Study

As noted in Chapter Four, the estimated harvest of moose by Nondalton hunters in the 2001/02 study year was 95 animals, or about 0.62 moose per person. This is the highest per capita harvest of moose ever reported for a Bristol Bay community. (This statement of course must be qualified with the observation that good data for most communities for most years are unavailable.) Table 55 reports estimated usable pounds of moose, salmon, caribou, and bear harvested by Nondalton residents for the five study years for which information on all four resources is available. The per capita harvest of moose in Nondalton in 2001 of 336.8 pounds was more than triple the previous highest estimate, 100.5 pounds per person in 1973. In contrast, harvests of caribou in Nondalton in 2001/02, at 22.8 pounds per person, were the lowest on record. Even more significant, subsistence harvests of salmon at Nondalton in 2001 totaled only 136.9 pounds person, far less than previous estimates that ranged from about 507 pounds per person in 1973 and 1981 to 833 pounds per person in 1980.

Table 55. Harvests of Salmon, Moose, Caribout, Bear, and All Resources in Pounds Usable Weight per Capita, Nondalton, All Study Years

Study Year	Pounds Usable Weight per Capita						Percentage of Total Pounds Harvested				
	Salmon	Moose	Caribou	Bear	All Big Game	All Resources	% salmon	% moose	% caribou	% bear	% big game
1973	506.5	100.5	111.6	7.0	219.1	802.6	63.1%	12.5%	13.9%	0.9%	27.3%
1980	832.7	76.5	69.4	0.0	145.9	1,036.4	80.3%	7.4%	6.7%	0.0%	14.1%
1981	507.2	85.0	61.1	13.0	159.1	738.3	68.7%	11.5%	8.3%	1.8%	21.5%
1983	768.7	64.4	108.7	6.4	179.6	1,174.8	65.4%	5.5%	9.3%	0.5%	15.3%
2001	136.9	336.8	22.8	14.4	374.0	NA	NA	NA	NA	NA	NA

Source: Scott et al. 2002; ADF&G and BBNA, household surveys, 2002; ADF&G Division of Subsistence Bristol Bay Subsistence Permit Database

The declines in subsistence harvests of caribou and salmon in 2001 compared to other study years help explain the unusually large moose harvest at Nondalton. As shown in Table 56 and Figure 15, in all previous study years, salmon contributed by far the largest portion of the subsistence harvest of salmon and big game combined, ranging from about 70 percent in 1973 to 85 percent in 1980.[1] But in 2001, due to poor returns of sockeye salmon to the Kvichak watershed, harvests fell to about 137 pounds per person and only 26.8 percent of the total harvest of salmon and big game. Also, in terms of usable pounds of meat, subsistence caribou harvests at Nondalton in past study years have been approximately similar to, or higher than moose harvests. But in 2001/02, caribou harvests were just 22.8 pounds per person. While moose made up about one third (in 1983) to about one half (in 1973, 1980, and 1981) of the big game harvest in Nondalton in past study years, in 2001, moose harvests made up 90.1 percent of all big game harvested.

At a meeting with the Nondalton Tribal Council on October 8, 2003, council members told project staff that they believed the survey estimates of subsistence harvests were accurate for the 2001/2002 study year. Moose harvests were up that year, they said, because of low salmon returns and scarce caribou. Council members also reported that moose numbers were down in 2003, but with strong runs of sockeye salmon, community members were able to harvest salmon in substantial numbers. For the 2003/2004 hunting season Nondalton hunters told project staff on October 21, 2004 that they had only taken one moose for the whole village.

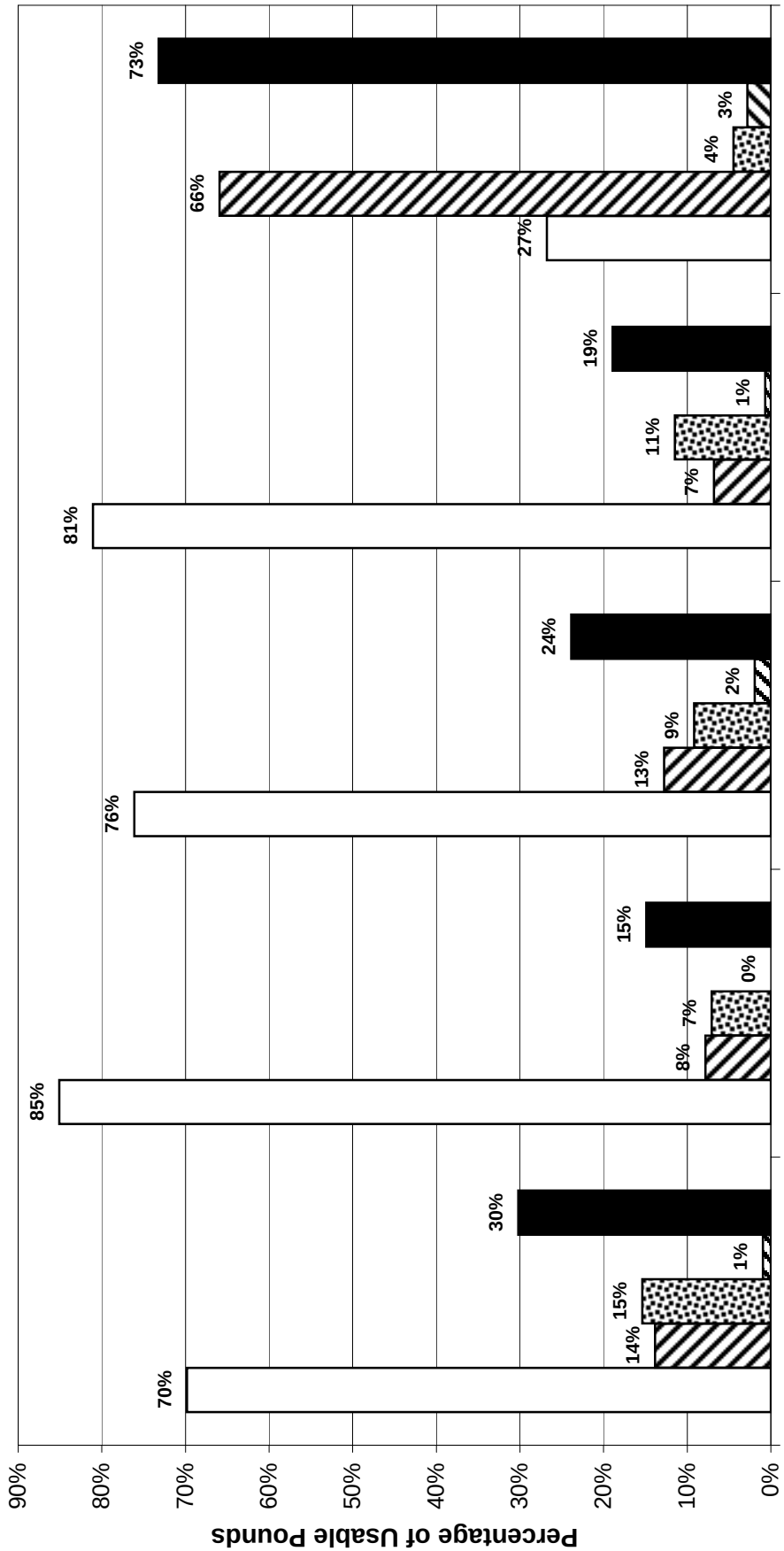
Table 56. Percentage of Harvests of Salmon and Big Game by Resource, Nondalton, All Study Years

Study Year	Total per capita pounds, salmon & big game	Percentage of Pounds Harvests of Salmon and Big Game					Percentage of Big Game Harvest Composed of Moose
		Salmon	Moose	Caribou	Bear	All Big Game	
1973	725.6	69.8%	13.8%	15.4%	1.0%	30.2%	45.9%
1980	978.6	85.1%	7.8%	7.1%	0.0%	14.9%	52.4%
1981	666.3	76.1%	12.8%	9.2%	1.9%	23.9%	53.4%
1983	948.2	81.1%	6.8%	11.5%	0.7%	18.9%	35.9%
2001	510.9	26.8%	65.9%	4.5%	2.8%	73.2%	90.1%

Source: Scott et al. 2001; ADF&G and BBNA, household surveys, 2002; ADF&G Bristol Bay Subsistence Permit Database

[1] Because a comprehensive survey was not conducted for 2001/02, it is not possible to compare the contributions of salmon and big game to the total harvest. Missing are harvests of other fish, small game, birds, and wild plants. However, these categories have historically contributed only a small portion to the total subsistence harvest at Nondalton, about 10 percent or less (Behnke 1982; Scott et al 2001).

Figure 15. Nondalton: Percentage of Usable Pounds of Salmon and Big Game Harvested by Resource



The case of Nondalton in 2001/02 illustrates how communities compensate for scarcities of key resources by substituting harvests from more abundant wildlife populations or fish stocks. If sockeye salmon returns improve in the Kvichak system or caribou become more accessible to the community's hunters, it is possible that moose harvests at Nondalton will be more similar to those of earlier study years.

RECOMMENDATIONS

This report concludes with several recommendations for improvements in the monitoring of subsistence harvests of large land mammals in the communities of the western Bristol Bay area.

- Initiatives to design harvest assessment programs with community-based components need to continue. Such initiatives can foster support for collection of harvest data among hunters and improve the accuracy of these programs.
- Discussion of community harvester and designated hunter programs, linked to community annual harvest quotas, needs to take place between local communities and ADF&G staff. These discussions could lead to the development of regulatory proposals for the Alaska Board of Game and the Federal Subsistence Board. Goals of such programs would include improved harvest reporting and regulations more consistent with local hunting traditions and sharing patterns.
- Meetings between tribal governments, ADF&G staff, and Federal land and resource managers need to occur on a more frequent basis to review harvest and wildlife population data and for regulatory review. This will encourage sharing of information and promote cooperative responsibility for management of subsistence resources.
- Traditional knowledge and other contextual information needs to be collected on a more regular basis for evaluating subsistence harvest information, assessing the status of local wildlife populations, and understanding local issues and concerns. This could include;

    1) Qualitative research on the impacts of climate and weather change and their affects on all species.

    2) Local and traditional knowledge of the changes in habitat relating to fisheries resources for both freshwater and anadromous species including local knowledge of indicators of resource abundance, spawning, population distribution, etc. This knowledge base should be mapped and incorporated into a GIS database.

    3) Impacts on possible disruptions in the ecological and social fabric of the Kvichak Watershed (GMU 9B) in relation to resource development.

In conclusion, with the increasing accessibility of the Bristol Bay area to recreational hunting by nonlocal Alaska residents and nonresidents, it will be increasingly important to accurately and systematically monitor local subsistence harvests of large land mammals. Also essential is to continue to expand the collection and application of local and traditional knowledge about wildlife, wildlife habitat, and traditional harvest and use patterns in this area. These two steps are necessary for both effective management of these wildlife populations and for providing reasonable hunting opportunities for subsistence hunting. These goals can be accomplished best through partnerships between resource management agencies, regional organizations, and local communities.

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BRISTOL BAY NATIVE ASSOCIATION
POLICY GUIDELINES FOR RESEARCH IN BRISTOL BAY

The Bristol Bay Native Association (BBNA) is a service agency dedicated to the betterment of the Native People of the Bristol Bay region. These principles are consistent with the policies adopted by the Alaska Federation of Natives in May of 1993 and shall serve as guidelines for scientific research involving BBNA.

Alaska Natives in Bristol Bay share with the scientific community an interest in learning more about the history and culture of our societies. The best scientific and ethical standards are obtained when Alaska Natives are directly involved in research conducted in our communities and in studies where the findings have a direct impact on Native populations.

BBNA recommends to public and private institutions that conduct or support research among Alaska Natives in Bristol Bay that they include a standard category of funding in their projects to ensure Native participation. BBNA recommends to all scientists and researchers who plan to conduct studies among Alaska Natives in Bristol Bay that they comply with the following principles:

- Advise Native people who are to be affected by the study of the purpose, goals and timeframe of the research, the data-gathering techniques, and the positive and negative implications of the research.
- Obtain the informed consent of the appropriate governing body, village or tribal council through a letter of support or the resolution process.
- Hire and train Native people to assist in the study with the intent of building capacity for Native-led research.
- Guarantee confidentiality of surveys and sensitive material.
- Honor the contributions of Native participants by compensating them for their time, intellectual property and involvement.
- Respect the culture and traditions of affected communities.
- Use Native language in communities where English is the second language.
- Provide the affected Native communities with the opportunity to comment on research reports before a final draft is released.
- Include Native viewpoints and acknowledge the contributions of Native resources and people in final publications.
- Inform affected parties and villages in a summary and in non-technical language of the major findings of the study.
- Provide copies of studies to the local library, villages, agencies and other affected organizations.

BRISTOL BAY NATIVE ASSOCIATION AND ALASKA DEPARTMENT OF FISH AND GAME, DIVISION OF SUBSISTENCE

WESTERN BRISTOL BAY LARGE LAND MAMMAL SURVEY 2001-2002

COMMUNITY:_____(_____)

COMMUNITY ID	HHID	INTERVIEWERS INITIALS	DATE	START TIME	STOP TIME	HOW MANY PEOPLE LIVED IN YOUR HOUSEHOLD DURING THE 2001/2002 HUNTING SEASON (JULY 1, 2001-JUNE 30, 2002)	ARE ANY MEMBERS OF THIS HOUSEHOLD ALASKA NATIVE?

BBNA

MOOSE

JULY 2001-JUNE 2002

DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT MOOSE BETWEEN JULY 2001 AND JUNE 2002? YES: _____ NO: _____

HAVE MEMBERS OF YOUR HOUSEHOLD HUNTED MOOSE IN THE PAST 20 YEARS? YES: _____ NO: _____

BETWEEN JULY 2001 AND JUNE 2002, DID MEMBERS OF YOUR HOUSEHOLD ...

	USE MOOSE	HUNT MOOSE	IF, YES HOW MANY PEOPLE IN THIS HOUSEHOLD HUNTED MOOSE?	HARVEST MOOSE	RECEIVE MOOSE FROM ANOTHER HOUSEHOLD	RECEIVE MOOSE FROM SPORT HUNTERS	IF YES HOW MUCH MOOSE FROM SPORT HUNTERS	GIVE AWAY MOOSE
MOOSE								
211800000								

PLEASE USE ONE LINE BELOW FOR EACH MOOSE HARVESTED.

2001/2002 HUNTING SEASON

MALE **F**EMALE **U**NK.	UNK.	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1													
2													
3													
4													
5													

MOOSE NEEDS

WERE YOUR HOUSEHOLD'S NEED FOR MOOSE MET DURING THE 2001/2002 HUNTING SEASON (JULY 2001-JUNE 2002)?

YES: _____ NO: _____ DON'T KNOW: _____

IF YOUR MOOSE NEEDS WERE NOT MET, WHY? _____

DID A SPORT HUNTER OFFER YOU MOOSE MEAT THAT YOU DID NOT ACCEPT? IF YES, WHY DID YOU NOT ACCEPT THE MOOSE MEAT? _____

CARIBOU

JULY 2001-JUNE 2002

DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT CARIBOU BETWEEN JULY 2001 AND JUNE 2002? YES: _____ NO: _____

HAVE MEMBERS OF YOUR HOUSEHOLD HUNTED CARIBOU IN THE PAST 20 YEARS? YES: _____ NO: _____

BETWEEN JULY 2001 AND JUNE 2002, DID MEMBERS OF YOUR HOUSEHOLD ...

	USE CARIBOU	HUNT CARIBOU	IF, YES HOW MANY PEOPLE IN THIS HOUSEHOLD HUNTED CARIBOU?	HARVEST CARIBOU	RECEIVE CARIBOU FROM ANOTHER HOUSEHOLD	RECEIVE CARIBOU FROM SPORT HUNTERS	IF YES HOW MUCH CARIBOU FROM SPORT HUNTERS	GIVE AWAY CARIBOU
CARIBOU								
211000000								

PLEASE USE ONE LINE BELOW FOR EACH CARIBOU HARVESTED.

2001/2002 HUNTING SEASON

C	**M**ALE **F**EMALE **U**NK.	UNK.	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														

USE ADDITIONAL SHEETS IF NECESSARY.

CARIBOU

JULY 2001-JUNE 2002

NEEDS

WERE YOUR HOUSEHOLD'S NEED FOR CARIBOU MET DURING THE 2001/2002 HUNTING SEASON (JULY 2001 - JUNE 2002)?

YES: _____ NO: _____ DON'T KNOW: _____

IF YOUR CARIBOU NEEDS WERE NOT MET, WHY? _____

DID A SPORT HUNTER OFFER YOU CARIBOU MEAT YOU DID NOT ACCEPT? IF YES, WHY DID YOU NOT ACCEPT THE CARIBOU MEAT? _____

BROWN BEAR

JULY 2001-JUNE 2002

DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT BROWN BEAR BETWEEN JULY 2001 AND JUNE 2002 YES: _____ NO: _____

HAVE MEMBERS OF YOUR HOUSEHOLD HUNTED BROWN BEAR IN THE PAST 20 YEARS? YES: _____ NO: _____

BETWEEN JULY 2001 AND JUNE 2002, DID MEMBERS OF YOUR HOUSEHOLD …

	USE BROWN BEAR	HUNT BROWN BEAR	IF YES, HOW MANY PEOPLE IN THIS HOUSEHOLD HUNTED BROWN BEAR?	HARVEST BROWN BEAR	RECEIVE BROWN BEAR	GIVE AWAY BROWN BEAR
BROWN BEAR						
210800000						

PLEASE USE ONE LINE BELOW FOR EACH BROWN BEAR HARVESTED.

2001/2002 HUNTING SEASON

BR	**M**ALE **F**EMALE **U**NK.	UNK.	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1														
1														
2														
2														
3														
3														
4														
4														
5														
5														

WHAT PARTS OF THE BROWN BEAR DID YOU USE?

HIDE	FAT	MEAT	OTHER	DETAIL OTHER PARTS

BROWN BEAR

JULY 2001 - JUNE 2002

USE OF BROWN BEAR MEAT OR FAT

HAS YOUR HOUSEHOLD EVER USED BROWN BEAR MEAT OR FAT? YES: _____ NO: _____

IF YES, WHEN WAS THE LAST TIME? _____

WHAT ELSE CAN YOU TELL ME ABOUT YOUR HOUSEHOLD'S PAST AND PRESENT USE OF BROWN BEAR? _____

NEEDS

WERE YOUR HOUSEHOLD'S NEED FOR BROWN BEAR MET DURING THE 2001/2002 HUNTING SEASON (JULY 2001-JUNE 2002)?

YES: _____ NO: _____ DON'T KNOW: _____

IF YOUR BROWN BEAR NEEDS WERE NOT MET, WHY? _____

BLACK BEAR

JULY 2001-JUNE 2002

DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT BLACK BEAR BETWEEN JULY 2001 AND JUNE 2002? YES: _____ NO: _____

HAVE MEMBERS OF YOUR HOUSEHOLD HUNTED BLACK BEAR IN THE PAST 20 YEARS? YES: _____ NO: _____

BETWEEN JULY 2001 AND JUNE 2002, DID MEMBERS OF YOUR HOUSEHOLD …

	USE BLACK BEAR	HUNT BLACK BEAR	IF YES, HOW MANY PEOPLE IN THIS HOUSEHOLD HUNTED BLACK BEAR?	HARVEST BLACK BEAR	RECEIVE BLACK BEAR	GIVE AWAY BLACK BEAR
BLACK BEAR						
210800000						

PLEASE USE ONE LINE BELOW FOR EACH BLACK BEAR HARVESTED.

2001/2002 HUNTING SEASON

BL	**M**ALE **F**EMALE **U**NK.	UNK.	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1														
1														
2														
2														
3														
3														
4														
4														
5														
5														

WHAT PARTS OF THE BLACK BEAR DID YOU USE?

HIDE	FAT	MEAT	OTHER	DETAIL OTHER PARTS

BLACK BEAR

JULY 2001 - JUNE 2002

USE OF BLACK BEAR MEAT OR FAT

HAS YOUR HOUSEHOLD EVER USED BLACK BEAR MEAT OR FAT? YES: _____ NO: _____

IF YES, WHEN WAS THE LAST TIME? _____

WHAT ELSE CAN YOU TELL ME ABOUT YOUR HOUSEHOLD'S PAST AND PRESENT USE OF BLACK BEAR? _____

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NEEDS

WERE YOUR HOUSEHOLD'S NEED FOR BLACK BEAR MET DURING THE 2001/2002 HUNTING SEASON (JULY 2001-JUNE 2002)?

YES: _____ NO: _____ DON'T KNOW: _____

IF YOUR BLACK BEAR NEEDS WERE NOT MET, WHY? _____

DALL SHEEP

JULY 2001-JUNE 2002

DID MEMBERS OF YOUR HOUSEHOLD USE OR HUNT DALL SHEEP BETWEEN JULY 2001 AND JUNE 2002? YES: _____ NO: _____

HAVE MEMBERS OF YOUR HOUSEHOLD HUNTED DALL SHEEP IN THE PAST 20 YEARS? YES: _____ NO: _____

BETWEEN JULY 2001 AND JUNE 2002, DID MEMBERS OF YOUR HOUSEHOLD …

	USE DALL SHEEP	HUNT DALL SHEEP	IF YES, HOW MANY PEOPLE IN THIS HOUSEHOLD HUNTED DALL SHEEP?	HARVEST DALL SHEEP	RECEIVE DALL SHEEP	GIVE AWAY DALL SHEEP
DALL SHEEP						
212200000						

PLEASE USE ONE LINE BELOW FOR EACH DALL SHEEP HARVESTED.

2001/2002 HUNTING SEASON

S	**M**ALE **F**EMALE **U**NK.	UNK.	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MAR.	APR.	MAY	JUNE
1														
2														
3														
4														
5														

DALL SHEEP NEEDS

WERE YOUR HOUSEHOLD'S NEED FOR DALL SHEEP MET DURING THE 2001/2002 HUNTING SEASON (JULY 2001-JUNE 2002)?

YES: _____ NO: _____ DON'T KNOW: _____

IF YOUR DALL SHEEP NEEDS WERE NOT MET, WHY? _____

FUTURE HUNTING ACTIVITY

HAS YOUR HOUSEHOLD FINISHED HUNTING FOR MOOSE, BROWN BEAR, BLACK BEAR, CARIBOU, AND SHEEP FOR THIS HUNTING SEASON WHICH CONTINUES THROUGH JUNE 2002?

YES/NO

IF NO, MAY I HAVE A TELEPHONE NUMBER OR ALTERNATIVE CONTACT FOR YOU SO THAT I CAN COMPLETE THE SURVEY AFTER THE END OF THIS HUNTING SEASON IN JUNE?

DO YOU HAVE OTHER QUESTIONS, COMMENTS, OR CONCERNS THAT YOU'D LIKE TO SHARE WITH US?

INTERVIEW SUMMARY:

MAPPING

WESTERN BRISTOL BAY LARGE LAND MAMMAL SURVEY 2001-2002

DURING THE PERIOD FROM JULY 2001 TO JUNE 2002 WHERE HAVE YOU **HUNTED** THE FOLLOWING RESOURCES?

	HUNTED Y/N	MAPPED Y/N	OTHER AREAS NOT ON THE BASE MAP (IN ORDER OF ACTIVITY):		
MOOSE			1	2	3
211800000					
CARIBOU			1	2	3
211000000					
BROWN BEAR			1	2	3
210800000					
BLACK BEAR			1	2	3
210600000					
DALL **S**HEEP			1	2	3
212200000					

DURING THE PERIOD FROM JULY 2001 TO JUNE 2002 WHERE DID YOU **HARVEST** THE FOLLOWING RESOURCES?

	HUNTED Y/N	MAPPED Y/N	OTHER AREAS NOT ON THE BASE MAP (IN ORDER OF ACTIVITY):		
MOOSE			1	2	3
211800000					
CARIBOU			1	2	3
211000000					
BROWN BEAR			1	2	3
210800000					
BLACK BEAR			1	2	3
210600000					
DALL **S**HEEP			1	2	3
212200000					

OVER THE PAST 20 YEARS (OR SINCE YOU HAVE LIVED IN THIS COMMUNITY, IF LESS), WHERE HAVE YOU HUNTED THE FOLLOWING RESOURCES?

	HUNTED Y/N	MAPPED Y/N	OTHER AREAS NOT ON THE BASE MAP (IN ORDER OF ACTIVITY):		
MOOSE			1	2	3
211800000					
CARIBOU			1	2	3
211000000					
BROWN BEAR			1	2	3
210800000					
BLACK BEAR			1	2	3
210600000					
DALL **S**HEEP			1	2	3
212200000					

COMMUNITY ID:_____ HHID:_____

BBNA

Western Bristol Bay Large Land Mammal Project, 2002

Background: This project is modeled after the highly successful Northern Alaska Peninsula Large Land Mammal Project. As with this earlier project, the Western Bristol Bay Large Land Mammal project is being conducted jointly by the Division of Subsistence of the Alaska Department of Fish and Game and the Natural Resource Department of the Bristol Bay Native Association (BBNA). Staff include local assistants hired from each community. Funding for the project is provided by the US Fish & Wildlife Service, Office of Subsistence Management.

Study communities are those of Game Management Units (GMU) 9B and 17: Aleknagik, Clarks Point, Dillingham, Ekwok, Igiugig, Iliamna, Kokhanok, Koliganek, Levelock, Manokotak, Newhalen, New Stuyahok, Nondalton, Pedro Bay, Portage Creek, Togiak, Twin Hills, and Port Alsworth.

Project Objectives:

1. To record for the communities of GMU 9B and 17, the percentage of households using, hunting, harvesting, receiving, and giving away each species of large land mammal in the 2001/02 regulatory year, including: caribou, moose, brown bear, black bear (where appropriate), and Dall sheep (where appropriate).
2. Estimate the harvests of large land mammals by residents of the communities of GMU 9B and 17 in the 2001-2002 regulatory year.
3. Record the timing of harvests by month.
4. Create maps of hunting and harvest locations in 2001-2002.
5. Create maps of areas hunted for each large land mammal species over the last 20 years, or since the last mapping project was conducted in the community.
6. Document the receipt of big game meat by local households by non-local sport hunters and guides.
7. Identify issues related to subsistence hunting of large land mammals.

Methods:

1. Each of the study communities named in the first section of the design adopted resolutions in support of the project.
2. The primary data gathering methods were systematic household surveys using a standard data-gathering instrument. All surveys were conducted face-to-face in people's homes.
3. The research is being conducted in accordance with BBNA's "Policy Guidelines for Research in Bristol Bay" and the "Ethical Principles for the Conduct of Research in the North," the standard for the Division of Subsistence. This means that participation in the project is voluntary and all individual and household responses are confidential.

For more information contact:

Ted Krieg, Alaska Department of Fish and Game, Division of Subsistence 842-5925
Hans Nicholson, Bristol Bay Native Association, Natural Resources Department 1-800-478-5257
or 842-5257 in Dillingham

APPENDIX D

WESTERN BRISTOL BAY LARGE LAND MAMMAL SURVEY
QUESTIONS FOR KEY RESPONDENTS

Can you tell me about the history of the caribou herd in your hunting area? Do you see a cycle of growth and decline in the herd over time?

Do people tell stories about the history of the caribou herd?

What are factors that you see which create a change in the number of caribou?

Did people used to hunt caribou more when the herd was larger to keep the caribou population from getting to large? If yes why?

Was there a time when people wouldn't hunt caribou if the caribou population dropped below a certain level?

What time of year did people not hunt caribou? Why?

When caribou were gone in the past, was there a story about where they went?

Have you seen changes in caribou behavior in the last 20 years? If yes, why do you think this has occurred?

Do you see a change in the environment from the way it was in your grandfather's days?

When did moose come into your hunting area? Were moose here in your grandfather's time? If they are new arrivals why do you think moose have come into this area?

Do you hunt moose more now than in the past?

What can you tell me about bears and their relationship in the ecosystem to caribou and moose? How about wolves?

Do you feel like subsistence hunters are part of the ecosystem, part of the land?

Did fires help to create a better habitat for caribou and moose? Did fire create a better habitat for bears? Did people used to start fires to create a better habitat for animals? Which animals?

Are subsistence foods still a large part of your diet?

Do subsistence regulations make it more or less difficult to access subsistence resources?

Appendix Table E-1. Study Findings for Dillingham. Households with Hunting Licenses, 2001/02 Regulatory Year.

	Percentage of Households[1]					Harvest							
										Per	95% Confidence Limit		
	Used	Hunted	Harvested	Received	Gave		Per	Per	Per	Successful	of Total Harvest		
Resource	(%)	(%)	(%)	(%)	(%)	Total	Household	Person	Hunter	Hunter	%	Low*	High
Black Bear	0.0	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0
Brown Bear	1.8	5.5	1.8	0.0	0.0	7.6	0.0	0.0	0.3	1.0	119.6%	2.0	16.6
Caribou	70.0	52.7	32.7	40.0	35.5	344.1	0.8	0.2	1.0	1.7	29.9%	241.3	447.0
Moose	85.5	76.4	38.2	54.5	45.5	208.0	0.5	0.1	0.4	1.0	25.1%	155.7	260.3
Dall Sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%	0.0	0.0

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

1 As discussed in Chapter One, in Dillingham only households with at least one member with a hunting license were interviewed. Percentages are based on a Sample of 110 of the 416 Dilingham housholds with hunting licenses. The estimated total number of households in Dillingham is 866.

Source: ADF&G Division of Subsistence and BBNA household survey 2002

Division of Subsistence

Harvests and Uses of Caribou, Moose, Bears, and Dall Sheep by Communities of Game Management Units 9B and 17, Western Bristol Bay, Alaska 2001-2002

An Overview of Study Findings

Bristol Bay Native Association

Division of Subsistence
Alaska Department of Fish and Game
&
Bristol Bay Native Association

July 2005

Background

The following is a brief overview of research conducted by the Division of Subsistence of the Alaska Department of Fish and Game (ADF&G) and the Bristol Bay Native Association (BBNA) on subsistence harvest of caribou, moose, bears, and dall sheep by residents of communities of Game Management Units (GMU) 9B and 17. The study period covers July 1, 2001 to June 31, 2002. The project was funded through a cooperative agreement with the US Fish and Wildlife Service (FWS Agreement Number 701811J3557; ADF&G Number COOP 01-073). Using local research assistants hired by BBNA, household interviews were conducted to collect harvest and use information for large land mammals. Hunters also mapped areas used to hunt and harvest these species. Study communities were Aleknagik, Clarks Point, Dillingham, Ekwok, Igiugig, Iliamna, Kokhanok, Koliganek, Levelock, Manokotak, Newhalen, New Stuyahok, Nondalton, Pedro Bay, Portage Creek, Port Alsworth, Togiak, and Twin Hills. Key respondent interviews were also conducted in Unit 9B communities to document their traditional ecological knowledge (TEK) relating to harvest methods, and trends in both the environment and large land mammal populations. These interviews took place in the communities of Igiugig, Iliamna, Kokhanok, Newhalen, Nondalton, Pedro Bay, and Port Alsworth.

Methods

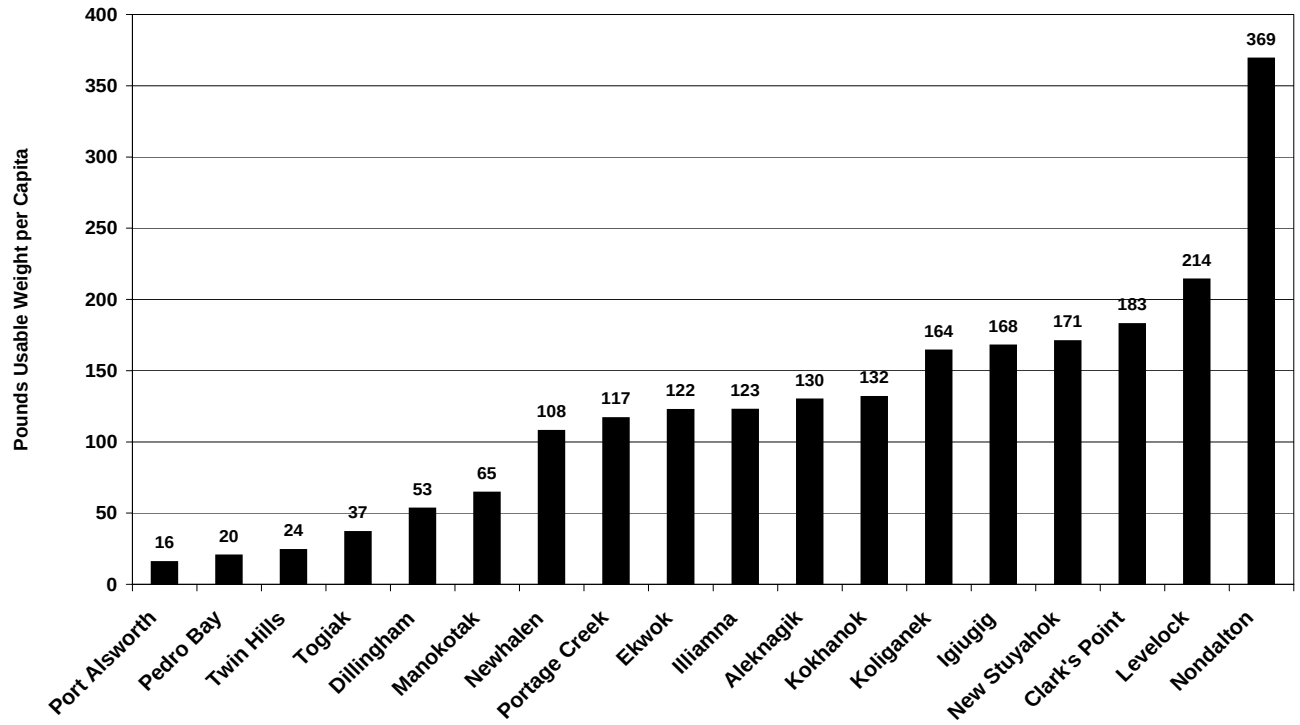
The primary data gathering method was systematic household surveys using the ADF&G Division of Subsistence standard data-gathering instrument. The surveys were conducted face-to-face in people's homes. The goal was to interview representatives of all households in communities with 70 households or less. A stratified random design was used for Togiak and Dillingham, much larger communities where interviewing all households would have been difficult. Of the 572 households in the 16 communities where census samples was the goal, 437 interviews were completed (76.4 percent). In total, 622 interviews were conducted for this project. This is a sample of 54.5 percent of the total estimated households in the 17 smaller communities plus the hunting households in Dillingham. In addition, mapping was conducted in each household for hunting done during the study year and for the past 20 years. Participation was voluntary, and individual and household-level data are confidential.

Findings

Subsistence hunting was an extremely common activity in these Bristol Bay communities in 2001/2002: 41 percent of all households hunted moose and 37 percent hunted caribou. Also, with the exception of Dillingham, for which use data were not collected, most households used moose (73.4 percent) and caribou (81.1 percent) that they harvested themselves or received from other households. Residents of the 18 communities continue to be interested in caribou hunting and caribou continue to make an important contribution to subsistence harvests and use patterns in the communities of the western Bristol Bay area. Large numbers of community residents hunt caribou. In general, subsistence harvests of caribou are conditioned largely by caribou movements and travel conditions for hunters. Overall in 2001/02 subsistence hunting and harvesting of moose were also key activities in the western Bristol Bay area. Most households used moose, many area residents hunted moose, and sharing of moose meat was common.

Compared to moose and caribou, subsistence harvests and uses of bears are relatively low in most western Bristol Bay communities. However, small numbers of black bears are used by the communities within their range such as Kokhanok, Iliamna, and Nondalton. Of all Bristol Bay communities, black bears are most important in Nondalton. There are low levels of use of brown bears in most western Bristol Bay communities. Use of brown bears is especially significant in Kokhanok. Subsistence harvests of Dall sheep have been low over the past several decades and no harvests were reported for the study year. No sheep hunting traditions were reported by the Central Yup'ik communities of GMU 17. Traditionally, Dena'ina Athabascan communities hunted sheep in the upper portions of GMU 17B and in GMU 9B. This customary and traditional use is recognized by federal subsistence hunting regulations, which allow subsistence sheep hunting for qualified rural residents within the Lake Clark National Park and Preserve.

Figure 1. Estimated Harvests of Large Land Mammals, Pounds Usable Weight per Capita, Study Communities, 2001/2002



As illustrated in Figure 1, there was a wide range of harvests, with a low of 16 pounds (usable weight) of large land mammals harvested per person in Port Alsworth to a high of 369 pounds per person in Nondalton. Harvests in most communities (10 of the 18) were in the 100 to 200 pounds per person range. For the study area overall, the harvest was 82.6 pounds of large land mammals per person in the 2001/2002 study year. Excluding the regional center of Dillingham, harvests averaged 113.2 pounds per person.

Table 1. Estimated Harvests of Large Land Mammals in Usable Pounds Harvested, 2001-2002

Community	estimated population	Caribou Pounds per person	Moose Pounds per person	black bear Pounds per person	brown bear Pounds per person	Percentage of total caribou	moose	black bear	brown bear
Residents of GMU 09B									
Igiugig	27	127.8	40.0	0.0	0.0	76.2%	23.8%	0.0%	0.0%
Illiamna	91	66.2	55.6	0.9	0.0	54.0%	45.3%	0.7%	0.0%
Kokhanok	133	22.1	106.2	0.0	3.3	16.8%	80.7%	0.0%	2.5%
Levelock	62	67.9	141.4	0.0	4.8	31.7%	66.1%	0.0%	2.2%
Newhalen	148	72.1	33.5	1.3	0.8	66.9%	31.1%	1.3%	0.7%
Nondalton	152	22.8	337.0	7.0	2.4	6.2%	91.3%	1.9%	0.7%
Pedro Bay	59	0.0	20.4	0.0	0.0	0.0%	100.0%	0.0%	0.0%
Port Alsworth	112	5.6	6.8	0.7	2.5	36.1%	43.3%	4.6%	16.0%
Subtotal	783	40.0	111.1	1.8	1.9	25.9%	71.8%	1.2%	1.2%
Residents of GMU 17A									
Togiak	700	22.6	13.7	0.0	0.4	61.6%	37.2%	0.0%	1.2%
Twin Hills	72	15.9	8.2	0.0	0.0	66.0%	34.0%	0.0%	0.0%
Subtotal	771	22.0	13.2	0.0	0.4	61.9%	37.0%	0.0%	1.1%
Residents of GMU 17B									
Koliganek	184	75.7	85.5	0.0	3.0	46.1%	52.1%	0.0%	1.8%
Subtotal	184	75.7	85.5	0.0	3.0	46.1%	52.1%	0.0%	1.8%
Residents of GMU 17C									
Aleknagik	157	45.8	82.4	0.0	1.7	35.2%	63.4%	0.0%	1.3%
Clark's Point	59	71.2	109.8	0.0	1.7	39.0%	60.1%	0.0%	0.9%
Dillingham **	2,443	16.7	36.4	0.0	0.2	31.3%	68.2%	0.0%	0.5%
Ekwok	104	39.8	82.7	0.0	0.0	32.5%	67.5%	0.0%	0.0%
Manokotak	369	27.9	36.6	0.0	0.0	43.2%	56.8%	0.0%	0.0%
New Stuyahok	488	79.9	90.8	0.0	0.0	46.8%	53.2%	0.0%	0.0%
Portage Creek	36	41.7	75.0	0.0	0.0	35.7%	64.3%	0.0%	0.0%
Subtotal	3,656	27.4	46.7	0.0	0.3	36.9%	62.8%	0.0%	0.4%
Subtotal without Dillingham	1,213	54.7	73.0	0.0	0.3	42.7%	57.0%	0.0%	0.2%
Grand total	5,395	29.8	51.9	0.2	0.6	36.1%	62.9%	0.3%	0.7%
Grand total without Dillingham	2,952	43.6	68.3	0.5	0.9	38.5%	60.3%	0.4%	0.8%

*Lower Confidence Limit is the higher of the Lower 95% confidence limit and reported harvest

** In Dillingham, only households with members holding hunting licenses were interviewed.
It is assumed that other Dillingham households did not hunt.

Source: ADF&G Division of Subsistence and BBNA, household surveys, 2002

The total harvest of large land mammals for all communities combined in 2001/2002 study year was 1,202 caribou, 581 moose, 35 brown bear, 24 black bear, and no dall sheep. As estimated in usable pounds, moose made the largest contribution to the large land mammal harvest at 51.9 pounds per person, 62.9 percent of the total. This is illustrated in Table 1 above. The area-wide harvest of caribou was 29.8 pounds per person, 36.1 percent of the total. Bears contributed about 1.0 percent of the total and about 0.8 pounds per person area-wide. Moose provided the largest portion of the large land mammal harvests for all the game management subunits but GMU 17A, where caribou contributed 61.9 percent.

Continuing Research

In March of 2005 the Division of Subsistence, in collaboration with local communities and the National Park Service, conducted a subsistence baseline harvest survey and mapping project in the communities of Iliamna, Newhalen, Nondalton, Pedro Bay, and Port Alsworth. As expected harvests and uses of large land mammal species have changed. These results will be available in the fall of 2005. Additional baseline studies are being planned for other communities in GMU 9B and 17 over the next two years.

For More Information:

Complete results for this project appear in: Holen, Davin L., Theodore Krieg, Robert Walker, and Hans Nicholson, 2005. *Harvests and Uses of Caribou, Moose, Bears, and Dall Sheep by Communities of Game Management Units 9B and 17, Western Bristol Bay, Alaska 2001-2002*. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 283. Juneau. The report is available by contacting the Division of Subsistence at P.O. Box 25526, Juneau, AK 99802 (907-465-4147).
http://www.subsistence.adfg.state.ak.us/

Copies of the report and a map atlas specific to each community have also been provided to the participating communities.