

**Wild Resource Harvests and Uses by Residents of
Lake Minchumina and Nikolai Alaska, 2001 - 2002**

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*Cover Image: Fishing on the Upper Kuskokwom near Nikolai, 2001.
Photograph by Davin L. Holen*

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ABSTRACT

The primary objective of this research was to update and expand information about subsistence uses, needs, and areas traditionally used for subsistence harvests by the subsistence residence zone communities of Denali National Park and Preserve, Lake Minchumina and Nikolai. Current community-based subsistence harvest information is lacking for these communities. In both communities, harvest, use and areas traditionally used for subsistence harvests have changed but there is consistency in harvest and use patterns. Most notable were comments made by residents of both communities about recent changes and concerns regarding fish species harvested for subsistence. In addition, residents spoke of a general decline in all species in the local areas. The principal reason Nikolai residents gave to explain for the drop in harvest levels was that resources were not as abundant as they used to be. People provided various reasons for this decline including environmental change, competition from outsiders or non-locals, predation by wolves and bears, and changes in traditional values. Residents of Lake Minchumina noted that the lake's ability to support the local population with freshwater fish is in doubt because fish populations have diminished over the past 20 years. Additionally, it is their understanding that climatic and local ecosystem change will be the determining factors regarding freshwater fish abundance in the future. Furthermore, residents of both communities feel that caribou are not as prevalent in the area as they once were, and there is general concern regarding the decrease in all species relied upon for meeting subsistence needs.

Keywords: Lake Minchumina, Nikolai, Denali National Park and Preserve, National Park Service, subsistence management.

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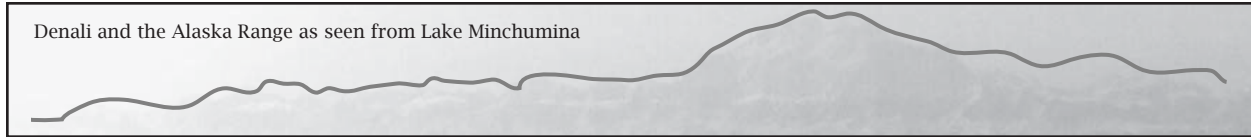
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CHAPTER ONE: INTRODUCTION
BACKGROUND

This report presents information about subsistence uses of wild resources in Lake Minchumina and Nikolai, two resident zone communities of Denali National Park and Preserve, Alaska. The information contained in this report was collected in conjunction with a larger project funded by the National Park Service (NPS) and the USFWS Fisheries Information Service (FIS).

The purpose of the NPS research was to gather information to update and expand existing information about all subsistence resources and areas traditionally utilized by residents of communities that, under Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA), are recognized as resident zone communities of Denali National Park and Preserve. Under ANILCA Denali National Park was expanded to 6 million acres and came to include the original park, classified as wilderness, and the ANILCA Additions, which include land classified as either park or preserve. Under Section 801 of ANILCA residents of communities located in the vicinity of a national park in Alaska, and designated as resident zone communities, are allowed to hunt within the ANILCA Additions of Denali National Park. That is, they are allowed to hunt on lands designated as either park or preserve but not on lands designated as wilderness.¹ Other Alaska residents, who are not members of the resident zone communities, are only allowed to hunt on national preserve lands. Cantwell and Telida, two additional resident zone communities, were also included in the research. The results of the Cantwell research are reported in Technical Paper 272 (Simeone 2002). The research on Telida is not included in the section on Nikolai in order to maintain the confidentiality of the single household in Telida.

The purpose of the FIS research was congruent with the NPS project goals but focused on documenting traditional knowledge of subsistence fishery resources. Results from the FIS funded research are reported in Williams et al. (2005) and also cited in this report in the section describing use and harvest of fisheries resources by Nikolai residents. Documentation of traditional ecological knowledge of subsistence fisheries is intended to assist federal fishery managers in understanding how resident zone communities utilize and value fishery resources. This understanding is necessary for federal managers to achieve the federal mandates of resource protection and provision of subsistence fishing opportunities.

¹ Not all NPS lands that are classified as wilderness in Alaska are closed to hunting.

STUDY AREA

The study area is part of the “Minchumina Basin,” a vast lowland of meandering rivers, scattered oxbow and pothole lakes, and marshy tundra (Figure 1-1). Relief is provided by ancient sand dunes now visible as gently forested hills and flat plains of sandy soil. On the southeast the Basin is bordered by the steep slopes of the Alaska Range and on the west by the low rolling hills of the Kuskokwim Mountains. The climate is continental and temperatures range from 90 degrees F. to -60 degrees F. In Nikolai the average daily temperature in June is around 55 degrees F.





Tributary streams of the upper Kuskokwim River, such as the South Fork, Big River, Windy Fork, Middle Fork, and Tonzona, originating in the glaciers of the Alaska Range, are silt laden during the summer months, while those arising in the low lands, such as the North Fork, East Fork, and Nixon Fork, are less turbid. Both types of streams drain numerous interconnected lakes and swamps. During the summer water levels in streams that head in the Alaska Range are most influenced by glacial melt while non-glacial streams are affected by precipitation. Most rivers are frozen by mid-November and ice free by mid-May, although ice in the South Fork of the Kuskokwim may remain until early June. Water velocities in the lowlands are slow to moderate (less than 6 miles an hour), so the Kuskokwim meanders widely over the basin floor creating great loops. Over the years erosion of the bank has necessitated moving the site of most communities including Nikolai and McGrath.

Close to the river corridors the basin is carpeted with a dense forest of white spruce, and mixed stands of balsam poplar, locally called cottonwood. Various species of birch occur in well-drained areas and stand either alone or in mixed stands of white spruce and poplar. Away from the river black spruce predominate except on the southern exposure and crowns of low rolling hills where birch and quaking aspen are found. Alder, willow, grasses, mosses, berry plants and other shrubs form undergrowth in the lowlands while above tree line there are mosses, grasses, shrub alder and willow.



Figure 1.1

Study Area

-  Denali National Preserve
-  Denali National Park: Non-Wilderness
-  Denali National Park: Wilderness
-  Alaska Highways



Wild Resource Harvests and Uses by Residents of Lake Minchumina and Nikolai, 2001-2002. Division of Subsistence, Alaska Department of Fish and Game. Technical Paper No. 296.



Scale: 1:3,800,000



RESEARCH GOALS AND OBJECTIVES

This report has three purposes: 1) describe the socioeconomic, demographic, and historical characteristics of Lake Minchumina and Nikolai; 2) document the hunting and fishing patterns of the residents of Lake Minchumina and Nikolai; and 3) report mapped information on areas used for hunting and fishing by residents of Lake Minchumina and Nikolai. The overall objectives of this research were to:

- Estimate the harvest of fish, game, and wild plants for a 12-month study period from October 1, 2001 to September 30, 2002.
- Estimate the level of participation in hunting and fishing activities of household members
- Collect demographic data on household size, ethnicity, age, and length of residency
- Document employment patterns for each adult in the sample, including number of months employed by job during the study period and location of cash employment
- Estimate household monetary income provided by each job and other sources of income; and
- Map resource harvest areas used by the residents of Lake Minchumina and Nikolai.

RESEARCH METHODS

This research was conducted through fieldwork in each community. Fieldwork in Lake Minchumina and Nikolai was conducted through a series of community visits. Research methods included community approval and participation, a formal harvest survey, employment of local researchers, key informant interviews, mapping harvest areas, and participant observation. Different researchers conducted fieldwork in each community. Although the same survey instrument was used different researchers and differing demographics between communities are factors that contributed to varying results. The information in this report is the product of contributions from community residents, local assistants, and all agency staff listed in the introduction.

Lake Minchumina Fieldwork

In 2001, Hollis Twitchell, Division Chief of Subsistence and Cultural Resources, Denali National Park and Preserve, visited the residents of Lake Minchumina, explained the proposed interviews and sought their approval. Between October 21 and 24, 2002 Davin Holen from the ADF&G Division of Subsistence and Chelsie Venechuk from NPS conducted key respondent interviews, a baseline harvest survey, and harvest use area mapping for all subsistence resources utilized by Lake Minchumina residents. Between

June 2 and 4, 2003, Davin Holen conducted more detailed key respondent interviews and harvest use area mapping in the community of Lake Minchumina.

The preliminary contact with each household occurred during a baseline harvest assessment survey conducted for the National Park Service. During each survey, Davin Holen recorded interview field notes. Field notes documented local knowledge and created a base to work from in formulating questions for more detailed key respondent interviews. Out of a total of eight households, six were interviewed (75 percent), one household was unavailable, and one household declined to be interviewed (Table 1-1). A local assistant facilitated setting up the interviews, provided transportation to and from the interview, and helped fill in gaps in the information during and after the interview.

Table 1- 1. SAMPLING AND PARTICIPATION OF HOUSEHOLD SURVEY: Nikolai and Lake Minchumina, September 2002		
	Nikolai	Lake Minchumina
Initial Estimated Households	34	8
Non-Households Encountered	0	0
Revised Estimate of HH	34	10
Interview Goal	34	8
Households Interviewed	27	6
Households Failed to Contact	3	1
Households Refused	2	1
Moved/Non-Resident Household *	2	
Total Households Attempted	34	8
Refusal Rate	5.88%	12.50%
Interview Goal (Percentage)	79.4%	75.0%
Final Households	32	10
Percentage Interviewed	84.38%	60.00%
Percentage of Total Households		
Interview Weighting Factor	1.185	1.667
Sampled Population	0	0
Estimated Population	0.00	0.00
NOTES: Shaded areas are computed fields. *Non-resident households are households which were not present during the study year or which resident less than the required number of months.		

In addition to these short preliminary interviews, key respondent interviews were conducted with three respondents in Lake Minchumina. These occurred immediately following the initial interview or, preferably, at a later time after the researcher had reviewed preliminary household information in order to formulate additional

questions. Longtime residents of Lake Minchumina were prioritized as potential key respondents. The major emphasis of key respondent interviews was local knowledge of fish, both anadromous and freshwater species. However, local knowledge was collected regarding all species utilized for subsistence. In most cases interviews were conducted through narrative, meaning the key respondent was asked a general question and allowed to talk at length on the subject instead of pointed questioning. ADF&G subsistence staff reviewed the interview for content and returned for additional interviews for clarification.

During key respondent interviews, a detailed mapping session was conducted, using the map as a discussion tool. All contemporary subsistence resource uses were mapped and key respondents discussed changes in the lake and local ecosystem. In Lake Minchumina, 11x17 paper maps (scale of 1:600,000) created by the GIS program ARC View were used. On these paper maps, the lake was at the center and larger rivers were labeled. Residents pointed out subsistence use areas precisely and this facilitated in transferring the information into the GIS database.

Some interviews were conducted during participant observation. Researchers asked for informed consent to use the documentation of activities, photographs, and interviews for this report.

Nikolai Fieldwork

Researchers made six trips to Nikolai. In May 2002, ADF&G Division of Subsistence and NPS staff traveled to Nikolai and met with the tribal council to discuss the upcoming research and the proposed key respondent questions about subsistence harvested fish. In order to get to know the community, ADF&G Division of Subsistence including William Simeone, Liz Williams, and Davin Holen and Chelsie Venechuk from NPS staff traveled to Nikolai over the week of August 5-13, 2002, and did community outreach, conducted key respondent interviews, past and present fishery harvest area mapping and participant observation in subsistence activities. From September 30-October 12, 2002, ADF&G Division of Subsistence and NPS staff traveled to Nikolai to conduct a formal harvest survey and to conduct additional key respondent interviews, map past and present fish and moose harvest areas and participate in subsistence activities. The goal was to interview a representative sample of all year around households in the community. Researchers were able to interview 27 of the 32 households, or 84.3 percent. Two households refused to be interviewed and researchers failed to contact three households (Table 1-1).

From January 4-12, 2003, with partial financing from the Alaska Humanities Forum (AHF), Liz Williams and Davin Holen participated in Russian Christmas in Nikolai in order to document the use and preparation of subsistence resources in the community. In May of 2003, with additional financing from AHF, William Simeone participated in a spring fishing trip with a family from Nikolai and in July 2003, Liz Williams made a self financed trip to spend several weeks at the salmon fish camp of a family from Nikolai.

Two meetings with the Edzeno Nikolai Tribal Council were held prior to the start of research to request community approval and participation. The first meeting included introductions of researchers to the tribal council and a discussion of the reason for the research. The second meeting included a review of a draft survey instrument and logistics planning. The first actual field visit began with another meeting with the tribal administrator.

The council assisted in hiring a local researcher to facilitate introductions between the community and the agency researchers, and to participate in community study and harvest assessment research. The local researcher and agency researchers discussed the purpose and methods of the project for several hours at the beginning of the second field visit when harvest surveys were conducted. The local researcher made phone calls and community contacts in order to explain the project and gain community interest, support, and project participation. The local researcher also helped orient ADF&G/NPS researchers to the community. The local researcher helped agency researchers clarify information collected that did not seem complete, for example, by explaining family relationships and filling in other gaps of data collected. Capacity building is an important aspect of this project. It should be noted, however, that it is often difficult for a member of a village to ask questions as personal as those on the survey. The local researcher said she was not comfortable asking people in her community the questions on the survey; other community members echoed this sentiment. For this reason, the local researcher did not accompany agency researchers on survey visits.

Key informant interviews were open ended but researchers used a list of topics to prompt general questions. A set of fish drawings borrowed from the Nikolai bilingual classroom was used to prompt discussion about the variety of fish species. (See Appendix A for a list of topics and questions.) Key informant interviews were conducted with 11 households. Nineteen separate interviews were conducted and 17 were recorded on audiocassettes. The approximate age of the 11 household members who were interviewed were 90 (1), 80 (1), 70 (3), 60 (2), 50 (2), and 40 (2). The primary

topic broached was fish, though all participants included information about fish as one part of a larger whole that included information about wildlife, environment, history, politics, and their life stories. Once the topic and the reason for the research had been explained, most key informants spoke at length without much more prompting. In most cases, once the first few questions were asked, respondents began speaking and further questions seemed inappropriate. While an occasional prompt question was used, a question guide was not used throughout most interviews. Following the descriptions of fieldwork in each study community is a discussion of data gathered by species. In some cases attempts were made to schedule interviews with some members of the community who declined. One person said, “too many people have ridiculed me, I don’t want to talk about it.” One community member recommended that researchers speak to a specific woman and when told that she declined to be interviewed, another individual related that she most likely would not want to be interviewed because too many people teased her about her food (William et al. 2005:11).

Harvest area maps were used to document where people take specific species and locations of fish camps. Two types of maps were used. USGS topographic 1:250,000 scale maps were used during surveys and interviews and participants wrote directly on them. In addition, 11x17 GIS created maps utilizing ARC View 3.2 were also used at a scale of 1:600,000. Some elders related that it was difficult for them to record specific routes, because they had traveled “everywhere”. A few older people said they did not read English and the map was not an appropriate method for learning. Some respondents said researchers needed to “go out there” if they really wanted to learn about subsistence resources.

Participant observation and engaging in community activities facilitated agency researcher/community relationships and opportunities to learn that could not occur with survey questions or scheduled interviews. Much of the information gathered was context-specific. When the research began, community members stated that it was preferable for agency researchers to learn by participating and observing because of the cultural expectation that if a person wants to know about something, or learn how to do it, they are not to ask questions but to observe. As researchers participated in various activities, Nikolai people told the researchers things they would not have known to ask about. For example, by visiting a fish camp researchers learned that when people harvest fish at their summer fish camp they leave them in the river overnight before cutting them. One family explained they do this because the fish are easier to cut after soaking. On a fall ride down the river to show researchers fish camps, another family said they leave their fish in the water overnight to ensure the

fish spirits have time to get back into the river. Other examples of opportunities for participant observation included the daily steam bath, hunting for spruce grouse, berry picking, attending daily community coffee hour at the school and eating meals in community homes.

In addition to conducting a formal harvest survey members of the research team interviewed people both formally and informally, took photographs, and worked with people in the village and in the bush. A number of the interviews were tape-recorded and the tapes transcribed. Numerous photographs were taken to further document resource use activities and as much as possible researchers tried to photograph people conducting subsistence activities. Researchers also took photographs of daily life the community to demonstrate how subsistence activities are integrated into daily life.

CHAPTER TWO LAKE MINCHUMINA REGIONAL CHARACTERISTICS AND HISTORICAL SETTING

PRE-CONTACT PERIOD AT LAKE MINCHUMINA

Located between the Tanana-Yukon and Kuskokwim Watersheds Lake Minchumina was called *Menchu Mene* by the Athabascan people. Occupied for 10,000 years Lake Minchumina was an important location for staging caribou and sheep hunts in the foothills of the Alaska Range. In addition, the lake was an optimal fishing location for freshwater fish such as pike, whitefish, and burbot. As a prominent location for portaging between watersheds, archaeological evidence for the pre-contact period in Lake Minchumina is difficult to place within existing traditions as multiple groups utilized the area. In between the two drainages, Lake Minchumina has evidence of multiple Athabascan traditions, as well as an Eskimo tradition.

There are twelve known cultural sites located around Lake Minchumina. Archaeological surveys at Lake Minchumina began in 1962 by Edward Hosley. Between 1973 and 1977 two out of the twelve known sites were excavated at Lake Minchumina (Holmes 1986). Both of these sites are located on the eastern shore of Lake Minchumina.

The 6,000 artifacts excavated from the two sites have been grouped within the Minchumina tradition. As noted phases of tool traditions at Lake Minchumina are difficult to place as the inhabitants of this area are located between two main river drainages in interior Alaska. The five phases of the Minchumina Tradition are; Blueberry Phase from 2600-1000 years ago, Cranberry Phase from 2000 to 1450 years ago, Raspberry Phase from 1450 to 1000 years ago, Dogwood Phase from 1450-1150 years ago, and the Spruce Gum Phase from 750-150 years ago to the beginning of the contact period. All phases are Athabascan traditions except the Dogwood Phase which is of the Norton/Iputak Tradition; a distinctively Eskimo tradition (Holmes 1986). According to Holmes (1986) there is both change and continuity between the phases of the Minchumina traditions. The first three phases are distinctively of the other Minchumina Tradition, the fourth as noted is an Eskimo tradition, and the last, the Spruce Gum Phase is difficult to place within the context of the Minchumina Tradition as there is shift from lithic technology to an introduction of Copper into the tool assemblages. In addition there is evidence of human cremation in burial practices in the Spruce Gum Tradition, which is not associated with the first three traditions that are comfortably placed within the Minchumina Tradition (Holmes 1986).

The most recent phase of occupation at Lake Minchumina is a group of Koyukon Athabascans (Gudgel-Holmes 1990) referred to as the *Minkhotanas*, or 'lake people'

(Gudgel-Holmes 1990). Two separate bands of *Minkhotanas* shared the area: the Minchumina-Bearpaw Band and the Cosna-Manly Band. Their traditional territory extended from the Kantishna River east of Minchumina, south to the McKinley Fork of the Kuskokwim River, and east to the Alaska Range (Holmes & Gudgel-Holmes 1987). As noted the area was important for hunting large land mammals including caribou, sheep, and bears and freshwater fishing. In late fall salmon were also taken in the Kantishna River and in the winter trapping was conducted especially during the fur trade. Euro-Americans in the early twentieth century who settled at Lake Minchumina joined the Athabascan in trapping.

LAKE MINCHUMINA: THE HISTORICAL PERIOD

Although the Russians explored the Kuskokwim and Yukon rivers they never reached Lake Minchumina. Lieutenant Zagoskin mentions a large lake when discussing his interaction with residents of the Nowitna River. He writes that “[t]hey do not visit the upper waters of the Yukon, and I could not get no satisfactory answer as to whether they call the upper Yukon Mynkkhatokh [Z.] (“Big Lake”) or whether Mynkkhatokh is the place from which the river originates” (Michael 1967: 175). Zagoskin on an earlier voyage up the Kuskokwim had sought the source of the Kuskokwim but ran out of time because he needed to get furs back to the fort to be sent off to Fort Alexander (Michael 1967: 272-273). Understanding that the two rivers may have their sources near each other, it was as he was turning back on his Kuskokwim expedition that he decided to try to reach the source of the Kuskokwim by way of the Yukon.

The first documented direct contact by Euro-Americans with Alaska Natives at Lake Minchumina was the 1899 military expedition led by Lt. Joseph Herron, where the party documented 15 Alaska Natives living at Lake Minchumina (Holmes & Gudgel-Holmes 1987; Herron 1909), the *Minkhotanas*, who are associated with Telida Lake and Lake Minchumina. Beginning in 1907 with George Gordon (Holmes & Gudgel-Holmes 1987), several trappers and prospectors began to arrive at Lake Minchumina, eventually building cabins where they could over-winter and trap for furs. Fox and mink farms were also built and operated throughout the 1920s and 1930s. In 1930 a post office was established to support this small population of trappers.

When the CAA (Civil Aeronautics Authority) arrived at Lake Minchumina in 1941 to build a runway, there were only a few scattered cabins in the area, Kammisgaard’s Roadhouse near the east end of the lake, and a small Alaska Native community. The CAA left a two story office building, electricity infrastructure, a 4400 foot runway, and three houses, which are clustered together on the north side of the lake. A road connects this central area with two houses towards the west and a few more

towards the east (Figure 2-1). Other residents live on the east and south side of the lake connected by trails in some cases. In the 1960s the Bureau of Land Management established a summer firefighting camp at the former CAA location. This lasted until 1986 when a 'let it burn' policy was enacted for natural forest fires (Minchumina Community School 1997). During the 1970s a subdivision was established on the northeastern side of the lake by the State of Alaska during the "back to the land movement" as people called this time period in Alaska's history. Also established were homestead sites and wilderness cabin locations for recreational users. Today the residents of Lake Minchumina are a mix of long established residents and newer arrivals.

THE CONTEMPORARY COMMUNITY OF LAKE MINCHUMINA

Surrounded by bluffs, woods, and marshy plains, Lake Minchumina is within sight of the low lying Kantishna Hills and the majestic Alaska Range on the northern rim of Denali National Park and Preserve. A clear day affords sights of nearby Denali and adjacent Mt. Foraker which dominate the horizon.



Plate 2-1. Lake Minchumina with the reflection of Denali and Mt. Foraker

The community of Lake Minchumina surrounds the lake from which it takes its name (see Figure 2-1). The lake is the focal point of the community for transportation, recreation, drinking water, and food. To travel between their homes and the main area where the runway, library, and post office are located, residents in the winter use snow machines or dog sleds and in the summer use boats. Planes are used all year round for travel in and out of Lake Minchumina and a runway is utilized, the planes having wheels instead of floats.

Many of the cabins and homes built around Lake Minchumina sit empty today. According to the Alaska Department of Community and Economic Development (2003) of the 41 structures surrounding the Lake Minchumina 25 are vacant. Most are log homes and one resident has made a living over the past 30 years building the homes and cabins using traditional log building techniques. Cabin building has slowed in the past few years as residents drift away and are not replaced by others. Many homes and cabins are occupied for only for a few weeks each summer or in some cases are no longer used.



Figure 2-1

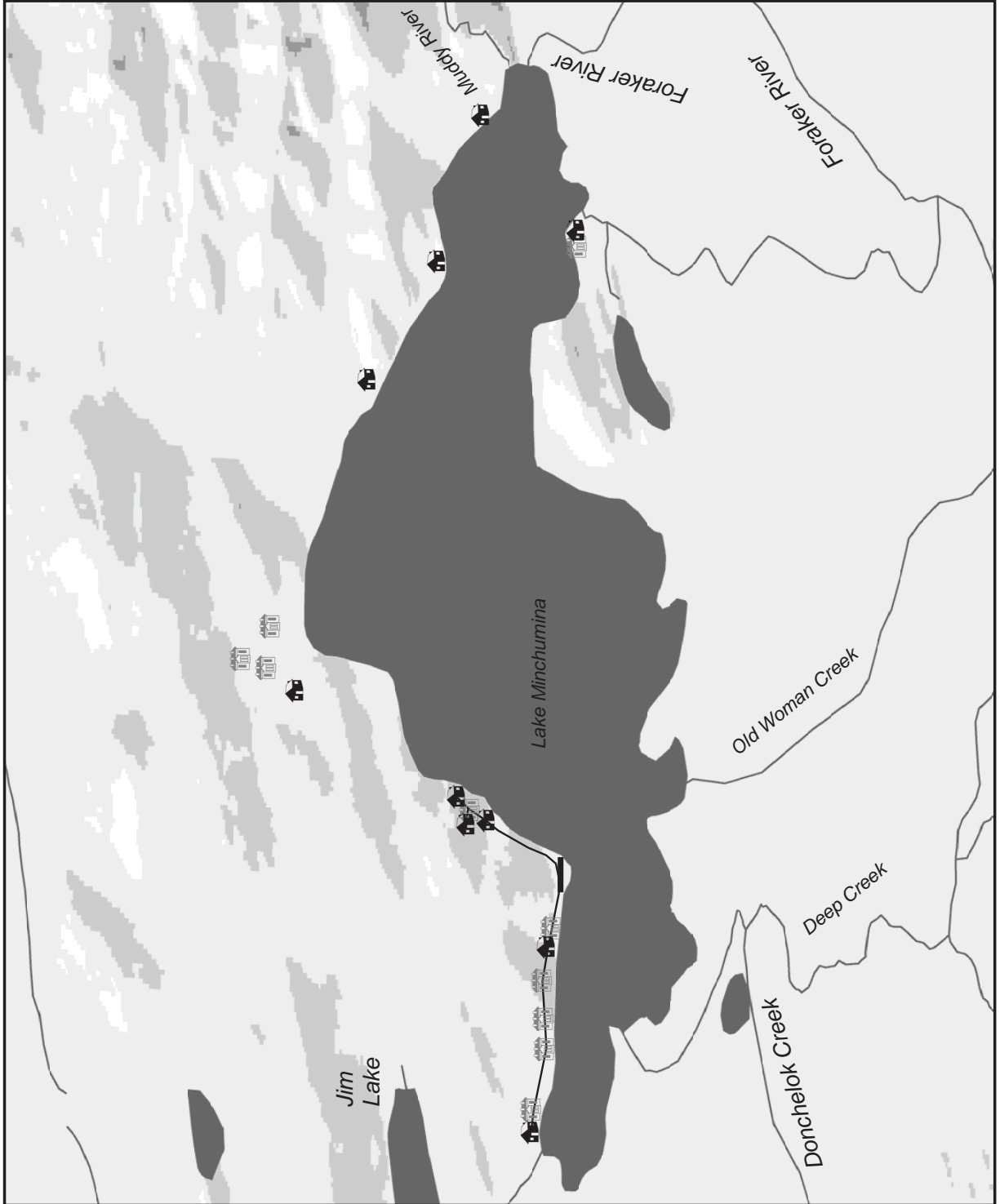
Lake Minchumina

- Home
- Vacant Homes or Seasonal Cabins
- lake minchumina roads
- lake minchumina airport

Source: Household Interviews
 2002-2003. Division of
 Subsistence, Alaska Department
 of Fish and Game. Technical
 Paper No. 296.



Scale: 1:150,000



CHAPTER THREE
LAKE MINCHUMINA DEMOGRAPHY, EMPLOYMENT AND MONETARY INCOME



DEMOGRAPHY

At one time there were as many as 50 residents living at Lake Minchumina. Today there are 25 official residents listed in the 2000 census (DCED 2003), the same number Bishop (1978) mentions inhabiting Lake Minchumina in 1977. The baseline harvest assessment survey in 2002 found 10 year round households in the community of which six were interviewed, or 60 percent (see Table 3-1). The sampled population was 16 people out of an estimated population of 26.7 people.

Local residents interviewed for this project attributed the population decline to a lack of jobs and a loss of interest in subsistence hunting and fishing. Of the 26.7 residents living at Lake Minchumina year round, only three are school-aged children (see Table 3-2 for a breakdown of age of the population). At one time there was a school in Lake Minchumina. The school first opened in 1963 and was funded by the FAA for the children of their employees and local residents (it was intermittently open and closed over the years depending on numbers of students). The responsibility for the school was later taken over by the Iditarod School District (Minchumina Community School 1997). Initially school was held in a resident's cabin but later children attended school in a remodeled FAA office building. The building now serves as the library and community center and local children are home schooled. The Iditarod School District ran the school for eight years but it was closed in 1999 when a majority of the students graduated and the community no longer had the minimum of 11 students necessary to maintain a public school. The mean age of the population of Lake Minchumina is 38.3 years (Table 3-2).

Many of the current residents of Lake Minchumina spend time outside Alaska or in Anchorage or Fairbanks during the winter. The mean number of years of residency was 27.2 years with the maximum residence at 75 years (Table 3-1). Of those who were present in Lake Minchumina during the study year 3 households (33.3 percent) are Alaska Native, with an estimated total Alaska Native population of 7 people (25 percent) (see Table 3-1). Ten of the current residents (37.5 percent) were born at Lake Minchumina and another 6.3 percent (1.7 residents) were born at Medfra. Just over 12 percent of the residents were born in Anchorage and 6.3 percent were born in nearby Palmer. Other Alaska communities include 1.7 (6.3 percent) residents born at Chistochina and 1.7 (6.3 percent) residents born in Holy Cross. Twenty-five percent of

Minchumina residents were born outside of Alaska within the United States (see Table 3-3). No residents were born outside the United States.

Table 3-1. Demographic Characteristics of Households, Lake Minchumina, 2002		
Characteristics		Lake Minchumina
Sampled Households		6
Number of Households in the Community		10
Percentage of Households Sampled		60.0%
Household Size		
Mean		2.7
Minimum		1
Maximum		4
Sample Population		16
Estimated Community Population		26.7
Age		
Mean (years)		38.3
Minimum		5.8
Maximum		69.2
Median		43.3
Length of Residency ¹ - Household Heads		
Mean (years)		33.3
Minimum		8.0
Maximum		75.0
Length of Residency ¹ - Population		
Mean (years)		27.2
Minimum		5.0
Maximum		75.0
Sex		
Males	Number	12
	Percentage	43.8%
Females	Number	15
	Percentage	56.3%
Alaska Native		
Households (Either Head) ²		
	Number	3
	Percentage	33.3%
Estimated Population		
	Number	7
	Percentage	25.0%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002.

¹ Length of residency in study community.

² A household was classified as "Alaska Native" if either or both of the household heads was Alaska Native.

Table 3-2. Population Profile, Lake Minchumina, 2002.									
AGE	MALE			FEMALE			TOTAL		
	NUMBER	PERCENT	CUM. PERCENT	NUMBER	PERCENT	CUM. PERCENT	NUMBER	PERCENT	CUM. PERCENT
0 - 4	0.0	0.0%	0.0%	0.0	0.0%	0.0%	0.00	0.00%	0.0%
5-9	1.7	14.3%	14.3%	1.7	11.1%	11.1%	3.3	12.50%	12.5%
10-14	0.0	0.0%	14.3%	1.7	11.1%	22.2%	1.7	6.25%	18.8%
15 - 19	0.0	0.0%	14.3%	0.0	0.0%	22.2%	0.0	0.00%	18.8%
20 - 24	3.3	28.6%	42.9%	0.0	0.0%	22.2%	3.3	12.50%	31.3%
25 - 29	0.0	0.0%	42.9%	1.7	11.1%	33.3%	1.7	6.25%	37.5%
30 - 34	1.7	14.3%	57.1%	0.0	0.0%	33.3%	1.7	6.25%	43.8%
35 - 39	0.0	0.0%	57.1%	0.0	0.0%	33.3%	0.0	0.00%	43.8%
40 - 44	0.0	0.0%	57.1%	3.3	22.2%	55.6%	3.3	12.50%	56.3%
45 - 49	0.0	0.0%	57.1%	3.3	22.2%	77.8%	3.3	12.50%	68.8%
50 - 54	3.3	28.6%	85.7%	0.0	0.0%	77.8%	3.3	12.50%	81.3%
55 - 59	0.0	0.0%	85.7%	1.7	11.1%	88.9%	1.7	6.25%	87.5%
60 - 64	0.0	0.0%	85.7%	0.0	0.0%	88.9%	0.0	0.00%	87.5%
65 - 69	1.7	14.3%	100.0%	1.7	11.1%	100.0%	3.3	12.50%	100.0%
Missing	0.0	0.0%	100.0%	0.0	0.0%	100.0%	0.0	0.00%	100.0%
TOTAL	11.7	43.8%		15.0	56.3%		26.7	100.00%	

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Table 3-3. Estimated Number of Residents Born in Various Locations, Lake Minchumina, 2002		
Place of Birth	Estimated Number of Residents	Percentage of Residents
Anchorage	3.3	12.5%
Cheesh'na (Chistochii)	1.7	6.3%
Holy Cross	1.7	6.3%
Lake Minchumina	10.0	37.5%
Medfra	1.7	6.3%
Palmer	1.7	6.3%
Other US	6.7	25.0%

Source: Alaska Dept. of Fish and Game, Division Of Subsistence, Household Surveys, 2002

EMPLOYMENT CHARACTERISTICS AND MONETARY INCOME

Local residents reported earning their living through trapping, working for the power company, the post office, keeping up the library, operating a lodge, selling handicrafts, writing, and building and maintaining cabins. The survey found that of the 18 employed adults in the community 63 percent were employed on a year round basis. The mean number of weeks employed was 38.2 weeks (see Table 3-4 for a full breakdown of employment characteristics).

Trapping is a popular means of obtaining income in Lake Minchumina. Sixty percent of households said they were engaged in trapping and this activity brought in 22.2 percent of the entire community income. Twenty percent of households reported employment in the construction industry, which provided 20.7 percent of community income. The power plant was one job included within transportation, communication, and utilities employing 18.2 percent of the population comprising 12.5 percent of jobs available within the community. Almost 38 percent of all the jobs in the community were provided by the service sector, with 54.5 percent of the population reporting jobs in services. Both state and federal government comprised another 12.5 percent of the available jobs (see Table 3-5 for a detailed breakdown of employment by industry).

The average household income in Lake Minchumina was \$27,366 (see Table 3-6). Households are small as there are few children in the community giving a per capita income of \$10,262. Of the community's total earned income of \$152,628, \$33,900 came from trapping. The other large earning categories were services with a total community income of \$45,000 and government jobs with \$33,062. Although construction employed a small portion of the community, a community total of \$31,667 was earned. Dividends and interest added additional income to the community. As compared to Nikolai, Lake Minchumina has a smaller Alaska Native population and this can be seen in the minimal contribution Native Corporation dividends made to the economy (see Table 3-7).

The largest private local employer is Denali West Lodge where, according to one resident, most residents has worked at one time or another. The lodge caters to a small number of visitors to Alaska who want an encounter with wilderness. Dog-sled tours are available in the winter and hiking in the summer. The lodge is open from February through October.

Table 3-4. Employment Characteristics, Lake Minchumina, 2002.

All Adults		
	Number	21.7
	Mean Weeks Employed	32.3
Employed Adults		
	Number	18.3
	Percentage	84.6
	Mean per Household	1.8
	Jobs	
	Number	26.7
	Mean Jobs per Person	1.5
	Minimum	1.0
	Maximum	3.0
	Months Employed	
	Mean	8.8
	Minimum	1.0
	Maximum	12.0
	Percent Employed Year-Round	63.6
	Mean Weeks Employed	38.2
Households		
	Number Employed	10.0
	Jobs per Employed Household	
	Number	8.3
	Percentage	83.3
	Mean Weeks Employed	3.2
	Minimum	1.0
	Maximum	4.0
	Employed Adults	
	Mean	2.2
	Minimum	1.0
	Maximum	3.0
	Mean Number of Weeks Worked	70.0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

Table 3-5. Employment by Industry, Lake Minchumina 2002

	Jobs	Households	Individuals	Percent of Income
Estimated Total Number	26.7	8.3	18.3	
Agriculture, Forestry, Fishing	0.0%	0.0%	0.0%	22.2%
Agriculture/Forestry	0.0%	0.0%	0.0%	0.0%
Agriculture	0.0%	0.0%	0.0%	0.0%
Forestry	0.0%	0.0%	0.0%	0.0%
Fishing, Hunting, Trapping	25.0%	60.0%	36.4%	22.2%
Hatchery/Enhancement	0.0%	0.0%	0.0%	0.0%
Commercial Fishing	0.0%	0.0%	0.0%	0.0%
Hunting/Trapping	25.0%	60.0%	36.4%	22.2%
Mining	0.0%	0.0%	0.0%	0.0%
Construction	6.3%	20.0%	9.1%	20.7%
Manufacturing	0.0%	0.0%	0.0%	0.0%
Cannery	0.0%	0.0%	0.0%	0.0%
Other Manufacturing	0.0%	0.0%	0.0%	0.0%
Logging/Timber	0.0%	0.0%	0.0%	0.0%
Transportation, Communications and Utilities	12.5%	40.0%	18.2%	5.9%
Trade	0.0%	0.0%	0.0%	0.0%
Wholesale	0.0%	0.0%	0.0%	0.0%
Retail	0.0%	0.0%	0.0%	0.0%
Finance, Insurance, and Real Estate	0.0%	0.0%	0.0%	0.0%
Services	37.5%	60.0%	54.5%	29.5%
Government	18.8%	40.0%	27.3%	21.7%
Federal	12.5%	40.0%	18.2%	20.9%
State	6.3%	20.0%	9.1%	0.8%
Local	0.0%	0.0%	0.0%	0.0%
Local Government	0.0%	0.0%	0.0%	0.0%
Local Education	0.0%	0.0%	0.0%	0.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

Table 3-6. Community, Household, and Per Capita Incomes, All Sources and by Employer Types			
INCOME SOURCE	COMMUNITY TOTAL	AVERAGE HOUSEHOLD	PER CAPITA
All Sources	\$273,655	\$27,366	\$10,262
Earned Income	\$152,628	\$15,263	\$5,724
Agriculture, Forestry, Fishing	\$33,900	\$3,390	\$1,271
Agriculture/Forestry	\$0	\$0	\$0
Agriculture	\$0	\$0	\$0
Forestry	\$0	\$0	\$0
Fishing, Hunting, Trapping	\$33,900	\$3,390	\$1,271
Hatchery/Enhancement	\$0	\$0	\$0
Commercial Fishing	\$0	\$0	\$0
Hunting/Trapping	\$33,900	\$3,390	\$1,271
Mining	\$0	\$0	\$0
Construction	\$31,667	\$3,167	\$1,188
Manufacturing	\$0	\$0	\$0
Cannery	\$0	\$0	\$0
Other Manufacturing	\$0	\$0	\$0
Logging/Timber	\$0	\$0	\$0
Transportation, Communications, and Utilities	\$9,000	\$900	\$338
Trade	\$0	\$0	\$0
Wholesale	\$0	\$0	\$0
Retail	\$0	\$0	\$0
Finance, Insurance, and Real Estate	\$0	\$0	\$0
Services	\$45,000	\$4,500	\$1,688
Government	\$33,062	\$3,306	\$1,240
Federal	\$31,833	\$3,183	\$1,194
State	\$1,228	\$123	\$46
Local	\$0	\$0	\$0
Local Government	\$0	\$0	\$0
Local Education	\$0	\$0	\$0
Unknown	\$0	\$0	\$0
Other Income	\$121,027	\$12,103	\$4,539

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002



Plate 3-1 Denali West Lodge, Lake Minchumina Alaska

For some residents Lake Minchumina is a quiet place to retire. Social security and retirement pensions brought in \$36,000 and \$11,193 respectively into the community (see Table 3-7). Retirement can be mixed with part time work for a comfortable income. One couple, who arrived in Lake Minchumina in 1975 upon retirement, said they came to “get away from work.” They now live off the income from trapping and wage labor from a part-time job. Aside from trapping they hunt and fish for subsistence use.

Table 3-7. Community, Household, and Per Capita Income by Source, Lake Minchumina, 2002				
	Percentage Reporting	Other Income Community Total	Average Household	Per Capita
All Sources		\$121,027	\$12,103	\$4,539
Pension/Retirement	33.3%	\$11,193	\$1,119	\$420
Social Security	16.7%	\$36,000	\$3,600	\$1,350
Supplemental Security Income	16.7%	\$16,667	\$1,667	\$625
Native Corporation Dividend	33.3%	\$1,167	\$117	\$44
Dividend/Interest	16.7%	\$6,667	\$667	\$250
Alaska Permanent Fund Dividend	100.0%	\$49,333	\$4,933	\$1,850

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

CHAPTER FOUR
LAKE MINCHUMINA
RESOURCE HARVEST AND USE PATTERNS



Table 4-1 describes resource harvest and use characteristics of the community of Lake Minchumina for the study year 2002. Every household used, attempted to harvest, or harvested at least one wild resource. The average household harvest was 791 pounds useable weight and 296.5 pounds were capita. During the study year Lake Minchumina residents harvested an average of 10.7 different kinds of resources and used an average of 12.7 different kinds of resources.

SPECIES USED AND SEASONAL ROUND

Table 4-2 summarizes resource harvest and use and is organized first by general category and then by specific species. Domesticated animals and plants have been excluded. All resources have been recorded in pounds useable weight (see Appendix A for conversion factors). The 'harvest category' includes resources actually taken by a member of the surveyed household during the year covered in the survey. The 'use' category includes all resources taken and given away by a household, and resources acquired after a harvest, either as gifts, by trade, through hunting partnerships, or meat given to hunting guides by their clients. The use category is not confined to resources for human consumption, but incorporated all non-commercial uses of resources including trap bait and dog food. Purchased foods were not recorded. Differences between harvest and use percentages reflect resources that have been shared and sharing between households, which resulted in a wider distribution of wild foods.

Fish were by far the most commonly harvested resource as indicated in Figure 4-1. Because Lake Minchumina is at the headwaters of the Tanana-Yukon Drainage few salmon make it this far into the system. Chum salmon were the only salmon species harvested by residents. However, Lake Minchumina harbors a variety of non-salmon species and 100% of households surveyed reported harvesting non-salmon species for subsistence (see Table 4-2). Of the non-salmon species, whitefish (66.7 percent), pike (100 percent), and burbot (83.3 percent) were the most commonly harvested, and used species.

The second major source of subsistence foods is moose. During the study year 100 percent of households reported using moose and 50 percent reported either harvesting or attempting to harvest a moose (see Table 4-2). Besides moose the only other large land mammal harvested was black bear. Just over 16 percent of households reported they used, attempted a harvest, or harvested black bear.

Table 4-1. Resource Harvest and Use Characteristics for the Community of Lake Minchumina

Mean Number of Resources Used Per Household	12.7
Minimum	6
Maximum	23
95% Confidence Limit (+/-)	0.3
Median	11.5
Mean Number of Resources Attempted to Harvest Per Household	10.7
Minimum	4
Maximum	22
95% Confidence Limit (+/-)	0.4
Median	9.0
Mean Number of Resources Harvested Per Household	10.7
Minimum	4
Maximum	22
95% Confidence Limit (+/-)	0.4
Median	9.0
Mean Number of Resources Received Per Household	3.3
Minimum	1
Maximum	6
95% Confidence Limit (+/-)	0.4
Median	3.0
Mean Number of Resources Given Away Per Household	1.5
Minimum	0
Maximum	3
95% Confidence Limit (+/-)	0.6
Median	1.5
Mean Household Harvest, Pounds	790.6
Minimum	71.7
Maximum	2,446.2
Total Pounds Harvested	7,906
Community Per Capita Harvest, Pounds	296.5
Percent Using Any Resource	100.0
Percent Attempting To Harvest Any Resource	100.0
Percent Harvesting Any Resource	100.0
Percent Receiving Any Resource	100.0
Percent Giving Away Any Resource	66.7
Number of Households in Sample	6
Number of Resources Available	30

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Table 4-2. Estimated Harvest and Use of Fish, Game, and Plant Resources, Lake Minchumina, 2002.

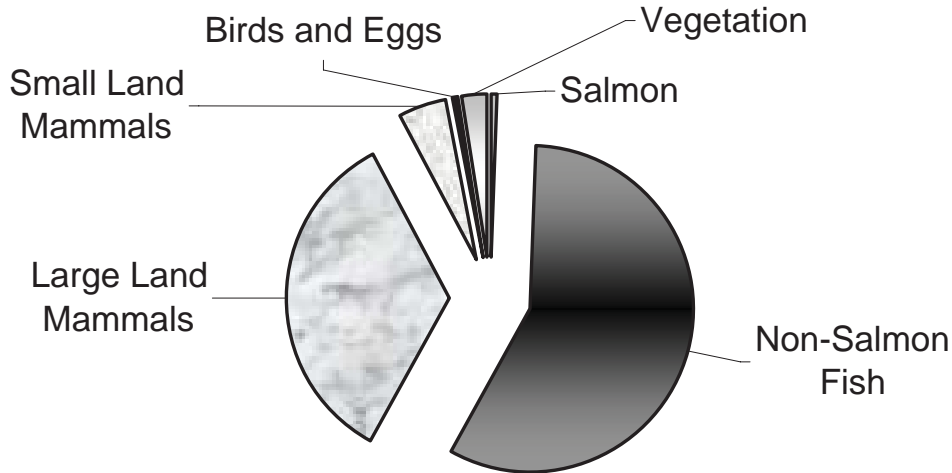
Resource Name	Percentage of Households				Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)	
	Use	Att	Harv	Recv	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
All Resources	100.0	100.0	100.0	100.0	7,906	790.6	296.5	7,906 lbs	790.6	68.5%	76.5%
Fish	100.0	100.0	100.0	83.3	4,598	459.8	172.4	4,598 lbs	459.8	121.5%	132.5%
Salmon	83.3	16.7	16.7	66.7	35	3.5	1.3	5 ea.	0.5	162.6%	173.2%
Chum Salmon	16.7	16.7	16.7	0.0	35	3.5	1.3	5 ea.	0.5	162.6%	173.2%
Chinook Salmon	16.7	0.0	0.0	16.7	0	0.0	0.0	0 ea.	0.0	0.0%	0.0%
Sockeye Salmon	66.7	0.0	0.0	66.7	0	0.0	0.0	0 ea.	0.0	0.0%	0.0%
Non-Salmon Fish	100.0	100.0	100.0	66.7	4,564	456.4	171.1	4,564 lbs	456.4	121.2%	132.2%
Halibut	16.7	0.0	0.0	16.7	0	0.0	0.0	0 lbs	0.0	0.0%	0.0%
Burbot	83.3	83.3	83.3	33.3	581	58.1	21.8	138 ea.	13.8	95.8%	109.2%
Grayling	33.3	33.3	33.3	16.7	27	2.7	1.0	27 ea.	2.7	107.5%	112.4%
Pike	100.0	100.0	100.0	33.3	1,155	115.5	43.3	385 ea.	38.5	80.2%	88.0%
Unknown Pike	100.0	100.0	100.0	33.3	1,155	115.5	43.3	385 ea.	38.5	80.2%	88.0%
Sheefish	16.7	16.7	16.7	0.0	9	0.9	0.3	2 ea.	0.2	162.6%	173.2%
Sucker	16.7	16.7	16.7	0.0	377	37.7	14.1	377 ea.	37.7	162.6%	173.2%
Whitefish	66.7	66.7	66.7	16.7	2,415	241.5	90.6	1,380 ea.	138.0	144.0%	155.4%
Unknown Whitefish	66.7	66.7	66.7	16.7	2,415	241.5	90.6	1,380 ea.	138.0	144.0%	155.4%
Land Mammals	100.0	83.3	83.3	83.3	3,060	306.0	114.8	463 ea.	46.3	68.9%	36.7%
Large Land Mammals	100.0	66.7	66.7	83.3	2,693	269.3	101.0	8 ea.	0.8	60.0%	51.3%
Black Bear	16.7	16.7	16.7	0.0	193	19.3	7.3	3 ea.	0.3	162.6%	173.2%
Caribou	16.7	0.0	0.0	16.7	0	0.0	0.0	0 ea.	0.0	0.0%	0.0%
Moose	100.0	50.0	50.0	66.7	2,500	250.0	93.8	5 ea.	0.5	72.7%	59.6%
Small Land Mammals	66.7	66.7	66.7	0.0	367	36.7	13.8	455 ea.	45.5	69.6%	107.6%
Beaver	50.0	50.0	50.0	0.0	219	21.9	8.2	25 ea.	2.5	113.6%	116.4%
Fox	33.3	33.3	33.3	0.0	0	0.0	0.0	10 ea.	1.0	111.1%	0.0%
Red Fox	33.3	33.3	33.3	0.0	0	0.0	0.0	10 ea.	1.0	111.1%	0.0%
Hare	33.3	33.3	33.3	0.0	20	2.0	0.8	10 ea.	1.0	111.1%	120.7%
Snowshoe Hare	33.3	33.3	33.3	0.0	20	2.0	0.8	10 ea.	1.0	111.1%	120.7%
Lynx	50.0	50.0	50.0	0.0	0	0.0	0.0	23 ea.	2.3	91.1%	0.0%
Marten	66.7	66.7	66.7	0.0	0	0.0	0.0	327 ea.	32.7	71.6%	0.0%
Mink	33.3	33.3	33.3	0.0	0	0.0	0.0	22 ea.	2.2	123.2%	0.0%
Porcupine	33.3	33.3	33.3	0.0	120	12.0	4.5	15 ea.	1.5	103.8%	110.1%
Weasel	33.3	33.3	33.3	0.0	8	0.8	0.3	17 ea.	1.7	102.8%	110.2%
Wolf	33.3	33.3	33.3	0.0	0	0.0	0.0	7 ea.	0.7	120.6%	0.0%
Birds and Eggs	83.3	83.3	83.3	0.0	46	4.6	1.7	67 ea.	6.7	91.6%	95.8%
Migratory Birds	33.3	33.3	33.3	0.0	3	0.3	0.1	5 ea.	0.5	111.1%	161.3%
Ducks	16.7	16.7	16.7	0.0	3	0.3	0.1	3 ea.	0.3	162.6%	161.3%
Mallard	16.7	16.7	16.7	0.0	2	0.2	0.1	2 ea.	0.2	162.6%	161.3%
Unknown Ducks	16.7	16.7	16.7	0.0	1	0.1	0.0	2 ea.	0.2	162.6%	161.3%
Seabirds & Loons	16.7	16.7	16.7	0.0	0	0.0	0.0	2 ea.	0.2	162.6%	0.0%
Loons	16.7	16.7	16.7	0.0	0	0.0	0.0	2 ea.	0.2	162.6%	0.0%
Unknown Loon	16.7	16.7	16.7	0.0	0	0.0	0.0	2 ea.	0.2	162.6%	0.0%
Other Birds	83.3	83.3	83.3	0.0	43	4.3	1.6	62 ea.	6.2	97.1%	104.1%
Upland Game Birds	83.3	83.3	83.3	0.0	43	4.3	1.6	62 ea.	6.2	97.1%	104.1%
Grouse	83.3	83.3	83.3	0.0	40	4.0	1.5	57 ea.	5.7	92.7%	99.1%
Ptarmigan	16.7	16.7	16.7	0.0	4	0.4	0.1	5 ea.	0.5	162.6%	173.2%

Table 4-2. Estimated Harvest and Use of Fish, Game, and Plant Resources, Lake Minchumina, 2002.

Resource Name	Percentage of Households			Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Total	Mean HH	Harvest	Percapita
Unknown Ptarmigan	16.7	16.7	16.7	0.0	0.0	4	0.4	0.1	0.5	162.6%	173.2%
Vegetation	100.0	83.3	83.3	33.3	16.7	202	20.2	7.6	20.2	107.6%	98.8%
Berries	66.7	50.0	50.0	33.3	16.7	200	20.0	7.5	5.0	108.2%	99.2%
Plants/Greens/Mushrooms	16.7	16.7	16.7	0.0	0.0	2	0.2	0.1	0.0	162.6%	173.2%
Wood	100.0	83.3	83.3	16.7	0.0	0	0.0	0.0	10.5	44.1%	0.0%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002.

Figure 4-1. Major Resource Categories Harvested by Lake Minchumina Residents



Just over 83 percent of households reported using birds for subsistence. Migratory birds were used and harvested by 33.3 percent of households, while 83.3 percent of households reported using and harvesting upland game birds. All households in the community reported using vegetation of which 100 percent used wood, 66.7 percent used berries, and 16.7 percent used plants, greens, and mushrooms. Small land mammals were used by 66.7 percent of households. The three most widely used species of small land mammal were marten (66.7 percent), lynx (50 percent), and beaver (50 percent). Fewer households reported using red fox, snowshoe hare, mink, porcupine, weasel, and wolf (see Table 4-2 for details).

HARVEST QUANTITIES

The total harvest for all subsistence resources, in terms of edible pounds, during the study year for the community of Lake Minchumina was 7,906 pounds or 296.5 pounds per person (Table 4-2). Fish constituted the largest portion of the harvest with 4,598 pounds (58% of the total), or 172.4 pounds per person (see Figure 4-1). As mentioned above there are few salmon that make their way this far into the river system so non-salmon species make up a majority of fish resources with 4,564 pounds for the community or 171.1 pounds per person (only 35 pounds of salmon were harvest or 1.3 pounds per person). Whitefish made up approximately half of the non-salmon species with 2,415 pounds harvested or 90.6 pounds per person. Following this was pike with 1,155 pounds or 43.3 pounds per person. 581 pounds of burbot, a favored species,

was harvested with 21.8 pounds per person. Also harvested were sheefish and sucker (see Table 4-2 for details).

The other major source of subsistence foods was moose. The community harvested an estimated 5 moose for a total of 2,500 pounds of moose, or 93.8 pounds per person. The only other large land mammal species harvested and used was black bear with 193 pounds harvested, or 7.3 pounds per person. The total large land mammal harvest was 2,693 pounds, or 101 pounds per person (34 percent of the total harvest); a little more than half of the freshwater fish harvest.

The next major source of wild food was berries with 200 pounds harvested or 7.5 pounds per person (2.5 percent of the total harvest). Mushrooms were also collected, but these only made up 2 pounds for the entire community or 0.1 pounds per person. Birds were not a major subsistence item. Only 43 pounds of birds were harvested or 1.7 pounds per person (.5 percent of the total). The majority of these were upland game birds with 40 pounds of grouse harvested, or 1.5 pounds per person. Small land mammals were harvested primarily for their pelts and constituted 4.5 percent of the total harvest of wild resources. The dominant species trapped were marten and the community reported a harvest of 327 marten. By weight beaver had the highest harvest with 219 pounds, or 8.2 pounds per person. Porcupine constitutes the next major harvest with 120 pounds harvested or 4.5 pounds per person. See Table 4-2 for additional small land mammal harvests and details on the mean household harvest.

HARVEST AREAS

The use area for the harvest of subsistence resources by Lake Minchumina residents is localized to the area including the lake itself or within 30-40 miles of the community when including trap lines. As noted above the major resource harvested by residents is freshwater fish. Figure 4-1 demonstrates that Lake Minchumina itself is the focus of harvesting freshwater or non-salmon species using nets (salmon are also occasionally caught in these nets). As will be described in Chapter 6, residents use nets at certain times of the year and in circumscribed areas to harvest fisheries resources. The table in Figure 4-2 demonstrates that many nets are set to catch a variety of fish. However, in the case of the western area of the lake nets are set to catch pike and whitefish in areas known to be good habitat for those two species. A further discussion of the knowledge of fisheries resources will follow in Chapter 6.

The hunting areas for moose, the second most prominent species harvested as a subsistence food item, can be accessed by using a boat on the rivers flowing into and out of Lake Minchumina and by using trails that are also used as trap lines. During the

study year residents report moose harvested in Game Management Unit 20C. A total of five moose were taken in this unit during the study year (see Table 4-3). Figure 4-3 displays the moose hunting area for Lake Minchumina residents. Viewing Figure 4-4, which depicts trap lines utilized by

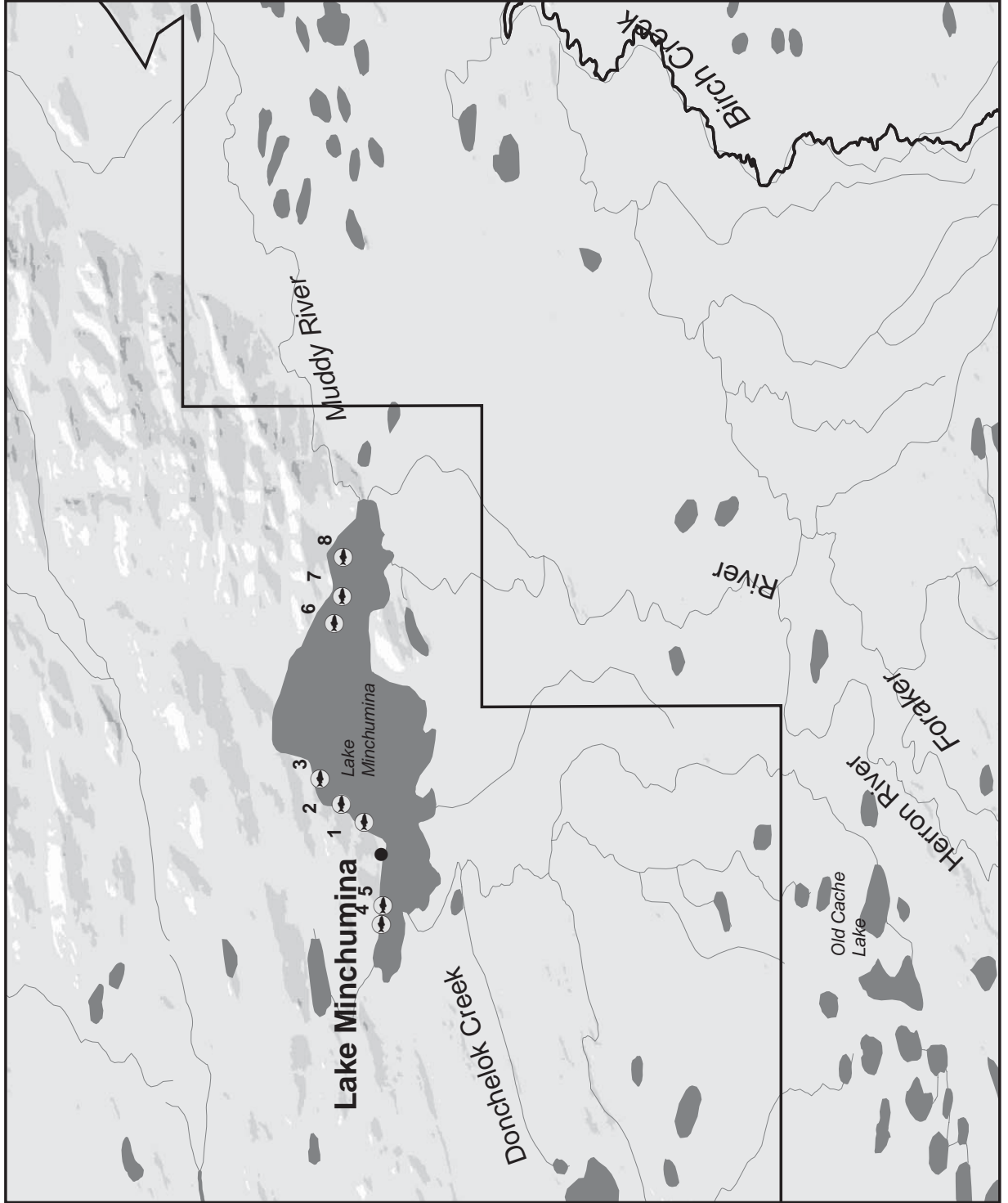
Lake Minchumina residents, shows that the largest area for moose hunting to the west of the community follows a trap line. The other hunting areas to the south and east pictured in Figure 4-3 follow rivers where moose hunting areas are accessible by boat.

Table 4-3. Estimated big game harvest by GMU, Lake Minchumina, 2002

RESOURCE	GMU 19C		GMU 19 D		GMU 20C		Unknown GMU	
	#	%	#	%	#	%	#	%
Black Bear	0.0	0.0%	0.0	0.0%	3.3	100.0%	0.0	0.0%
Moose	0.0	0.0%	0.0	0.0%	5.0	100.0%	0.0	0.0%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 20

Figure 4-4 displays the trap lines of Lake Minchumina residents. The main species targeted is marten. Different traps are also set to harvest beaver and weasel as well. Beaver are trapped off the trap lines where they houses and dams. Porcupine are also harvested, however, one resident said that these are mainly harvested to keep the sled dogs from getting stuck with quills; the meat does not go to waste, however. The trap lines pictured in Figure 4-4 are buffered to three miles so their exact locations are not displayed.



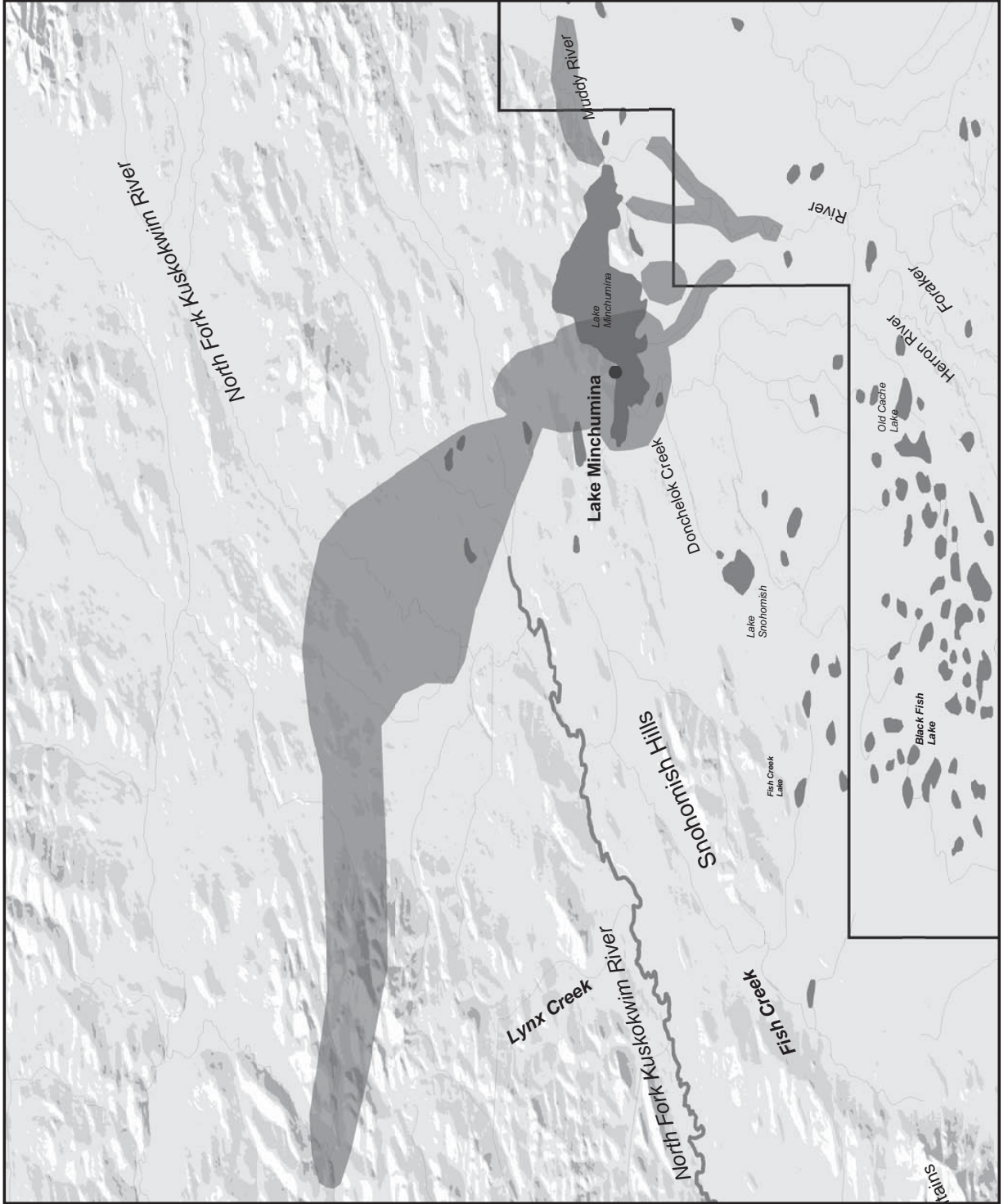




Figure 4-3

-  Lake Minchumina moose hunting areas
-  Denali National Park & Preserve

Source: Household Interviews 2002-2003. Division of Subsistence, Alaska Department of Fish and Game. Technical Paper No. 296.
 Note: As not all resident households were interviewed this is only a sample of harvest use areas.



Scale: 1:600,000

LEVELS OF PARTICIPATION IN THE HARVEST AND USE OF WILD RESOURCES

Table 4-4 illustrates levels of participation in the harvest and processing of wild resources by residents of Lake Minchumina. Participation rates were equal for harvesting and processing game and plants. Forty-eight percent of Lake Minchumina residents said they hunted or gathered plants and just over 40 percent said they processed game and plants. More people said they fished and processed fish, with 55.5 percent fishing and 48.1 percent processing fish. Fewer residents were engaged in trapping as 37 percent participated in trapping and 22 percent processed trapped furbearing animals. Fishing for non-salmon species had the highest participation as 100% of households reported harvesting non-salmon species (see Table 4-2). In addition 83.3 percent of households reported harvesting large land mammals.

Table 4-4. Participation in the Harvesting and Processing of Wild Resources, Lake Minchumina, 2002		
Total Number of People 27		
Game		
	Hunt Number	13
	Percentage	48.1%
	Processing Number	11
	Percentage	40.7%
Fish		
	Fish Number	15
	Percentage	55.5%
	Processing Number	13
	Percentage	48.1%
Furbearers		
	Hunt or Trap Number	10
	Percentage	37%
	Processing Number	6
	Percentage	22.2%
Plants		
	Gather Number	13
	Percentage	48.1%
	Processing Number	11
	Percentage	40.7%

Source: ADF&G, Division of Subsistence, Household Survey, 2002

SHARING AND RECEIVING WILD RESOURCES

All households (100 percent) in Lake Minchumina received resources from other residents; 66.7 percent of households gave resources away. Households received an average of 3.3 resources and gave away an average of 1.5 resources (Table 4-2). The trend of fish being the most abundantly used resource is continued in that it is also the most commonly shared resource with 83.3 percent of households giving fish away and 50 percent of households receiving fish. Although only a total of 35 pounds of salmon were harvested in the community, 66.7 percent of households received salmon (residents report most salmon comes in by air from Yukon and Tanana River communities) while 16.7 percent of households gave salmon away (see Table 4-2 for details). Non-salmon fish species, the most abundant wild resources used by Lake Minchumina residents, were commonly shared. Just over 33 percent of residents reported giving non-salmon species to others while 66.7 percent of residents reported receiving non-salmon species. The difference by half demonstrates that those who were the main harvesters of non-salmon fish shared with others in the community. Both pike and burbot were the most shared species with 33.3 percent of residents receiving these two species while 16.7 percent of residents gave these species away; again a difference by half.

Large land mammals also were highly shared. Some residents reported that because many families were small a single moose was enough for two households. Therefore it is not surprising to see that the harvest assessment data exhibits that 66.7 percent of households received moose and 33.3 percent of households gave moose away; in other words a single household sharing their meat with at least one other household. Interestingly black bear was reported to be given by households (16.7 percent) while no households reported receiving black bear. On the other side caribou was received by 16.7 percent of households while no household reported giving caribou. Residents reported that this meat was obtained from Nikolai (see Table 4-2).

Berries were the only other edible wild resource shared with 33.3% of households receiving berries and 16.7 percent of households giving berries. Residents also helped others out in heating their homes as wood was received by 16.7 percent of households although no household reported giving it away. During the study year there was no sharing of small land mammal species as these are harvested to earn income. In addition, the small number of birds harvested in the community (46 pounds total) were not shared.

CASH EARNED FOR LOCAL HARVESTS

The only evidence of sale of local wild resources occurring in Lake Minchumina are those items which are made by local residents from wild resources and are sold both within the community as well as outside the community. For example one resident reported earning money by making handicrafts from porcupine quills and furs. Another resident creates a value added product by harvesting furs from their trap line and then making boots from the furs. These are sold outside the community, or can be sold locally when firefighters, lodge visitors, or government work crews come through the community. Another resident makes hats from the furs that they harvest off their trap line. In addition a resident makes cards for sale both inside and outside the community made from pressed wild flowers.

One location that residents could sell their wares was at Denali West Lodge where eco-tourists come to ride dog sleds, hike, and enjoy the splendid scenery. Other than the lodge homemade items must be sold outside the community. During interviews there was no evidence of residents trading food items; residents simply gave portions of their subsistence harvests of food items to their neighbors.

PREPARATION AND PRESERVATION OF WILD FOODS

There are only a few methods used to process and preserve subsistence resources by Lake Minchumina residents. For the most part residents relate that they eat food fresh when they can. Fish can be taken from Lake Minchumina year round and this is preferable to freezing or drying. Although the harvest assessment survey did not ask residents about the processing of fish resources many residents related during key respondent interviews if they do store fish for later they prefer to freeze, smoke, or can the fish.

Processing large land mammal meat for storage is common in Lake Minchumina (see Table 4-5 for details). All households reported freezing moose, and making hamburger from moose. When they do harvest or are given caribou 66.7 percent of residents relate that they freeze the meat or grind it into hamburger, and 50 percent said they can the meat. Caribou is not as abundant, however, and many residents will eat the caribou fresh when they obtain some. Other methods of preservation include drying moose and caribou, and making sausage.

In addition to using the meat from moose and caribou, residents said they also used the heart, liver, kidney, stomach, and fat. All residents reported using the heart of moose while 66.7 of residents used the heart of caribou. Fewer households reported

using the liver of either moose or caribou, and even fewer said they used the kidneys and stomach, with just 33.3 percent of residents reporting using these parts of the animals for both species (see Table 4-6). A larger portion used the fat with 83.3 percent of residents use fat from moose and 50 percent of residents using the fat from caribou. The heads of these animals were used as well with 83.3 percent of residents using the head of moose and 50 percent of residents using the head of caribou.

Table 4-5. Estimated Number and Percentage of Households Using Various Preservation Methods for Large Land Mammals, Lake Minchumina, 2002			
Preservation Method		Caribou	Moose
Freeze	Number	6.7	10.0
	Percent	66.7%	100.0%
Dry	Number	3.3	3.3
	Percent	33.3%	33.3%
Sausage	Number	5.0	6.7
	Percent	50.0%	66.7%
Hamburger	Number	6.7	10.0
	Percent	66.7%	100.0%
Salt	Number	0.0	0.0
	Percent	0.0%	0.0%
Smoke	Number	0.0	0.0
	Percent	0.0%	0.0%
Can	Number	5.0	5.0
	Percent	50.0%	50.0%
Corn	Number	0.0	0.0
	Percent	0.0%	0.0%

Source: Alaska Dept. of Fish and Game, Div. of Subsistence, Household Surveys, 2002

Table 4-6. Estimated Number and Percentage of Households Using Various Parts of Large Land Mammals, Lake Minchumina, 2002			
Parts Used		Caribou	Moose
Heart	Number	6.7	10.0
	Percent	66.7%	100.0%
Liver	Number	5.0	6.7
	Percent	50.0%	66.7%
Kidney	Number	3.3	3.3
	Percent	33.3%	33.3%
Stomach	Number	3.3	3.3
	Percent	33.3%	33.3%
Hide	Number	5.0	5.0
	Percent	50.0%	50.0%
Antler	Number	6.7	8.3
	Percent	66.7%	83.3%
Bone	Number	6.7	8.3
	Percent	66.7%	83.3%
Sinew	Number	3.3	3.3
	Percent	33.3%	33.3%
Hoof	Number	3.3	3.3
	Percent	33.3%	33.3%
Fat	Number	5.0	8.3
	Percent	50.0%	83.3%
Head	Number	5.0	8.3
	Percent	50.0%	83.3%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

Non-edible parts of the animals were used as well. Half of the household interviewed said they used the hides from both moose and caribou, 83.3 percent used the antlers of moose and 66.7 percent used the antlers from caribou with similar proportions for bone. Thirty-three percent of households used both the sinew and bone from both moose and caribou.

CHAPTER FIVE LAKE MINCHUMINA USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY



INTRODUCTION: LOCAL KNOWLEDGE

The term local knowledge (LK) can be used to describe that knowledge which is held by residents of Lake Minchumina relating to the ecology of the natural world around them. This differentiates from the term traditional ecological knowledge (TEK) in that TEK has two criteria: 1) TEK is a knowledge system that is passed on over multiple generations, and 2) the knowledge is culturally embedded having as much to do with a groups shared belief system as their understanding of the natural world that surrounds them. In the case of Lake Minchumina some residents have resided in the area for three generations learning to hunt, trap, and fish from their parents. Second generation residents spend time on the land observing the movement and habits of animals and fish creating a complex knowledge system that they may pass onto their children. For example one resident, who was raised at Lake Minchumina, related the location where lampreys spawn on Birch Creek, a stream southeast of Lake Minchumina. Information was gathered not only from her own observations but from the observations passed on by her parents. This information meets the first criterion of TEK. However, it does not meet the second criterion especially as TEK has been used in the literature in the context of indigenous peoples whose understanding of the natural world is embedded within their complex cultural system of beliefs. Therefore, the term local knowledge (LK) will be utilized in the context of this discussion.

LARGE LAND MAMMALS

Historical and Contemporary Use Areas

To hunt moose residents either utilize the Muddy and Foraker Rivers for transportation or trap lines, which are located on the North Fork of the Kuskokwim to the Northwest (see figures 4.2 & 4.3). One resident notes that most often his family will hunt on their trap line for moose as they are familiar with that area. However, most hunting by Lake Minchumina residents is done to the east by heading down the Muddy River.

Another resident hunts moose around the north part of the lake (See figure 4.2). He says he doesn't have to travel too far to find a moose as they are now plentiful. He used to go into the preserve at times when they were scarce, traveling down the Muddy River.

Southwest of Lake Minchumina there are small herds of 6 - 8 caribou but they are difficult to find and not worth hunting as the chances of getting one are so slim.

POPULATION TRENDS AND VARIATION IN ABUNDANCE, MOOSE AND CARIBOU: THE LARGE SUBSISTENCE RESOURCES

One resident related that he hunts moose in September, and at the same time will hunt grouse. Moose are plentiful in the area surrounding Lake Minchumina. Due to the shift in habitat for caribou moose have become the main resource used for meat in addition to fish. All residents interviewed relate that moose are easier to find than caribou and worth the hunt as they provide a large amount of meat (500 pounds of useable meat per moose compared to 165 pounds for caribou).

A longtime resident says he used to get one moose a year for subsistence about four or five years ago when they were plentiful, but there are less moose now - he says you are lucky if you get one to split with another family. This relates to a wildfire that happened in 1991. The resulting clearing of the forest created new growth of birch and aspen species, favorite browse for moose. In 1994 and 1995 he said moose were located around the homes and were easy to find. Now a few years later they are less plentiful. A new burn in 2002 near their house could create good habitat to bring the moose back. Even so residents related that they don't have to travel far to find moose.

A resident relates that caribou are nearby if you do not mind hiking far to find them. Their population density is not large and they have only come close to the community once since he has lived there; about 8 -10 years ago he saw three of them across the lake. Caribou used to be plentiful in the area in the 1950 - 1960s according to other residents but they have not been seen in many years. During this period of time (Hemming 1971 *In* Bishop 1978) the main wintering ground for the caribou was the north side of the Lake. By the mid-1970s, however, caribou had become scarce. This has continued into the present and during the study year 2002, only a few scattered caribou will make their way up to the lake, the herd having joined the Mulchatna herd to the west.

Long Term Variation

As related above, there used to be a lot of caribou on or near the lake over 30 years ago. Today, a few make it up to the lake but are scattered; not in a herd like they once were. One resident relates that he believes many of the caribou have mixed into the Mulchatna herd, an observation made by another resident. Many of these caribou used to be located in the Alaska Range. Now there is still a small group of caribou north of the community on the other side of the lake from the Alaska Range. This is a significant shift in habitat for the caribou. As there are fewer caribou, residents mostly

rely on moose for a bulk of their red meat to supplement a diet of freshwater fish harvested from the lake.

Explanations for Abundance

Bishop (1978) mentions that moose numbers over the years have fluctuated. This is evidenced in higher moose numbers in the 1950s to 1960s with a decline in the 1970s (a trend observed in caribou as well). In 1975 Lake Minchumina residents, of which there were roughly the same as there are now, took seven moose. In 1976 they took six moose. This was during a period of time when moose populations were depressed and residents related to Bishop that outsiders had even made it up to Lake Minchumina looking for moose via the Muddy River. All left empty handed.

Today, moose population cycles are continuing to fluctuate. One of the reasons for more moose in the immediate area is the as mentioned forest fire of 1991. Five moose were taken in 1995 right in the community following four seasons of growth of new species including young birch and willows. This past summer, however, there were very few moose observed near the community; one bull, and a mother and calf together. There are now many new burns near the community and the hope is that in 4 - 5 years the moose will return. Residents relate that they can rely on store bought goods and fish from the lake if they do not get a moose every year or if they have to share one.

Predators of large land mammal species such as moose and caribou are seen by residents as following the cycle of the large land mammal species they rely upon. I asked a lifetime resident of Lake Minchumina to give his impressions on predator problems in the area. He says that it is the bears taking the moose calves and that this is common knowledge from people who work out on the land. Wolf numbers started to decline two years ago. Up through the 1990's they had grown but now there is a significant decrease in numbers. He says the numbers of wolves fall with the decrease in moose and caribou. The wolves are more desperate now and can be seen near homes and will even come into their yard to scavenge for food..

Brown bears are increasing at the same time as the number of wolves decline. This can be measured by numerous tracks observed on the trails and damage done to trapping cabins. There were three bears taken by Lake Minchumina residents at Wien Lake three years ago but none have been taken since. Brown bear is not a species taken by residents for food. It is used for fur or they are taken when they become a nuisance. One resident believes that the bear population is able to increase, as there is not much hunting pressure on them in the area. The case of black bears is opposite as they are now reported by residents to be scarce.

Conservation Measures

Many residents comment that they do not need to go outside the established regulatory season to hunt moose. The season for moose, the target species, in GMU 20C (where all moose harvests took place during the study year – see Table 4-3) is September 1 – 20 on state land and September 1 – 30 on federal land (see Figure 5-1 for the proximity of the Denali block, federal land). As one resident relates they mostly hunt after the 10th of September when it starts to cool off and the leaves are gone from the trees. If they see a bear before a moose, they will forgo getting moose and this will meet their red meat requirements for the year. Residents stop hunting before September 30, in line with game regulations. Almost always most residents will get a moose and do not have to go too far up a river as moose are readily available nearby. More than one resident commented that they can hunt nearby their house and do not need to go far to find moose.

FISHERIES RESOURCE USE AT LAKE MINCHUMINA

We landed a mile or so from the [a local family's] house and walked over a hump to their place, a grouping of cabins in the trees; one large cabin with surrounding sheds and sunken cabins dating back to the 1920's. All the old cabins are still intact and useable (for storage). The Foraker and Muddy Rivers used to run by their house in a wide channel and boats could pull right up in front of the house. This channel was once part of the lake and the entrance to the river is now a narrow stream – the rest filled in with silt, the silt now covered with grass, brush, and the beginnings of trees. Field Notes ~ June 4, 2003

Introduction

According to a resident who grew up at Lake Minchumina, perhaps a third of the lake cannot be traveled over by boat, as was the case 20 years ago. What was once a rock-laden lake with marsh near the edge, good habitat for whitefish has become shallow near the shore where silt has filled in over the rocks (Area 2, Figure 5-2). This means less fish and less opportunity for subsistence fishing. A clear stream and gravel-laden lake bottom (Area 1, Figure 5-1) where a local family was able to pull their boats right up to their house is now filled in with silt and overgrown with small bushes. Changes in the environment, warmer winters, shifting river channels, and melting permafrost coupled with changing community demography and non-local recreational users entering the area are changing the way people live in Lake Minchumina.

Along with wildlife resources and wild plants, residents of Lake Minchumina rely mainly on freshwater fish for subsistence uses. Only a few salmon make it up to Lake Minchumina, so the discussion below relates mainly to freshwater fish. Although there are preferences in fish for consumption, residents reported that they do not specifically target particular species when utilizing nets, the primary harvest tool.



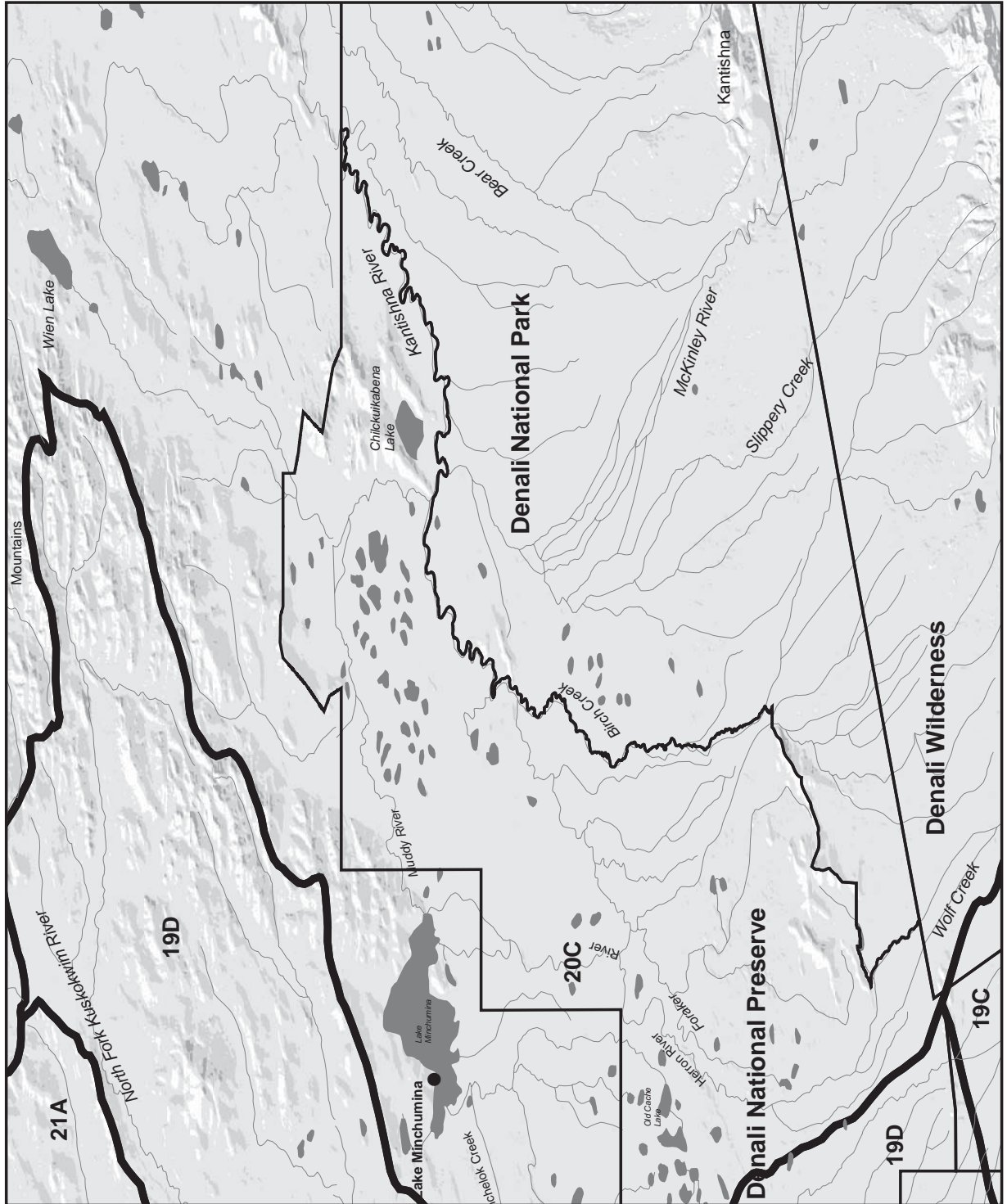
Figure 5-1
 Lake Minchumina Proximity
 to Denali National Park and Preserve

Denali National Park & Preserve
 Game Management Unit

Source: Household Interviews
 2002-2003. Division of
 Subsistence, Alaska Department
 of Fish and Game. Technical
 Paper No. 296.
 Note: As not all resident
 households were interviewed
 this is only a sample of harvest
 use areas.



Scale: 1:750,000



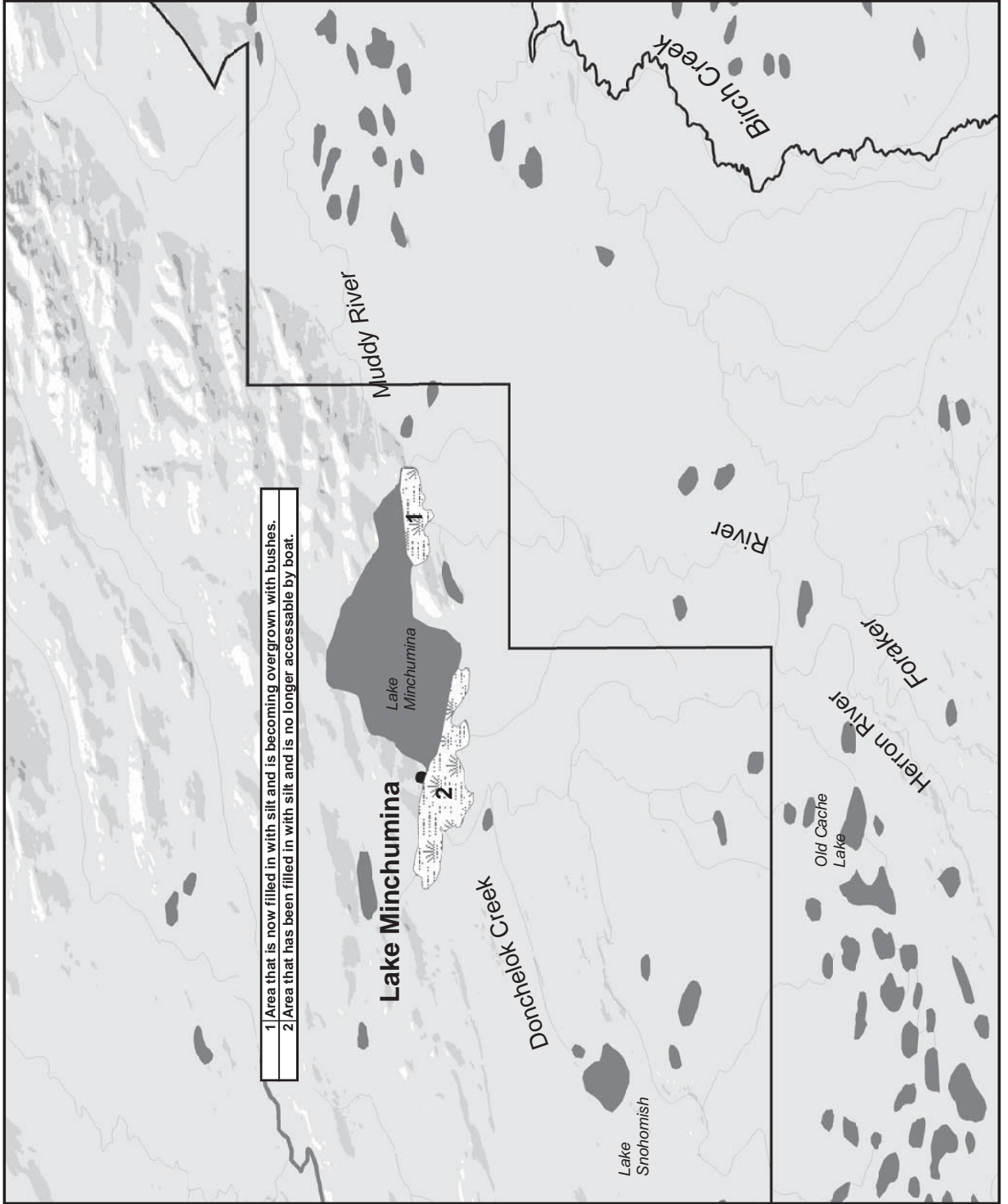




Figure 5-2

-  Lake Minchumina Hydrologic Changes
-  Denali National Park & Preserve

Source: Household Interviews 2002-2003. Division of Subsistence, Alaska Department of Fish and Game. Technical Paper No. 296.
 Note: As not all resident households were interviewed this is only a sample of harvest use areas.



Scale: 1:400,000

The information in this section therefore presents freshwater fish species as a single subsistence resource. The only exception to this is burbot, which are targeted using hooks; this will be discussed below as well.

Local Knowledge and Fish Locations and Spawning Habitat

Many community residents have knowledge of fish migration patterns in and around Lake Minchumina. For example, they know whitefish can be caught in the late fall with a net under the ice; that in October-November whitefish usually spawn near shore; and in winter whitefish are found in the deep part of the lake (see Figure 5-3). These observations are important as whitefish are a primary subsistence resource.



Pike, another main species that is used for subsistence, spawn at the end of May on the west end of the lake in shallow water (see Figure 5-3). Pike move into the Foraker River in late fall, and move around in the river system during the winter.

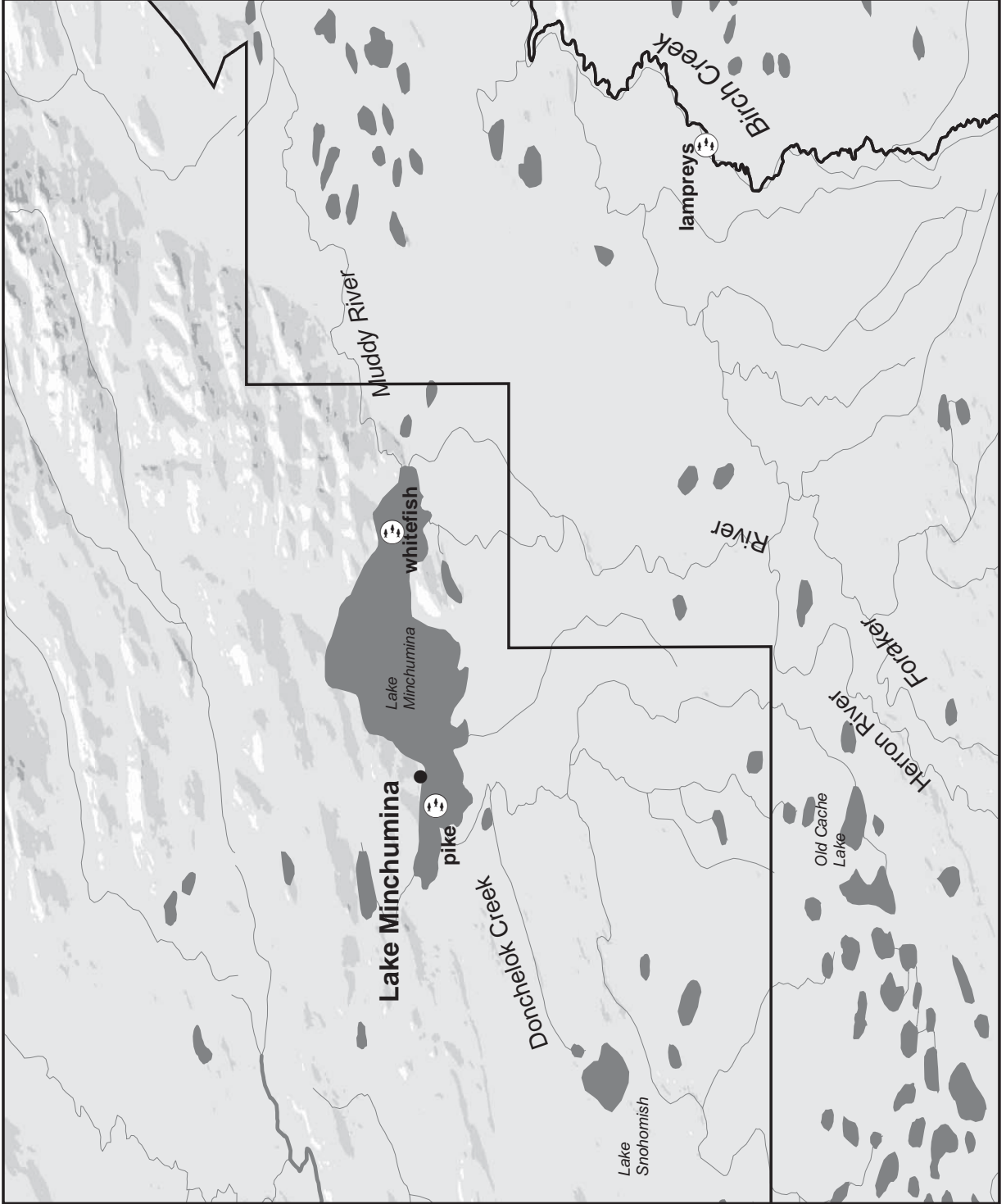
Two species that community residents catch incidentally that are not as favored for subsistence are cisco and lamprey. Cisco spawn between August and September, and lamprey spawn in May and June on Birch Creek and the north fork of Baker Creek (see Figure 5-3), although they are rarely seen. While longnose suckers are not a species that is popular for food, local residents report that they believe they spawn in May, but are not sure of the exact locations. This illustrates that local residents make careful observations on the life cycle of those primary species of a subsistence diet such as whitefish and pike and have only a general understanding of lesser used species such as suckers, cisco, and lamprey. Both blackfish and sculpin are also caught by Lake Minchumina residents, however, interviewed fishers did not know the spawning times of these two species of fish.

Burbot, locally called “cod,” is a favored subsistence species at Lake Minchumina. Residents did not report the spawning location of burbot, a fish that is elusive, except to state they used to be seen near the Muddy River when it flowed clear in the past. The areas of the lake where burbot can be caught vary with the season. In the summer they are caught towards the middle of the lake where the water is cooler and towards the shore in the fall.



Figure 5-3

-  Freshwater Fish Spawning Areas
-  Denali National Park & Preserve



Source: Household Interviews 2002-2003. Division of Subsistence, Alaska Department of Fish and Game. Technical Paper No. 296.
 Note: As not all resident households were interviewed this is only a sample of harvest use areas.



Scale: 1:400,000

Preferred Fish Species

There are only a few Chinook and chum salmon that reach the watersheds around Lake Minchumina. These fish are extremely red and well into their spawning state when they arrive and their flesh is bleached out. One resident observed that the meat of these salmon is less fishy tasting and the color of the meat is almost white. He said he wouldn't be able to tell if the salmon are sockeye or coho due to their advanced state of degeneration. Most residents relate, however, that they will not eat these salmon and may just feed them to their dogs.

Of those fish harvested from the lake with a net, residents report that the species they mainly eat are whitefish, pike, and sheefish, and the rest caught in the net go to the dogs. This makes up a portion of the dog feed for residents who still utilize dog teams. In addition to fish, they also use store bought dog food to feed their sled dogs. Aside from being used for subsistence and dog food, fish are also used as bait on trap lines. Both burbot and pike are favored for use as bait, and they are also fed to dogs as well.

Most residents relate that they see no difference in the quality of fish from one season to another. Of all the various species taken from Lake Minchumina, most residents favor burbot as the preferred fish species harvested from Lake Minchumina to eat. Large three-foot long burbot were not uncommon up until 1980. Presently, mainly only small burbot are caught.

Fish Abundance in Lake Minchumina

According to people interviewed, fishing used to be a major source of subsistence foods for the residents of Lake Minchumina during the winter and the summer, but this has changed over the past 40 years. The Foraker River moved from the Muddy River into the lake prior to the 1960s, and has shifted mouths several times. The river filled in the bay in the southeast corner of the lake. This initial movement of the river also caused a lowering of water levels in the lake, which subsequently drained swampy feeding areas. Since this time, the quality of the water, and level of the water in Lake Minchumina has been changing; changing from a clear water lake to silt-laden water especially over the past 10-20 years. In 1992, the Foraker River shifted channels again and began dumping silt into the lake. One resident explained that the water subsequently became oxygen starved. Consequently, residents who once took 100 to 120 fish in a single night using nets now catch only a few, and these fish are reportedly smaller than they used to be. This change in water quality did not affect one single species, according to residents; all fish species were equally affected. Two years ago, the Foraker River shifted back and stopped dumping as much silt into the lake and the fish population is slowly starting to rebuild. The two dominant species of fish in the lake have been and continue to be pike and whitefish.

Contemporary Fishing Technology

According to one resident, fish has become mostly a summer food, although they are still taken in the winter under the ice with nets. Nets are put out in the spring for whitefish when they are running, and then they are smoked. Also caught in the nets during the summer are pike and burbot. Salmon are rarely caught in nets in Lake Minchumina. Table 5-1 clarifies this by demonstrating that during the study year only five chum salmon were caught in subsistence set nets in the lake for a total of 35 pounds. However, this amount is small compared to the 3,694 pounds of non-salmon species caught in subsistence nets in Lake Minchumina, which amounts to 369.4 pounds per household. Table 5-2 breaks down this amount by species with subsistence gear responsible for a vast majority of the harvest, with rod and reel as a secondary technology responsible for 672 pounds of non-salmon fish, or 67.2 pounds per household. Species caught with rod and reel are mainly pike with 470 pounds harvested. Whitefish make up a majority of the harvest using nets with 2,240 pounds harvested during the study year, pike with 655 pounds caught by subsistence net during the study year, as well as sucker and burbot.

The main technology used in the fall to catch burbot is a set of 5 - 6 hooks. This is usually done in October, the primary harvest period for burbot. Many residents relate that extra effort is focused on catching burbot because they are a favored species. As

Table 5-1. Estimated Salmon Harvest by Gear Type, Lake Minchumina, 2002

Species	Harvest Unit	Set Net		Dip Net		Fishwheel		Subsistence Gear		Rod and Reel		Any Method	
		Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean
Salmon	ea.	5	0.5	0	0.0	0	0.0	5	0.5	0	0.0	5	0.5
	lbs.	35	3.5	0	0.0	0	0.0	35	3.5	0	0.0	35	3.5
Chum Salmon	ea.	5	0.5	0	0.0	0	0.0	5	0.5	0	0.0	5	0.5
	lbs.	35	3.5	0	0.0	0	0.0	35	3.5	0	0.0	35	3.5
Chinook Salmon	ea.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	lbs.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Scokeye Salmon	ea.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	lbs.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

Table 5-2. Estimated Harvest of Fish Other Than Salmon by Gear Type, Lake Minchumina, 2002

Species	Harvest Unit	Unspecified Gear		Subsistence Gear		Rod and Reel		Ice Fishing		Any Method	
		Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean
Non-Salmon Fish	Lbs	0	0.0	3,694	369.4	672	67.2	198	19.8	4,564	456.4
Halibut	Lbs	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Burbot	Lbs	0	0.0	413	41.3	0	0.0	168	16.8	581	58.1
Grayling	Lbs	0	0.0	0	0.0	27	2.7	0	0.0	27	2.7
Unknown Pike	Lbs	0	0.0	655	65.5	470	47.0	30	3.0	1,155	115.5
Sheefish	Lbs	0	0.0	9	0.9	0	0.0	0	0.0	9	0.9
Sucker	Lbs	0	0.0	377	37.7	0	0.0	0	0.0	377	37.7
Unknown whitefish	Lbs	0	0.0	2,240	224.0	175	17.5	0	0.0	2,415	241.5

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

burbot lie in the deep water during the summer, one resident related that he is going to try a deep net in the future to target this species. Burbot are also caught on the ice using rod and reel gear or jigging. During the study year a total of 168 pounds of burbot were harvested during ice fishing (see Table 5-2).

As noted earlier, burbot are located close to the lakeshore in fall-winter and in the deep part of the lake during the summer. A person related that one year he dug a hole in the ice too close to shore by mistake. Although he expected that the hole was too close to shore to catch anything, he needed to thaw out some beaver meat that was frozen to a hook so he dropped it in the hole to thaw out overnight. With only a foot of water under that hole he found a burbot on the hook in the morning.

Many residents have a schedule as to when nets are set throughout the year. In May, they put out a net in the ice when it is just about to go out. One person indicated that they always set the net off the spit and beach near their home. In the past they also put a net on the Muddy River; however, there are too many boats in this river now for a net to be set. They primarily catch whitefish in their nets, and a few pike, suckers, and burbot. They also may possibly catch one to four chum salmon and one chinook salmon a year, and a sheefish every four years or so. These are all fed to the dogs except sheefish, a favored species which is rarely caught, which people eat. The nets return to the water under the ice starting in October when the ice has set for the winter and hooks may also be used. Besides burbot, pike are occasionally caught on a hook.

Conservation Measures Relating to Subsistence Fishing

Local residents interviewed for this project reported that in general they follow fishing regulations because they provide adequate opportunity to harvest what they need. The human population of the lake is too small to create a large impact on fisheries resources, yet there are still three households with dog teams residing around the lake, two of which still feed fish to their dogs. However, these two dog teams create little impact on local fisheries resources because residents relate they can fly in store bought food for their dogs.

Reflecting the cultural heritage of the present population of Lake Minchumina, and the fact three residents who were interviewed have studied biology or natural resource management at a university, there is a notion of western conservation built into subsistence practices and the understanding of the carrying capacity of the watershed. In addition, residents expressed the opinion that regulations on subsistence activities are in place for a reason and should be followed. One resident said that while she does not disapprove of residents of other communities not following established subsistence regulations if adequate opportunity is not provided, it is not necessary for them to do so. Residents will fly in supplies when the ability to harvest subsistence resources is diminished, or if a need for food supplies arise outside the regulatory season.

As an example of the type of conservation ethics endorsed by local residents, one resident commented that fish from the lake cannot support her dog team of 60 dogs so she buys commercial dog food. She said that a neighboring resident has far fewer dogs and is able to feed them fish part of the year. At her former home on the Yukon River her 11 dogs ate 1100 salmon a year, but there are almost no salmon at Lake Minchumina and the current freshwater fish abundance is not adequate.

The necessity of store bought food has much to do not only with the decline of fish abundance but the decline in trapping as well. Bishop (1978) found that there were three households in Lake Minchumina with active sled dog teams. These residents reported a need of 3000 fish a year for household consumption, and to feed teams comprised of 7-8 dogs. Dogs could also be fed beaver carcasses from trapping and this is still done, however, with the decline of fish abundance even an increased harvest of beaver, 219 beaver in 2002 (see Table 4-2) compared to 128 in 1976 (Bishop 1978) cannot supplement the lack of fish.



Plate 5-1. Dog Team at Denali West Lodge

SMALL GAME HARVEST AT LAKE MINCHUMINA

Of the four interviews conducted in Lake Minchumina three of the households engaged in trapping annually. This is a major source of income for some, but for many trapping has become less prevalent in recent years. Of the many species trapped marten is the main furbearer that is targeted. This compares to Bishop's (1978) assessment of marten, mink, and beaver as three main furbearers trapped in 1975 - 1976. Today only a limited number of other resources besides marten are trapped including fox, muskrat, mink, beaver, and wolves

Trapping usually begins the first of November. One resident says they will wait longer for the swamps and lakes to freeze if necessary as they travel their trap lines by dog sled. In addition to this the other pragmatic reason for waiting until it is cold is the fur quality is better as it gets colder as the animals' fur thickens. When the fur becomes thicker the quality is better leading to a higher price.

Traps are usually pulled around the 20th of February (the season officially ends the 28th but by this time the fur is getting thin) for marten. They trap other species later including muskrat which can be trapped until May or June.

Fur prices haven't been as competitive as they were in the past and many residents have reduced their trapping effort. Last year the average price for marten furs was \$35.00. This year it went as high as \$50.00. In the 80's it was over \$100.00 and one trapper commented that the most he has ever received was a \$168.00 for a single pelt of excellent quality. The prices paid currently for furs is the same as the 1970's, however, the costs associated with trapping have gone up. This has reduced the amount of people trapping now according to residents. As one resident related the price is the same as the 1970's but a snow machine costs five times as much and gas is twice as much, so it is not worth the effort for the money for most.

Bait for traps is sometimes beaver meat. A longtime trapper says they have three strategies for baiting traps. For bait they will either use 1) rotten fish and moose guts, 2) beaver castor which is good for lynx, and 3) grouse guts and feathers which are frozen together for lynx and marten.

Of the fur bearers caught that are targeted for their pelts a resident commented that they will also eat the beaver, lynx, and muskrat. All of these are eaten by the dogs in addition to fox.

Historical and Contemporary Use Areas

According to residents species for trapping that can be found in the area surrounding Lake Minchumina are otter, weasel, marten, muskrat, beaver, fox, wolverine, mink, lynx, and wolves. However, most of these species are not plentiful. As one resident comments, although he may trap a few fox, wolverine, mink, and lynx; he does not get a lot of these. It's "not fox territory, not wolverine territory, not mink territory, and not lynx territory.." He said there are a few wolverines in the area, but less wolves because there are less moose in the area. He will usually get one to two during a season and 40 - 60 marten a year on average.

Of the three key respondent households interviewed that engage in trapping each has a separate trap line. One household heads northwest to trap, another northeast, and another southeast (see Figure 4-3). As mentioned above marten are the main target species. Transportation along the trap lines is dog sled in the case of two households and a snow machine by the third.

Population Trends and Variation in Abundance of the Long Term

Trapping is the major occupation during the winter. As marten are the target species most observations concern this species. During key respondent interviews each household was asked about their observations in a cycle of growth and decline of

target species. A resident says that he doesn't see a cycle of growth and decline in marten populations that can be measured. In the early 1970's there were less marten and then they grew between 1977 and 1983. After this they dropped off and last year was not so good. This relates to the same observation made by trapper.



Plate 5-2. Steven Green checking a trap.



5-3. An unset trap on the Green's trapline.

Another species that is targeted is muskrat, which have decreased in recent years especially on the flats to the east of Lake Minchumina. The flats used to be good for harvesting muskrats before thirty years ago. Some of this may be due to the permafrost melting and changing the landscape coupled with mild winters.

Beaver, once an important target species, are declining in importance as their fur prices drop. The population of beaver has been increasing over the past 10 years. Now the population is stabilizing or even going down. Although beaver used to get a good sum per pelt a trapper relates that he never trapped them much anyway as getting to the beaver means you "get wet, and your clothes freeze." He will still usually harvest a couple in the fall to use as bait for traps. He relates that "anything that eats meat, likes beaver," meaning beaver is the preferred meat of predators.

Porcupine, once a scarce species are very common in the Lake Minchumina area today, however, up until 4 - 5 years ago according to residents there were no porcupines at all. Now they are all over the place. In the past residents would kill every porcupine they saw to keep the numbers down, as the quills would get stuck in their sled dogs when they came across them. As dogs are not used as much for transportation and therefore there are much fewer dogs in the community coupled with the reduction of human population in Lake Minchumina, the porcupine are not being controlled as they once were and their population numbers have increased considerably. People use the quills of the porcupine and they will eat them sometimes.



Plate 5-4. Unset Trap

The other species besides porcupines that are controlled are squirrels. A resident says they have to shoot the squirrels to keep them from getting into the dog food. According to her the squirrels can eat a 50 pound bag of dog food in a summer. As they rely heavily on dog food to supplement fish for feeding the dogs they cannot afford to have it eaten by squirrels. The added benefit is that the dogs will eat the squirrels as well.

Explanations for Abundance

The explanation for the high population numbers now seen for beaver may be due to the inter-relationship between the trappers and the beaver. As beaver used to be trapped in abundance up through the 1970's, their populations were kept in check. This action by trappers kept the beaver populations suppressed. Today as beaver are not being targeted their numbers are increasing.

There are two reasons given by residents as to the low amount of marten taken. As noted marten are the target species; however, there were not as many this past year. A close forest fire burn meant they were further out on the trap line and in addition to this with poor traveling conditions - no snow - he couldn't get to the marten as he uses a snow machine to travel the trap line. He says "it wasn't much of a winter last year with little snow to travel on."

Conservation Measures

Of the three key respondents interviewed that trap two explicitly related their strategies for conservation. A resident says that if the season is bad and he is not getting enough or if the marten do not look healthy he will pull his traps or not even trap at all. He enjoys getting out on the land but it's not worth trapping marten if their population numbers are not high enough. He said sometimes the marten need a break from being trapped so their numbers can recover. For example, this past year he didn't trap at all. Another resident relates that the fur value goes down if rubbed or thin and there is no reason to trap a poor quality animal that could become better the following year. This is a pragmatic reason and in the case of conservation, whose explicit aim is to save the resource for future use this comment addresses this notion of saving a resource for the future.

BIRD HARVEST AT LAKE MINCHUMINA

Spruce grouse are taken during the summer. To get the grouse one resident relates that the dogs will tree the grouse and then they will shoot them. They either get 15 - 20 a summer or only 1 - 2 depending on how prevalent they are. She relates that it is definitely either or.

PLANT RESOURCE HARVESTS AT LAKE MINCHUMINA

Berries are collected every year, as well as mushrooms by one household. As one resident relates they eat whatever they can harvest from the land. Blueberries, raspberries, and cranberries are mostly what are collected in large amounts. This past year according to residents it was too dry for berries and mushrooms due to a significant decrease in rainfall.

CHAPTER SIX
LAKE MINCHUMINA CHANGES IN PATTERNS OF LOCAL RESOURCE MANAGEMENT



OUTSIDE PRESSURES ON FISHERIES RESOURCES

According to Lake Minchumina residents interviewed for this project there are too many non-local people coming into the area for recreation. Both snow machines and dog teams are starting to reach Lake Minchumina from urban Alaska. In addition, recreational hunters are moving closer every year. The Brice Trail traveling northeast from Lake Minchumina was built in 1989 to bring in equipment and supplies to work on the runway. There is a proposal to open up the trail as a recreational trail for snow machine users to reach McGrath by way of Lake Minchumina.

Much of the concern about the effects of increasing non-local presence on subsistence activities has to do with trapping as trails may become a conduit for linking to the outside world. The potential impact on fishing cannot be determined as of yet because non-local recreational fishermen are still not using the area's lakes and rivers in large numbers. However, the opening of trails from Nenana and Denali National Park could change the relationship between subsistence and recreational use in the Lake Minchumina area. This discussion will be continued in the next chapter.

CURRENT DEMOGRAPHIC SHIFTS AND POSSIBLE EFFECTS ON FISH POPULATION

According to local residents interviewed for this project, many people reside at Lake Minchumina for the subsistence lifestyle and to trap for a living are leaving. Longtime residents are concerned that there is a shift occurring in the population from a focus on subsistence hunting and fishing, trapping, and some wage employment to a recreational and retirement community.

There is no store in the community, which means that groceries must be shipped through the mail or by passenger plane. Postal increases in 2002 were dramatic. According to a longtime resident there have been small increases in postal costs in the past but this year it was considerably higher. It "doubles the price of everything" from what it would cost in the store. This makes the cost of heavy staples such as flour twice what they are in the store from where they were shipped. With an increase in postal costs residents may likely begin increasing subsistence harvests, and fishing is a major subsistence activity. The other side effect to this is that residents may choose to leave Lake Minchumina as it may become too expensive to continue a rural lifestyle.

CHAPTER SEVEN
LAKE MINCHUMINA SUMMARY AND CONCLUSIONS



DISCUSSION: THE INFLUENCE OF ENVIRONMENTAL CHANGE ON SUBSISTENCE
FISHERIES

The winters in the Lake Minchumina area have reportedly become milder over the past 30 years, a general trend seen in many parts of Interior Alaska (Alaska Regional Assessment Group 1999). Permafrost has been melting in low-lying areas and ponds and marshy areas are drying up. (This phenomena was noted by Nikolai residents as well.)

The past two years prior to the survey in 2002 were very mild. The warming trend that has occurred has not changed the landscape much as far as tree species distribution. Residents who have been living in Lake Minchumina for over 30 years have not seen any noticeable change in the environment as far as tree species abundance and composition. They do relate, however, that the trees are sick, especially the cottonwood, tamaracks, and spruce trees.

The major notable change observed by residents relates to water and this affects the land as well. As the permafrost melts the water table has changed significantly and this has caused ponds and lakes to dry up, eliminating habitat where freshwater fish formerly thrived. Low water has also had an adverse affect on berries, which need abundant groundwater to thrive; berry abundance is a local indicator of a healthy ecosystem.

In addition, according to a local resident, after the 1964 earthquake the water level in the lake dropped eight feet. Fishing for all freshwater species declined after this and the swamp surrounding Lake Minchumina drained, which was a prime location of whitefish habitat, one of the dominant species in the lake. In October 2002 another earthquake occurred and since then the lake has dropped another two feet. One resident says she is not sure that these two events are connected, but it is possible since water levels dropped after the 1964 earthquake. The drop in water level could also be due to the limited snowfall during winter 2002-2003 and lack of rain as well. These factors are causing problems as whitefish, a major subsistence resource do not do well in shallow silt laden water.

Coupled with the drop in water level, another factor affecting the lake is the Foraker River, the main source of water for the lake, which shifted channels and started dumping silt into Lake Minchumina beginning in 1992. In 2001, the river shifted back to its normal channel dumping silt directly into the mouth of the Muddy River clearing up the water and the population numbers of fish are starting to grow according to local residents. The effect of the addition of large amounts of soil material in the lake is the creation of thicker weed beds. This can be beneficial for some species, such as pike, that thrive in habitat that is rich in weeds. However, too much vegetation growth in the lake can decrease the amount of oxygen in the water, which will kill fish, or at least make certain areas such as weed beds that were once productive habitat are now a dead habitat for fish. This trend has been observed by residents for other species such as burbot and whitefish as well as pike.

Another indicator of climatic change according to two residents is that they used to put their garden in the 1st of June and now can do this on the 25th of May. 2002 saw a late spring and they had to wait until June but when compared to the 1960s the overall trend still relates to an earlier spring.

The ability of Lake Minchumina as an ecosystem able to support the local population with freshwater fish has diminished over the past 20 years. Residents still rely upon the lake as their main source of fish for subsistence use and have an intimate knowledge of the local ecosystem surrounding the lake. With fewer residents – and fewer dogs – the lake has been able to sustain the population that is following the trend of diminishing fisheries resources.

In addition, the impacts from non-local users on fisheries resources have yet to be observed due to low numbers of non-local people reaching the lake. The only local lodge, Denali West Lodge is small, housing only 10-12 guests at a time and their activities are not focused on sport fishing. As noted earlier, however, the amount of people coming into the Lake Minchumina area could rise with the opening of trails from Denali National Park and Nenana.

According to local people climatic and local ecosystem change will be determining factors regarding freshwater fish abundance in Lake Minchumina in the future. Residents point to a gradual increase in fish abundance, but so far the fish are still smaller than in the past and the numbers caught in a net overnight are far lower

than the 100 - 120 reported in the past. Many residents still enjoy fishing and will continue to do so as a subsistence activity in order to live in the community of Lake Minchumina.

CONCLUSION AND RECOMMENDATIONS

- The change in the composition of the population of the community from one relying on subsistence hunting, fishing, and trapping to a recreational and retirement community is troubling for some longtime residents of Lake Minchumina. In addition, proposals to open up a trail to the road system, and the use of trap line trails by recreational users, will bring considerably more traffic through the area in the future. This may lead to more recreational users of the area surrounding the lake, and the lake itself. A future study to address these socio-economic factors and what could be done to subsistence opportunities at Lake Minchumina could be helpful to community residents and resource managers.
- The second concern relates to changes in Lake Minchumina itself. What is most troubling is the filling in of the lake from silt deposits from the Foraker River, and the lowering of the water table not just in Lake Minchumina, but in surrounding lakes as well. This is creating a habitat that is not suitable for freshwater fish species, a major resource for residents. A further study could determine the causes and effects of local ecosystem change in more detail. Residents of Lake Minchumina have considerable knowledge based on many years of observing the environment that they rely upon for subsistence. This could be beneficial as studies in this geographic and topical area are limited.
- Regarding regulations, residents of Lake Minchumina relate that subsistence regulations allow for an adequate harvest of fisheries resources. As noted, Lake Minchumina itself has diminished in fisheries abundance; however, there are no other locations for fishing opportunities for residents to shift. Residents will take what they can and fly in provisions when necessary. No regulatory changes are necessary at this time. However, if access to this area opens up in the future, this situation could change.



CHAPTER EIGHT NIKOLAI INTRODUCTION



In this section of the report we present information on the nature and extent of wildlife and other natural resource use in the community of Nikolai. The report builds on the work of Jeff Stokes (Stokes 1985) who wrote about the use of wild resources in upper Kuskokwim River in the 1980s.

CULTURAL AND HISTORICAL BACKGROUND

In the anthropological literature Nikolai people are classified as Upper Kuskokwim Athabascans. During the 19th century there were eight different bands living on the Upper Kuskokwim River. One of these was the Nikolai Band whose territory included the drainages of the South Fork of the Kuskokwim and the Tonzona River all the way into the foothills of the Alaska Range (Gudgel-Holmes 1990:300). Early on the Upper Kuskokwim people were referred to as Kolchan (Hosely 1961; 1981), but this term, which seems to be an anglicized form for the Athabaskan word for “stranger,” is no longer used. The term Upper Kuskokwim has now become commonplace but the people continue to call themselves “Dina’ena” which means “the people” (Stokes 1985:19).¹ “Upper Kuskokwim Athabaskan” is also the term used to designate the language in reference to the geographic occurrence of its modern speakers (Collins 1966).

In his 1985 report Jeff Stokes provided information on the genealogical background of the Nikolai people. His investigations indicated multiple connections between the Upper Kuskokwim, the lower middle Yukon, Innoko River and the Koyukuk and Tanana Rivers. And at least one genealogy indicates ties with Dena’ina Athabascans living near Cook Inlet. Additionally several families have ancestral ties to the Yup’ik speaking people of the middle Kuskokwim. So while the Upper Kuskokwim language is distinct from neighboring Athabaskan languages the population of Nikolai is composed of families whose members have migrated into the area from other Athabaskan or Yup’ik groups - usually through intermarriage.

In the 1830s the Russians established a series of trading posts within reach of the Upper Kuskokwim people. The closest of these was Kolmakov Redoubt located near the mouth of the Holitna River. From this post Russian traders and explorers such as L.A. Zagoskin made their way into Upper Kuskokwim territory. This early fur trade brought a few changes to the Upper Kuskokwim people mostly by way of

1 Not to be confused with the Dena’ina or Tanaina who live around Cook Inlet.

manufactured items including metal tools, clothing, firearms, and tobacco. As they became accustomed to these things Native people reordered their seasonal activities to include fur trapping, although food production was still the major occupation until the early part of the 20th century. Following the traders came Russian Orthodox missionaries who, in the mid-1890s, established a church at the site of “old Nikolai” near the confluence of the Tonzona River and the South Fork of the Kuskokwim.

Lt. Zagoskin's Encounter with the Upper Kuskokwim People

In May of 1843 the Russian explorer L.A. Zagoskin accompanied the manager of the fort on a trip up the Kuskokwim River. Toward the evening of May 26th 1843 Zagoskin's party encountered a group of Upper Kuskokwim men on their way to inform the manager that the people living farther up river had already traded their furs to Dena'ina who had come into the upper Kuskokwim drainage from Cook Inlet, probably by way of Rainey Pass. But these men had furs to trade and as soon as they met the Russians the Native men began to trade. Zagoskin notes “[T]he natives were used to our trade goods and would have made a rush for the Kolosh capes, but as they did not have a sufficient number of beaver pelts they had to select other goods. There was one who did not have to wait – he paid 15 beaver pelts for a cape of black broadcloth with a pattern of red crosses and a border” (Michael 1967:269). While the others could not afford a “kolosh cape” they did buy blue cloth caps, tobacco, beads, flint, and sealskin thongs for making snares to catch caribou. Once they had finished the trading the Native men began to dance (ibid).

Nikolai has been relocated at least twice since the 1880s. The current site was established around 1918. During the gold rush Nikolai was the site of a trading post and roadhouse and was situated on the Rainy Pass Trail that connected the Ophir gold mining district to Cook Inlet. It became a winter trail station along the Nenana-McGrath Trail, which was used until 1926. Many elderly residents say they learned English when working with European-Americans who traveled through their homeland (Williams et al. 2005:18). In 1927, the St. Nicholas Orthodox Church was constructed and in 1948, a private school was established. Many families who lived nomadically hunting game in the mountains and fishing in the lowlands in the spring and summer settled in Nikolai after the school was established, and residents who are now in their mid fifties and older recall this transition. Many of the current

residents moved from Telida after the school closed there in the mid 1990s. The first airstrip was built in 1963. The Village Council is called the Nikolai Edzeno' Village Council. Edzeno' is an Upper Kuskokwim Athabascan word that refers to “place by the river.” The river is considered a major source of resources and a transportation corridor to hunting areas, fishing sites, wood gathering areas, and other communities in summer and winter.

CHAPTER NINE
NIKOLAI DEMOGRAPHY, EMPLOYMENT CHARACTERISTICS and MONETRAY INCOME

DEMOGRAPHY

In 2002 Nikolai was a community of 96 people living in 32 households (Table 9-1). Ninety one residents are Alaska Native, with the majority being of Upper Kuskokwim Athabaskan descent (Table 9-2). From its high in 1970 the population has fluctuated only slightly (Table 9-1). Stokes (1985) reported a population of 107 people living in 29 households in 1984. Average household size in 2002 was 3 persons and 3.7 persons in 1984. Since 1984 the population has grown older. In 2002 the average age

Year	Population	Source
1898	20	Oswalt 1980
1910	9	Oswalt 1980
1928	35	Stokes 1985
1935	52	Oswalt 1980
1950	88	Rollins 1978
1960	85	Rollins 1978
1970	112	Rollins 1978
1976	98	Stokes 1985
1980	91	U.S. Census
1984	107	Stokes 1985
1990	109	U.S. Census
2000	100	U.S. Census
2002	96	ADF&G 2002

Adapted from Stokes 1985

Place of Birth	Estimated Number of Residents	Percentage of Residents
Anchorage	4.7	4.9%
Anvik	1.2	1.2%
Bethel	1.2	1.2%
Chitina	1.2	1.2%
Crooked Creel	4.7	4.9%
Kotzebue	1.2	1.2%
McGrath	2.4	2.5%
Medfra	4.7	4.9%
Nikolai	47.4	49.4%
Telida	17.8	18.5%
Other US	5.9	6.2%
Vinasale	3.6	3.7%

Source: ADF&G Div. Of Subsistence, Household Surveys, 2002

Table 9-3. Demographic Characteristics of Nikolai Households, 2002

Sampled Households		27
Number of Households in the Community		32
Percentage of Households Sampled		84.4%
Household Size		
Mean		3.0
Minimum		1
Maximum		9
Sample Population		81
Estimated Community Population		96.0
Age		
Mean (years)		37.8
Minimum		3.5
Maximum		83.0
Median		39.1
Length of Residency ¹ - Household Heads		
Mean (years)		35.8
Minimum		1.0
Maximum		73.0
Length of Residency ¹ - Population		
Mean (years)		25.0
Minimum		1.0
Maximum		73.0
Sex		
Males	Number	60
	Percentage	63.0%
Females	Number	36
	Percentage	37.0%
Alaska Native		
Households (Either Head) ²	Number	32
	Percentage	100.0%
Estimated Population	Number	91
	Percentage	95.1%

SOURCE: ADF&G, Division of Subsistence, Household Survey, 2002.

¹ Length of residency in study community.

² A household was classified as "Alaska Native" if either or both of the household heads was Alaska Native.

Table 9-4. Population Profile, Nikolai, 2002.

AGE	MALE			FEMALE			TOTAL		
	NUMBER	PERCENT	CUM. PERCENT	NUMBER	PERCENT	CUM. PERCENT	NUMBER	PERCENT	CUM. PERCENT
0 - 4	1.2	2.0%	2.0%	1.2	3.3%	3.3%	2.4	2.5%	2.5%
5-9	2.4	3.9%	5.9%	0.0	0.0%	3.3%	2.4	2.5%	4.9%
10-14	7.1	11.8%	17.6%	7.1	20.0%	23.3%	14.2	14.8%	19.8%
15 - 19	2.4	3.9%	21.6%	3.6	10.0%	33.3%	5.9	6.2%	25.9%
20 - 24	4.7	7.8%	29.4%	0.0	0.0%	33.3%	4.7	4.9%	30.9%
25 - 29	2.4	3.9%	33.3%	0.0	0.0%	33.3%	2.4	2.5%	33.3%
30 - 34	3.6	5.9%	39.2%	3.6	10.0%	43.3%	7.1	7.4%	40.7%
35 - 39	5.9	9.8%	49.0%	2.4	6.7%	50.0%	8.3	8.6%	49.4%
40 - 44	5.9	9.8%	58.8%	2.4	6.7%	56.7%	8.3	8.6%	58.0%
45 - 49	4.7	7.8%	66.7%	4.7	13.3%	70.0%	9.5	9.9%	67.9%
50 - 54	3.6	5.9%	72.5%	2.4	6.7%	76.7%	5.9	6.2%	74.1%
55 - 59	1.2	2.0%	74.5%	3.6	10.0%	86.7%	4.7	4.9%	79.0%
60 - 64	4.7	7.8%	82.4%	1.2	3.3%	90.0%	5.9	6.2%	85.2%
65 - 69	2.4	3.9%	86.3%	2.4	6.7%	96.7%	4.7	4.9%	90.1%
70 - 74	1.2	2.0%	88.2%	1.2	3.3%	100.0%	2.4	2.5%	92.6%
75 - 79	1.2	2.0%	90.2%	0.0	0.0%	100.0%	1.2	1.2%	93.8%
80 - 84	1.2	2.0%	92.2%	0.0	0.0%	100.0%	1.2	1.2%	95.1%
Missing	4.7	7.8%	100.0%	0.0	0.0%	100.0%	4.7	7.8%	102.9%
TOTAL	60.4	63.0%		35.6	37.0%		96.0	100.00%	

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

of Nikolai residents was 37.8 years. In 1984 the average age was 27.2 years. In 1984 males outnumbered females and this imbalance has increased. In 2002 63 percent of the population was male and 37 female (Table 9-3), and there were no females living in the community between the ages of 20 and 29 (Table 9-4).

EMPLOYMENT CHARACTERISTICS AND MONETARY INCOME

In Nikolai 70 percent of all adults were employed during the study year, but only 25 percent were employed year-round. Employed adults worked an average of 6.4 months and held an average of 1.8 jobs (Table 9-5). Of those households interviewed for this project, 92.6 percent reported holding some form of employment in the study year. A majority of Nikolai residents were employed either by the City of Nikolai or Nikolai Tribal Council. In addition, 30 percent of Nikolai residents interviewed said they worked at fishing, hunting and trapping and 25 percent said they worked construction. In 2002 there were several construction projects in the community. The runway was being extended and a fuel tank farm was being rebuilt to accommodate larger deliveries of fuel on the new runway. A majority of the labor on both those projects was brought in from outside the community, but a few locals were also employed. Other forms of employment included transportation, communications and utilities (10 percent) and retail trade (2.5 percent) (Table 9-6).

Table 9-5 . Employment Characteristics of Nikolai, 2002.

All Adults		
	Number	67.6
	Mean Weeks Employed	19.4
Employed Adults		
	Number	47.4
	Percentage	70.2
	Mean per Household	1.5
	Jobs	
	Number	86.5
	Mean Jobs per Person	1.8
	Minimum	1.0
	Maximum	4.0
	Months Employed	
	Mean	6.4
	Minimum	1.0
	Maximum	12.0
	Percent Employed Year-Round	25.0
	Mean Weeks Employed	27.6
Households		
	Number	32.0
	Employed	
	Number	29.6
	Percentage	92.6
	Jobs per Employed Household	
	Mean Weeks Employed	2.9
	Minimum	1.0
	Maximum	7.0
	Employed Adults	
	Mean	1.6
	Minimum	1.0
	Maximum	5.0
	Mean Number of Weeks Worked	40.9

Source: ADF&G, Division of Subsistence, Household Surveys, 2002

Table 9-6. Employment by Industry, Nikolai 2002

	Jobs	Households	Individuals	Percent of Earned Income
Estimated Total Number	86.5	29.6	47.4	
Agriculture, Forestry, Fishing	2.7%	8.0%	5.0%	3.4%
Agriculture/Forestry	0.0%	0.0%	0.0%	0.0%
Agriculture	0.0%	0.0%	0.0%	0.0%
Forestry	0.0%	0.0%	0.0%	0.0%
Fishing, Hunting, Trapping	16.4%	48.0%	30.0%	3.4%
Hatchery/Enhancement	2.7%	8.0%	5.0%	2.0%
Commercial Fishing	0.0%	0.0%	0.0%	0.0%
Hunting/Trapping	13.7%	40.0%	25.0%	1.4%
Mining	0.0%	0.0%	0.0%	0.0%
Construction	13.7%	36.0%	25.0%	33.5%
Manufacturing	0.0%	0.0%	0.0%	0.0%
Cannery	0.0%	0.0%	0.0%	0.0%
Other Manufacturing	0.0%	0.0%	0.0%	0.0%
Logging/Timber	0.0%	0.0%	0.0%	0.0%
Transportation, Communications and Utilities	6.8%	16.0%	10.0%	3.7%
Trade	1.4%	4.0%	2.5%	1.6%
Wholesale	0.0%	0.0%	0.0%	0.0%
Retail	1.4%	4.0%	2.5%	1.6%
Finance, Insurance, and Real Estate	0.0%	0.0%	0.0%	0.0%
Services	0.0%	0.0%	0.0%	0.0%
Government	56.2%	84.0%	77.5%	54.6%
Federal	1.4%	4.0%	2.5%	1.9%
State	19.2%	48.0%	35.0%	14.8%
Local	35.6%	64.0%	55.0%	37.9%
Local Government	24.7%	48.0%	42.5%	25.2%
Local Education	11.0%	32.0%	20.0%	12.6%
Employer Unknown	5.5%	4.0%	5.0%	3.3%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

The average household income, derived from all sources was \$42,097, while the average earned household income was \$29,891 (Table 9-7). The average per capita income from all sources was \$14,032. Sources of earned income included government employment, followed consecutively by employment in construction, fishing, hunting and trapping, and retail trade (Table 9-7). Sources of unearned income, in order of importance, included the Permanent Fund Dividend (100 percent of households), Native Corporation Dividends (88.9 percent), energy assistance (29.6 percent), unemployment (25.9 percent), and social security (22.2 percent). Eleven percent of households reported receiving the longevity bonus, pensions and retirement, and adult public assistance.

Table 9-7. Community, Household, and Per Capita Incomes, All Sources and by Employer Types, Nikolai, 2002

INCOME SOURCE	COMMUNITY TOTAL	AVERAGE HOUSEHOLD	PER CAPITA
All Sources	\$1,347,091	\$42,097	\$14,032
Earned Income	\$956,504	\$29,891	\$9,964
Agriculture, Forestry, Fishing	\$32,474	\$1,015	\$338
Agriculture/Forestry	\$0	\$0	\$0
Agriculture	\$0	\$0	\$0
Forestry	\$0	\$0	\$0
Fishing, Hunting, Trapping	\$32,474	\$1,015	\$338
Hatchery/Enhancement	\$18,726	\$585	\$195
Commercial Fishing	\$0	\$0	\$0
Hunting/Trapping	\$13,748	\$430	\$143
Mining	\$0	\$0	\$0
Construction	\$320,152	\$10,005	\$3,335
Manufacturing	\$0	\$0	\$0
Cannery	\$0	\$0	\$0
Other Manufacturing	\$0	\$0	\$0
Logging/Timber	\$0	\$0	\$0
Transportation, Communications, and Utilities	\$35,240	\$1,101	\$367
Trade	\$15,407	\$481	\$160
Wholesale	\$0	\$0	\$0
Retail	\$15,407	\$481	\$160
Finance, Insurance, and Real Estate	\$0	\$0	\$0
Services	\$0	\$0	\$0
Government	\$521,824	\$16,307	\$5,436
Federal	\$17,749	\$555	\$185
State	\$141,867	\$4,433	\$1,478
Local	\$362,208	\$11,319	\$3,773
Local Government	\$241,351	\$7,542	\$2,514
Local Education	\$120,857	\$3,777	\$1,259
Unknown	\$31,407	\$981	\$327
Other Income	\$390,587	\$12,206	\$4,069

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

CHAPTER TEN NIKOLAI RESOURCE HARVEST AND USE PATTERNS

SPECIES USED AND SEASONAL ROUND

Table 10-1 describes the resource harvest and use characteristics of the community of Nikolai. During the study year Nikolai residents harvested an average of 11.5 different kinds of resources and used an average of 14.4 different kinds of resources. Some of the most widely used resources were moose (100 percent of households), salmon (88.9 percent), grouse (85.2 percent), geese (77.8 percent), and berries (66.7 percent) (Table 10-2).

Figure 10-1 depicts the seasonal round of resource harvest activities in Nikolai. June is called “Chinook Salmon Month,” or *Gasno’o’* in the Upper Kuskokwim language (Collins and Petruska n.d.:64). Chinook salmon arrive on the upper Kuskokwim in late June or early July and the Fourth of July weekend is considered a very important time to be at fish camp. Families, who can, stay at their camps for a month. Almost all Nikolai families go for some period of time, even if only for a few days. Because most locally available wage work occurs in the summer, it sometimes interferes with fish camp participation. Firefighting and construction are two major sources of cash income in the area and occur during the Chinook salmon run. Some, but not all, families with a seasonal wage earner will go to fish camp without that person. Those who are not able to fish, receive fish from others in Nikolai or other communities. Fish camp is a very important social time. As people travel to their fish camps, they frequently stop and visit at other fish camps along the way. People chat and share information about fishing, river conditions, brine recipes, and cutting techniques often while snacking on freshly dried fish. Several fish camps are large and can become communal as members of multiple families join each other at one camp (Williams et al. 2005:36).

July is “Dog Salmon Month” or *srughot’ayeno’o’* (ibid 63), however the harvest of chum or dog salmon has declined substantially since snow machines replaced dog teams for transportation in the 1960s. More people fish for coho salmon, which are known locally as “reds.” August is “Silver Salmon Month” (*nosdlagheno’o*) (ibid) and September is “Whitefish Month,” (*tiayano’o*), but people harvest whitefish almost year round.

At the end of the summer the emphasis shifts from fishing to picking berries and preparing for the fall moose hunt. October is called *Nichuneno’o* or “bull moose month.” Most Nikolai residents hunt in Game Management Unit 19D in a portion of

Table 10-1. Resource Harvest and Use Characteristics for the Community of Nikolai, 2002

Mean Number of Resources Used Per Household	14.4
Minimum	2
Maximum	24
95% Confidence Limit (+/-)	0.1
Median	15.0
Mean Number of Resources Attempted to Harvest Per Household	12.0
Minimum	0
Maximum	22
95% Confidence Limit (+/-)	0.1
Median	11.0
Mean Number of Resources Harvested Per Household	11.5
Minimum	0
Maximum	22
95% Confidence Limit (+/-)	0.1
Median	10.0
Mean Number of Resources Received Per Household	4.9
Minimum	0
Maximum	19
95% Confidence Limit (+/-)	0.2
Median	3.0
Mean Number of Resources Given Away Per Household	5.9
Minimum	0
Maximum	17
95% Confidence Limit (+/-)	0.1
Median	6.0
Mean Household Harvest, Pounds	1,210.6
Minimum	0.0
Maximum	3,356.6
Total Pounds Harvested	38,741
Community Per Capita Harvest, Pounds	403.5
Percent Using Any Resource	100.0
Percent Attempting To Harvest Any Resource	96.3
Percent Harvesting Any Resource	96.3
Percent Receiving Any Resource	88.9
Percent Giving Away Any Resource	85.2
Number of Households in Sample	27
Number of Resources Available	50

SOURCE: ADF&G Division of Subsistence, Household Survey, 2002

Figure 10 - I. Seasonal Round of Resource Harvesting Activities for Nikolai Residents, 2002.*

Resource Harvested		Months Harvested											
Upper Kuskokwim		June	July	August	September	October	November	December	January	February	March	April	May
English	Athabascan												
chinook salmon	gas		-XXXXXXXX										
chum salmon	nolaya, srughot'aye		-XXXXXXXXXXXXXXXXXXXX										
coho salmon	nosdlaghe				XXXXXXXXXXXXXXXXXXXX								
whitefish	sajila	X			XXXXXXXX								-XXXXXXXX
sheefish	zidlaghe	XXXXXX											
pike	ch'ighilduda				XXXXXXXXXX				XXXXXXXXXX				
grayling	ts'idatana	XX			XXXXXXXXXXXXXXXXXXXX								
black bear	shir	X			XXXXXXXXXX								
moose	dinceje	X			XXXXXXXXXX				XXXXXXXXXXXXXXXXXXXX				
caribou	midzish								XXXXXXXXXXXXXXXXXXXX				
beaver	tso'	X											
marten	suje								XXXXXXXXXXXXXXXXXXXX				
mink	tats'uts'a								XXXXXXXXXXXXXXXXXXXX				
otter	mizreya'								XXXXXXXXXXXXXXXXXXXX				
fox	k'altsa								XXXXXXXXXXXXXXXXXXXX				
lynx	gwchuh								XXXXXXXXXXXXXXXXXXXX				
wolf	tekone								XXXXXXXXXXXXXXXXXXXX				
muskrat	nito troda	X											
hare	gwh												
porcupine	nune	XXXXXXXXXXXXXXXXXXXX											
waterfowl													
grouse													
berries	jija'												
plants	dlot'												
firewood	du	XXXXXXXXXXXXXXXXXXXX											

XXX primay harvest periods
* adapted from Stokes 1985

that unit designated as the Upper Kuskokwim River Controlled Use Area. In 2002 the season was divided into two periods: August 20 through September 20 and December 1 through the 15. While most Nikolai residents hunt moose during these designated periods, moose are sought almost on a year-round basis (cf. Stokes 1985:76).

Nikolai residents once hunted Dall sheep extensively, especially in the fall and early winter, after snow had driven the animals off the steep mountains. But changes in resource use patterns along with restrictive state hunting regulations have resulted in a decline in sheep hunting among Nikolai residents (see below). Fall is also the time of year Nikolai people hunt grizzly bear, although no one reported a harvest in 2001-2002. Various species of non-salmon fish are also harvested during the fall, including whitefish, Northern pike (known as the “poor man’s lobster” by some Nikolai people), sheefish, and burbot. The harvest of fur bearing animals takes place throughout the winter months and November is called *Minich’i’unadla’e* or “trapping month” in the Upper Kuskokwim language. The state seasons for fox, lynx, mink, weasel, marten, river otter and wolverine in GMU 19 open November 1 and close either in February or March depending on the species. Black bears are intensively hunted in the winter, while they are in their dens, and in the spring and early summer after they have left their dens. Muskrat, beaver, and returning waterfowl are also hunted in the spring. May is known as egg month (*Ch’ighazrno’o*). Waterfowl are also taken in the fall. Other small game, such as porcupine, are taken opportunistically throughout the year and wood is gathered year round, but most intensively in the fall before freeze up and in the spring.

HARVEST QUANTITIES

Table 10-2, summarizing resource harvest and use is organized first by general category and then by specific species. In all instances domesticated animals and plants have been excluded. All resources have been recorded in pounds usable weight (see Appendix A for conversion factors). The ‘harvest category’ includes resources actually taken by a member of the surveyed household during the year covered in the survey. The ‘use’ category includes all resources taken and given away by a household, and resources acquired after a harvest, either as gifts, by trade, or through hunting partnerships. This includes meat given to hunting guides by their clients. The use category was not confined to resources for human consumption, but incorporated all non-commercial uses of resources including trap bait and dog food. Purchased seafood such as halibut, crab, and salmon were not recorded. Differences between harvest and use percentages reflect resources that have been shared and sharing between households, which resulted in a wider distribution of wild foods.

Table 10-2 . Estimated Harvest and Use of Fish, Nikolai, 2002.

Resource Name	Percentage of Households						Edible Pounds Harvested				Amount Harvested		95% Conf Limit (+/-)	
	Use	Att	Harv	Recv	Give		Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita	
All Resources	100.0	96.3	96.3	88.9	85.2		38,533	1,204.1	401.4	38,533 lbs	1,204.1	12.2%	11.7%	
Fish	92.6	88.9	88.9	59.3	70.4		13,865	433.3	144.4	13,865 lbs	433.3	21.7%	23.3%	
Salmon	88.9	70.4	70.4	51.9	55.6		11,035	344.9	115.0	1,124 ea.	35.1	22.7%	25.5%	
Chum Salmon	40.7	33.3	33.3	7.4	11.1		1,045	32.6	10.9	151 ea.	4.7	42.4%	43.1%	
Coho Salmon	44.4	29.6	29.6	14.8	18.5		1,177	36.8	12.3	222 ea.	6.9	34.5%	37.8%	
Chinook Salmon	81.5	59.3	59.3	48.1	48.1		8,814	275.4	91.8	751 ea.	23.5	27.8%	28.7%	
Sockeye Salmon	3.7	0.0	0.0	3.7	0.0		0	0.0	0.0	0 ea.	0.0	0.0%	0.0%	
Non-Salmon Fish	81.5	81.5	81.5	37.0	55.6		2,830	88.4	29.5	2,830 lbs	88.4	19.4%	21.0%	
Herring Roe	3.7	3.7	0.0	3.7	0.0		0	0.0	0.0	0 gal	0.0	0.0%	0.0%	
Herring Spawn on Kelp	3.7	3.7	0.0	3.7	0.0		0	0.0	0.0	0 gal	0.0	0.0%	0.0%	
Burbot	22.2	18.5	11.1	7.4	7.4		110	3.4	1.1	26 ea.	0.8	73.8%	76.6%	
Char	7.4	7.4	7.4	0.0	0.0		36	1.1	0.4	12 ea.	0.4	57.5%	60.9%	
Dolly Varden	7.4	7.4	7.4	0.0	0.0		36	1.1	0.4	12 ea.	0.4	57.5%	60.9%	
Grayling	51.9	44.4	40.7	22.2	18.5		286	8.9	3.0	286 ea.	8.9	44.4%	44.6%	
Pike	70.4	70.4	70.4	7.4	33.3		725	22.7	7.6	242 ea.	7.6	21.5%	24.2%	
Unkown Pike	70.4	70.4	70.4	7.4	33.3		725	22.7	7.6	242 ea.	7.6	21.5%	24.2%	
Sheefish	40.7	33.3	33.3	14.8	14.8		997	31.2	10.4	181 ea.	5.7	36.9%	36.3%	
Sucker	3.7	0.0	0.0	3.7	0.0		0	0.0	0.0	0 ea.	0.0	0.0%	0.0%	
Whitefish	55.6	48.1	48.1	14.8	29.6		676	21.1	7.0	386 ea.	12.1	29.2%	31.0%	
Unknown Whitefish	55.6	48.1	48.1	14.8	29.6		676	21.1	7.0	386 ea.	12.1	29.2%	31.0%	
Land Mammals	100.0	96.3	88.9	77.8	74.1		23,130	722.8	240.9	680 ea.	21.3	20.9%	10.9%	
Large Land Mammals	100.0	81.5	74.1	77.8	66.7		22,151	692.2	230.7	72 ea.	2.3	19.0%	10.7%	
Bison	3.7	0.0	0.0	3.7	0.0		0	0.0	0.0	0 ea.	0.0	0.0%	0.0%	
Black Bear	44.4	18.5	18.5	29.6	14.8		1,031	32.2	10.7	18 ea.	0.6	46.4%	48.2%	
Brown Bear	3.7	0.0	0.0	3.7	3.7		0	0.0	0.0	0 ea.	0.0	0.0%	0.0%	
Caribou	63.0	37.0	33.3	29.6	29.6		2,157	67.4	22.5	17 ea.	0.5	28.2%	26.3%	
Moose	100.0	81.5	74.1	70.4	59.3		18,963	592.6	197.5	38 ea.	1.2	13.2%	9.7%	
Dall Sheep	3.7	0.0	0.0	3.7	3.7		0	0.0	0.0	0 ea.	0.0	0.0%	0.0%	
Small Land Mammals	74.1	74.1	70.4	18.5	29.6		979	30.6	10.2	608 ea.	19.0	22.9%	25.2%	
Beaver	51.9	48.1	44.4	14.8	14.8		705	22.0	7.3	81 ea.	2.5	27.4%	30.7%	
Fox	18.5	18.5	18.5	0.0	0.0		0	0.0	0.0	13 ea.	0.4	41.6%	0.0%	
Red Fox	18.5	18.5	18.5	0.0	0.0		0	0.0	0.0	13 ea.	0.4	41.6%	0.0%	
Hare	14.8	14.8	11.1	0.0	0.0		24	0.7	0.2	12 ea.	0.4	45.6%	47.1%	
Snowshoe Hare	14.8	14.8	11.1	0.0	0.0		24	0.7	0.2	12 ea.	0.4	45.6%	47.1%	
Land Otter	3.7	3.7	3.7	0.0	0.0		0	0.0	0.0	1 ea.	0.0	81.3%	0.0%	
Lynx	33.3	25.9	25.9	7.4	3.7		0	0.0	0.0	20 ea.	0.6	35.2%	0.0%	
Martin	48.1	48.1	48.1	0.0	11.1		0	0.0	0.0	416 ea.	13.0	28.1%	0.0%	
Mink	7.4	7.4	7.4	0.0	0.0		1	0.0	0.0	4 ea.	0.1	59.6%	0.0%	
Muskrat	3.7	3.7	3.7	0.0	0.0		1	0.0	0.0	1 ea.	0.0	81.3%	0.0%	
Porcupine	37.0	37.0	37.0	11.1	7.4		247	7.7	2.6	31 ea.	1.0	24.5%	26.4%	
Squirrel	3.7	3.7	3.7	0.0	0.0		1	0.0	0.0	1 ea.	0.0	81.3%	83.0%	
Tree Squirrel	3.7	3.7	3.7	0.0	0.0		1	0.0	0.0	1 ea.	0.0	81.3%	83.0%	
Weasel	7.4	7.4	7.4	0.0	3.7		2	0.0	0.0	5 ea.	0.1	56.3%	60.3%	
Wolf	33.3	33.3	33.3	0.0	3.7		0	0.0	0.0	20 ea.	0.6	29.3%	0.0%	
Wolverine	11.1	11.1	11.1	0.0	3.7		0	0.0	0.0	4 ea.	0.1	45.1%	0.0%	
Birds and Eggs	92.6	88.9	85.2	51.9	59.3		968	30.3	10.1	808 ea.	25.3	16.1%	21.7%	
Migratory Birds	81.5	74.1	70.4	40.7	48.1		679	21.2	7.1	395 ea.	12.3	23.9%	25.9%	

Resource Name	Percentage of Households				Edible Pounds Harvested			Amount Harvested		95% Conf Limit (+/-)		
	Use	Att	Harv	Recv	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
Ducks	59.3	51.9	51.9	14.8	29.6	120	3.7	1.2	149 ea.	4.7	23.9%	24.2%
Bufflehead	11.1	11.1	11.1	0.0	7.4	4	0.1	0.0	9 ea.	0.3	50.3%	51.5%
Goldeneye	7.4	7.4	7.4	0.0	0.0	5	0.1	0.0	6 ea.	0.2	66.4%	67.6%
Unknown Goldeneye	7.4	7.4	7.4	0.0	0.0	5	0.1	0.0	6 ea.	0.2	66.4%	67.6%
Mallard	25.9	25.9	25.9	3.7	11.1	26	0.8	0.3	26 ea.	0.8	31.5%	29.9%
Northern Pintail	44.4	40.7	40.7	7.4	18.5	52	1.6	0.5	65 ea.	2.0	25.1%	26.2%
Northern Shoveler	11.1	11.1	11.1	3.7	7.4	9	0.3	0.1	8 ea.	0.3	51.8%	52.3%
Wigeon	18.5	18.5	18.5	0.0	18.5	22	0.7	0.2	32 ea.	1.0	41.1%	42.3%
American Wigeon	18.5	18.5	18.5	0.0	18.5	22	0.7	0.2	32 ea.	1.0	41.1%	42.3%
Unknown Ducks	7.4	3.7	3.7	3.7	3.7	2	0.1	0.0	2 ea.	0.1	81.3%	84.1%
Geese	77.8	70.4	66.7	33.3	44.4	512	16.0	5.3	241 ea.	7.5	25.7%	26.0%
Canada Geese	70.4	51.9	48.1	25.9	29.6	207	6.5	2.2	113 ea.	3.5	27.4%	28.9%
Lesser Canada Geese	22.2	22.2	18.5	3.7	11.1	41	1.3	0.4	34 ea.	1.1	52.0%	45.3%
Unknown Canada Geese	48.1	29.6	29.6	22.2	18.5	166	5.2	1.7	78 ea.	2.4	35.4%	37.7%
White-fronted Geese	55.6	51.9	44.4	22.2	33.3	284	8.9	3.0	119 ea.	3.7	27.8%	26.7%
Unknown Geese	3.7	3.7	3.7	0.0	3.7	21	0.7	0.2	9 ea.	0.3	81.3%	84.1%
Swan	3.7	3.7	3.7	0.0	3.7	27	0.8	0.3	2 ea.	0.1	81.3%	82.0%
Tundra Swan (whistling)	3.7	3.7	3.7	0.0	3.7	27	0.8	0.3	2 ea.	0.1	81.3%	82.0%
Crane	3.7	3.7	3.7	0.0	3.7	20	0.6	0.2	2 ea.	0.1	81.3%	84.1%
Sandhill Crane	3.7	3.7	3.7	0.0	3.7	20	0.6	0.2	2 ea.	0.1	81.3%	84.1%
Other Birds	85.2	77.8	74.1	33.3	40.7	290	9.0	3.0	414 ea.	12.9	14.9%	20.3%
Upland Game Birds	85.2	77.8	74.1	33.3	40.7	290	9.0	3.0	414 ea.	12.9	14.9%	20.3%
Grouse	85.2	77.8	74.1	33.3	40.7	254	7.9	2.6	363 ea.	11.3	15.3%	20.9%
Ptarmigan	11.1	11.1	11.1	0.0	7.4	36	1.1	0.4	51 ea.	1.6	46.4%	47.2%
Unknown Ptarmigan	11.1	11.1	11.1	0.0	7.4	36	1.1	0.4	51 ea.	1.6	46.4%	47.2%
Marine Invertebrates	3.7	3.7	3.7	0.0	0.0	2	0.1	0.0	1 gal	0.0	81.3%	84.1%
Clams	3.7	3.7	3.7	0.0	0.0	2	0.1	0.0	1 gal	0.0	81.3%	84.1%
Freshwater Clams	3.7	3.7	3.7	0.0	0.0	2	0.1	0.0	1 gal	0.0	81.3%	84.1%
Vegetation	81.5	74.1	70.4	44.4	44.4	568	17.7	5.9	568 lbs	17.7	22.8%	22.0%
Berries	66.7	51.9	51.9	29.6	33.3	511	16.0	5.3	128 gal	4.0	22.8%	21.8%
Plants/Greens/Mushrooms	14.8	14.8	7.4	3.7	7.4	57	1.8	0.6	14 gal	0.4	56.3%	56.7%
Wood	77.8	63.0	63.0	33.3	18.5	0	0.0	0.0	128 cor	4.0	15.4%	0.0%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002.

For the study year Nikolai's total community harvest of wild resources was 38,533 pounds usable weight with an average household harvest of 1,204.1 pounds, or 401.4 pounds per person (Table 10-2). By comparison, in 1984 the community harvested a total of 84,165 pounds with an average household harvest of 2,902.2 pounds (Scott et al. 2001). In 2002 Nikolai's total subsistence harvest was composed primarily of moose and Chinook salmon. Moose made up 49.2 percent of the total harvest and 81.9 percent of the land mammal harvest. The rest of the land mammal harvest was composed of caribou, black bear, and a variety of small land mammals (principally beaver and porcupine). Almost 80 percent of the fish harvest was composed of Chinook salmon, and 20 percent of non-salmon species. Coho and chum salmon each made up about 1 percent of the total salmon harvest but were less than one percent of the total fish harvest. Vegetation was less than one percent of the total harvest.

In terms of total pounds edible weight, the community harvested 23,130 pounds of land mammals 13,865 pounds of fish, 979 pounds of small land mammals, 968 pounds of birds and eggs, and 511 pounds of berries. Moose made up the largest component of the community's harvest as measured by edible weight (18,963 pounds). Households harvested an average of 592.6 pounds of moose, or 197.5 pounds per capita. Chinook salmon ranked second at 8,814 pounds, followed by caribou (3,698 pounds), coho salmon (1,177 pounds), chum salmon (1,045), and black bear (1,031 pounds). The community also harvested over 900 pounds of sheefish, over 700 pounds of northern pike, and beaver, and lesser amounts of Canada geese, grouse and porcupine (Table 10-2).

HARVEST AREAS

Moose, Caribou and Black Bear

Much of the land around Nikolai is state land, which means that the State of Alaska has jurisdiction over the management of fish and game. The nearest federal land is a tract managed by the Bureau of Land Management south of Nikolai on the Pitka and Windy forks of the Kuskokwim River, which is peripheral to the area used by Nikolai people. Denali National Park and Preserve is to the west of the community and too far for people for people to hunt and fish.

Historically Nikolai people hunted moose in a very large area that included most of the major tributaries of the upper Kuskokwim drainage (Figure 10-2 also cf. Stokes 1985). Stokes (1985: 90) reported that Nikolai hunters went up the Salmon River, the South Fork and Little Tonzona, the East Fork, and the Slow Fork, but that in 1984 they most utilized the North Fork of the Kuskokwim. Responses to questions on the household survey indicate that a majority of Nikolai residents hunt moose in Game

RESOURCE	GMU 19C		GMU 19 D		GMU 20C		Unkown GMU	
	#	%*	#	%	#	%	#	%
Black Bear	0.0	0.0%	4.7	14.8%	0.0	0.0%	0.0	0.0%
Caribou	3.6	11.1%	7.1	22.2%	0.0	0.0%	0.0	0.0%
Moose	1.2	3.7%	22.5	70.4%	0.0	0.0%	1.2	3.7%

*Percentage of Hunting Households

RESOURCE	GMU 19C		GMU 19 D		GMU 20C		Unkown GMU	
	#	%	#	%	#	%	#	%
Black Bear	0.0	0.0%	8.3	100.0%	0.0	0.0%	0.0	0.0%
Caribou	3.6	21.4%	13.0	78.6%	0.0	0.0%	0.0	0.0%
Moose	1.2	3.2%	35.6	96.8%	0.0	0.0%	0.0	0.0%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2002

Management Unit 19D (Table 10-3) and in fact, 96.8 percent of the estimated moose harvest for Nikolai occurred in Unit 19D and 70.4 percent of households that said they hunted moose in 19D. In addition, 100 percent of the black bear harvest took place in 19D and 78.6 percent of the caribou harvest. A few households (3.7 percent) reported harvesting moose in Unit 19C (Table 10-3, Table 10-4). According to ADF&G Division of Wildlife Conservation, in 2002 Nikolai residents harvested 26 moose from Unit 19D and one moose from Unit 19C. Mapped data collected from nine Nikolai households in 2002, as well as discussions with several more local residents, indicate that within Unit 19D the North Fork is the primary moose hunting area (Figure 10-2). Some Nikolai hunters travel over 200 miles up the North Fork to hunt moose. Traveling by boat is fairly easy with a 75-horse power engine and a 24-foot aluminum boat equipped with a windshield and comfortable chairs. One hunter said that he chose to hunt the North Fork because the South Fork is rocky and there are grizzly bears. He also believed there was more game on the North Fork, which is part of the Upper Kuskokwim Controlled Use Area and closed to the use of aircraft during the moose-hunting season.

Fish

Most Nikolai residents fish for Chinook salmon at family fish camps along the Salmon River, Pitka's Fork near Medfra, the North Fork, and Blackwater Creek (Figure 10-3). A few fish for Chinook salmon at the sites of former family fish camps on the Little Tonzona River. Chinook salmon are also found in the South Fork of the Kuskokwim River, but these fish are considered "poor" by the time they arrive. People harvest and eat them although one person said she only uses them for soup, jerky, and for their heads (Williams et al. 2005:36). Coho and chum salmon are harvested in the South Fork as well as the North Fork, and Middle Fork of the Kuskokwim River.

Division of Subsistence - Alaska Department of Fish and Game



Figure 10-2

Nikolai & Teldia Moose Hunting Area 1967-1983



Nikolai



Teldia



Nikolai & Teldia Moose Hunting Area 2002



Game Management Unit

Source: Household Interviews 2002-2003, Division of Subsistence, Alaska Department of Fish and Game, Technical Paper No. 296.

Note: As not all resident households were interviewed this is only a sample of harvest use areas.



Scale: 1:1,350,000

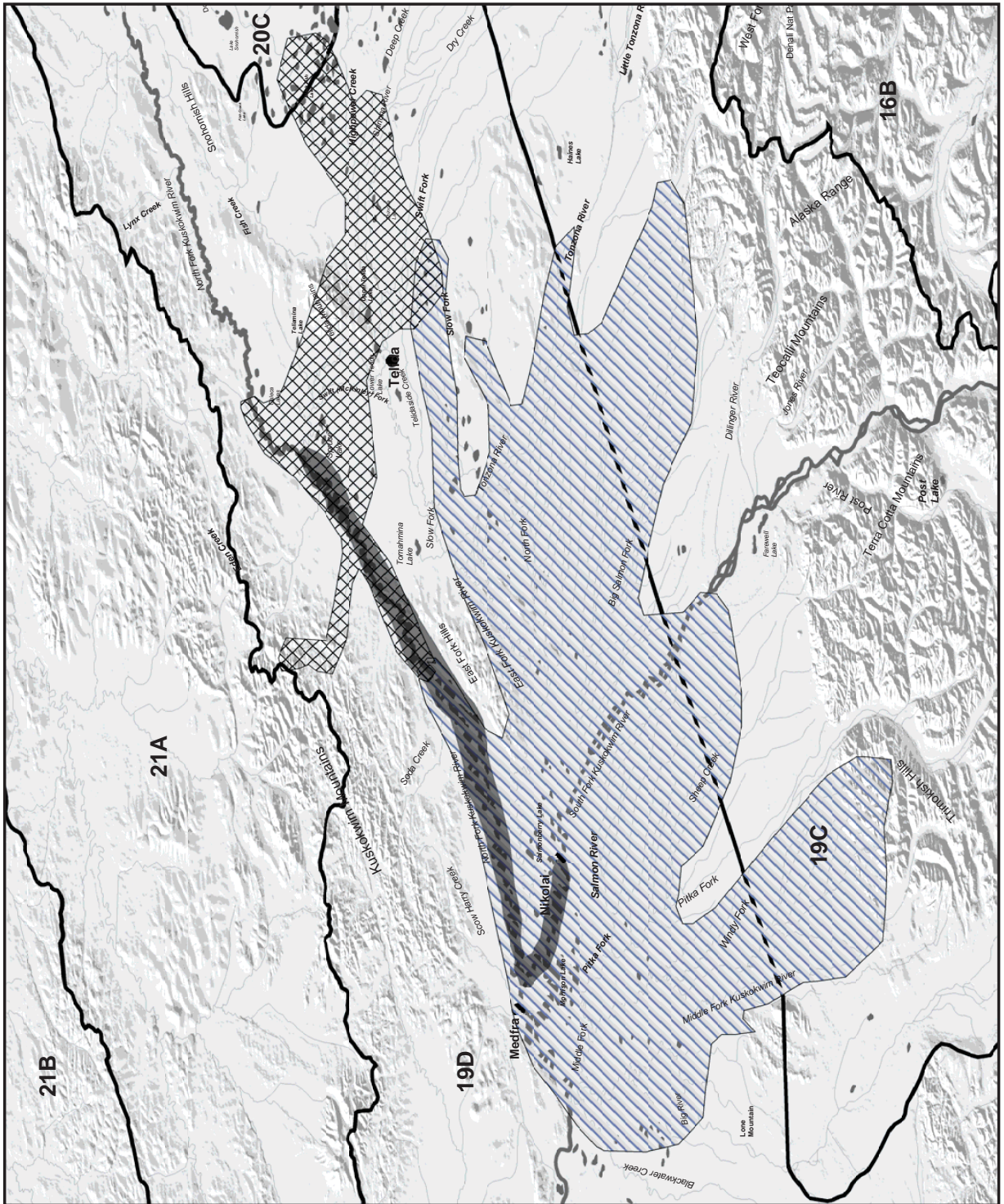
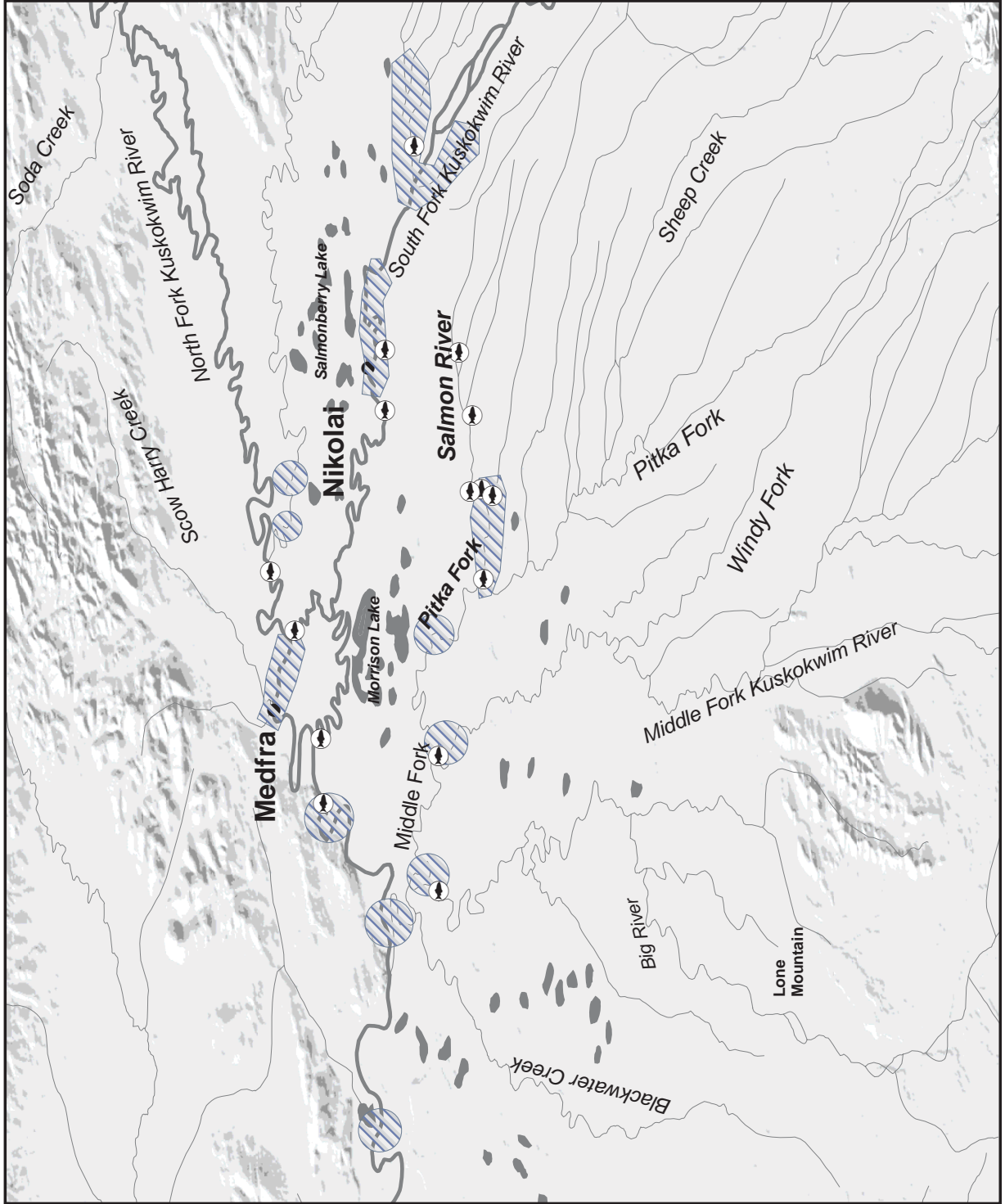




Figure 10-3

Nikolai Salmon Fishing Locations 2002
 Nikolai Salmon Fishing 1987-1984 (Stokes 1985)



Source: Household Interviews 2002-2003. Division of Subsistence, Alaska Department of Fish and Game. Technical Paper No. 296.
 Note: As not all resident households were interviewed this is only a sample of harvest use areas.



Scale: 1:600,000

Whitefish harvest locations are almost limitless in the areas surrounding Nikolai and Telida. They are the most plentiful genus of fish found north of the Alaska Range and inhabit almost every type of river and freshwater habitat in this part of interior Alaska (ADF&G 2004). Nikolai residents spoke of harvesting whitefish in numerous locations and almost year round. Sheefish exist in many of the tributaries of Kuskokwim, such as the McKinley Fork, Swift River, Tonzona, Blackwater, Salmon River, Big River and Highpower Creek near Telida. One resident indicated that some sheefish travel, “up to the mountains from there, McKinley Fork,” late in the fall to spawn. He also said that sheefish travel back downriver about the time of freezeup, and they were harvested then using traps or nets set underneath the ice (see Figure 10-4 for a sample of freshwater fish harvest use areas).

Nikolai residents harvest grayling almost year-round. In the spring, they are harvested at eddies along the South Fork using hand lines and set nets underneath the ice. Later in the spring, once the ice has dissipated, they are harvested using light rod and reel gear. In the summer, they are harvested in nets or with rod and reel gear. In the early winter, grayling are caught along with whitefish in nets under the ice, and historically, in traps set into creeks.

Pike are an important subsistence resource for Upper Kuskokwim communities. They are available throughout the year and are found in most rivers and many of the area lakes. One person told researchers pike were planted by a resident in Salmonberry Lake at Nikolai, and now residents are able to fish for pike, just a short walk away from their homes.

Dolly Varden used to be found in the South Fork of the Kuskokwim River, but according to some people they have disappeared. One person said they used to be at Little Tonzona and another said they spawn upriver from Nikolai where chinook, coho, and chum salmon spawn. An elder spoke of setting nets for burbot at the fork near Medfra. Lake trout are found in lakes near the Alaska Range and one man in his thirties said he sometimes eats them when he is hunting in the mountains. An elder mentioned trout near the head of Salmon River. Only a few people mentioned freshwater mussels. One person said she heard of other residents trying to transplant freshwater clams from Lost Jack Lake into Salmonberry Lake at Nikolai. She was not sure if their efforts were successful or not, but several types of fish have been successfully transplanted to this lake over the years (Williams et al. 2005:62-70).



Figure 10-4

- Nikolai Freshwater Fishing Location**
- blackfish
 - grayling
 - northern pike
 - sheefish
 - whitefish
 - multiple species



Source: Household Interviews 2002-2003. Division of Subsistence, Alaska Department of Fish and Game. Technical Paper No. 296.

Note: As not all resident households were interviewed this is only a sample of harvest use areas.



Scale: 1:1,350,000

LEVELS OF PARTICIPATION IN THE HARVEST AND USE OF WILD RESOURCES

Table 10-5 illustrates levels of participation in the harvest and processing of wild resources by residents of Nikolai. Just over 70 percent of Nikolai residents said they fished and almost 60 percent said they harvested game. Fifty percent said they gathered plants but only 34.3 percent hunted or trapped fur-bearing animals. The two most widely harvested categories of wild resources reported by households were

Table 10-5. Participation Harvest and Processing, Nikolai, 2002		
Total Number of People 96		
Game		
	Hunt Number	57
	Percentage	59.3
	Processing Number	62
	Percentage	64.3
Fish		
	Fish Number	68
	Percentage	70.8
	Processing Number	61
	Percentage	63.5
Furbearers		
	Hunt or Trap Number	33
	Percentage	34.3
	Process Number	34
	Percentage	35.4
Plants		
	Gather Number	48
	Percentage	50
	Process Number	46
	Percentage	47.9

Source: ADF&Game, Division of Subsistence, Household Surveys, 2002

Chinook salmon (59.3 percent of households) and moose (74.1 percent) (Table 10-2). Over seventy percent of households reported a harvest of small land mammals, mainly marten (48.1 per cent) and beaver (44.4 per cent). Eighty-five percent of households harvested birds (grouse 74.1 percent and Canada geese 48.1 percent), and 70.4 percent harvested some form of vegetation (mainly berries 51.9 percent). Just 3.7 percent of households said they harvested marine invertebrates (i.e. fresh water clams). The most widely used resource was moose (100 percent of households), followed by grouse (85.2 percent) and Chinook salmon (81.5 percent). Over 90 percent of households said they used birds and eggs, 81.5 per cent said they used plants and 74.1 percent small game. Success rates among Nikolai households were very high, reflecting the fact that Nikolai people are in general very skilled hunter, fishers, and gatherers. In every major resource category 90 to 100 percent of households successfully harvested a resource

(Table 10-2). For example, 100 percent of households who tried to harvest salmon were successful, 90 percent were successful in harvesting large game, 95 percent in harvesting birds and eggs, and 95 percent in harvesting some kind of vegetation.

SHARING AND RECEIVING WILD RESOURCES

Subsistence studies throughout Alaska commonly show household levels of resource use that exceed levels of harvest, indicating a pattern of sharing and distribution, and such is the case in Nikolai. There is considerable sharing of subsistence resources among Nikolai households (Tables 10-1 and 10-2). Of those households interviewed 88.9 percent reported they received a resource and 85.2 percent said they gave away one or more resources. Households gave away an average of 6 different kinds of resources and received an average of 3 resources. The most commonly distributed resources were fish (70.4 percent of households said they gave fish, particularly chinook salmon), and moose (59.3 percent). In addition households distributed birds and eggs (59.3 percent, particularly Canada geese), berries (33.3 percent), caribou (29.6 percent), and beaver (14.8 percent). Those resources most commonly received were moose (70.4 percent), fish (59.3 percent, again mostly chinook salmon), birds and eggs (51.9 percent) and berries (29.6 percent).

Moose meat is shared especially during the winter. During the fall hunt “everyone” hunts for their own moose and then they hunt either together or alone in the post-season, sharing the meat with the “entire village” if a moose is taken. One woman said that her husband “hunts to put meat in our freezer in season;” but when he hunts out of season – “it’s because the village *needs* it.” Considerable sharing also takes place during certain community events such as funerals, Forty-Day parties held after the funeral, and during Russian Christmas. Moose head soup is usually one of the principal foods shared on these occasions but people also share black bear, and homemade ice cream made from berries and fish whipped with fat.

Despite the evidence that community does share some people voiced the opinion that sharing has declined. One concern is that declines in animal populations, especially fish, could be attributed to the loss of traditional values of respect for animals and a discontinuation of sharing and working together. One woman said when they stopped using the fish wheel, they stopped sharing and that is when the fish slowed down (i.e. stopped coming). When people used gear, such as fish wheels and traps that enabled them to catch large amounts of fish everyone had to work together. Now they have to use rod and reel what was once a joint effort is now more of an individual effort.

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

Salmon

Three species of salmon are available on the upper Kuskokwim River: Chinook salmon (*gas* in the Upper Kuskokwim language); chum or dog salmon (*stughat'aya*), and coho or silver salmon (*nosdlaghe*) (Stokes 1985:207). In 2002, salmon made up 28.6 percent of the total harvest subsistence harvest compared to 48.1 percent in 1984 (Scott et al. 2001). Of the households interviewed 88.9 percent reported using salmon while 70.4 percent said they harvested salmon. In addition, 55.6 percent of households said they gave away salmon while almost 52 percent said they received salmon. The average household harvest of salmon was 344.9 pounds or 115 pounds per person. The average number of fish harvested by Nikolai households was 35.1 fish (Table 10-2). Chinook salmon was the most widely used and harvested salmon species. Over 81 percent of households reported using Chinook salmon and 59.3 percent reported harvesting them. The community harvested 8,814 pounds of king salmon, 1,177 pounds of coho salmon and 1,045 pounds of chum salmon.

Salmon harvest data from Stokes (1985), and the Alaska Subsistence Fisheries Database shows that Nikolai salmon harvests have declined substantially over the last 17 years, and especially since 1995 (Table 10-6, Figure 10-5). Note that the table is missing data from 1985 through 1988. In 2001-2002 the community caught a total of 1,124 salmon of all species. That amounts to 12 fish per person. In 2000 the community caught two salmon per person compared to 57 salmon per person in 1985 and 47 salmon per person in 1981. In contrast to the declining chum and coho harvests the chinook harvest has remained relatively stable.

Nikolai residents reported that they caught 751 Chinook salmon in 2002, which is above the 17 year average of 506 fish. But according to Nikolai elders whom Stokes (1985:228) interviewed in 1984, chinook harvests on the Salmon River up until the mid 1960s were in the range of 2,000 or more fish. Stokes (1985: 256) also reported that during the period 1981 through 1984 the average household harvest of Chinook salmon remained relatively flat at about 32 fish. However, the average household harvest of chums and coho declined even as the number of households fishing increased.

Since 1981 the chum harvest has declined considerably (from a high of 5,100 in 1984 to 151 fish in 2002) and residents reported less chum salmon than they consider normal during 2002, but there is a caveat to the reported chum harvest. In the 1960s most Nikolai households moved to Medfra to fish for salmon and be available for fire

Table 10-6. Nikolai Salmon Harvests, 1981-2002								
		Chinook Salmon		Chum Salmon		Coho Salmon		Total Salmon
Year	Permits Issued	Number Harvested		Number Harvested		Number Harvested		Number Harvested
1981		500		3,700		50		4,250
1982		778		4,360		978		6,116
1983		750		2,600		300		3,650
1984		795		5,100		200		6,095
1989	29	715		1,221		328		2,264
1990	30	559		882		72		1,513
1991	31	421		494		82		997
1992	30	604		818		173		1,595
1993	29	475		353		267		1,095
1994	28	449		293		119		861
1995	30	978		300		545		1,823
1996	25	304		248		64		616
1997	22	231		64		140		435
1998	28	330		519		113		962
1999	29	288		88		117		493
2000	29	155		60		31		246
2001	35	282		65		165		512
2002	36	(751)	507	(151)	171	(222)	105	(1,124) 783
Averages		507		1185		213		1,905

SOURCE: Caylor and Walker, 2003

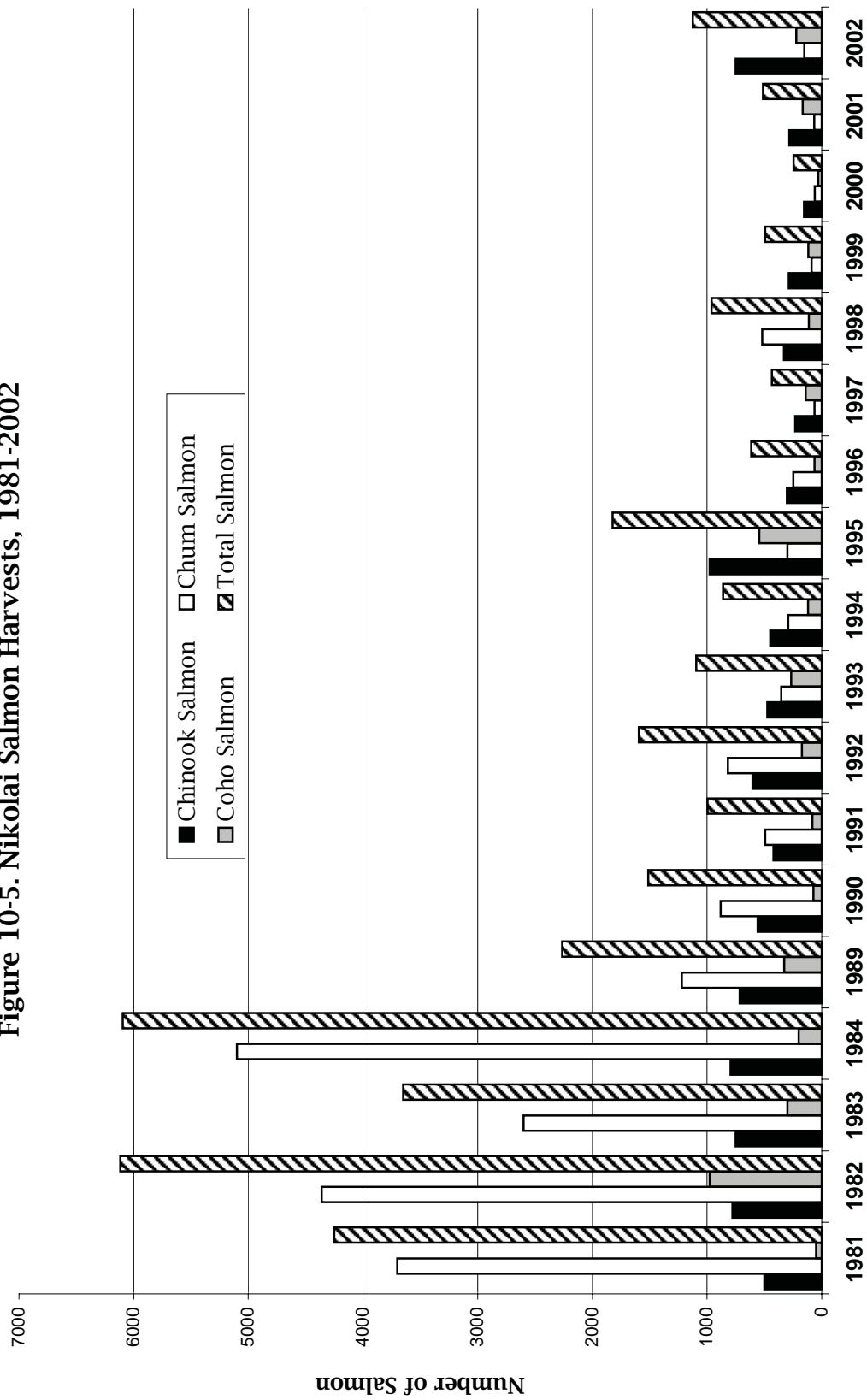
* Data from household survey in parenthesis.

fighting jobs. A large part of this harvest was chum salmon used primarily for dog food. With the introduction of the snow machine in the late 1960s the chum harvest declined and people stopped going to Medfra to fish. A few Nikolai residents, however, continued to maintain dog teams for recreational purposes into the 1990s and used chum salmon to feed their dogs (cf. Stickney 1981:10). Apparently these dog teams were eliminated when the stocks of chum salmon began to decline in the mid 1990s.

According to Stokes (1985:268) there was a resurgence of salmon harvests on the upper Kuskokwim drainage in the late 1970s despite the fact that residents were increasingly worried about the health of salmon stocks, “whose populations are at substantially lower levels in comparison to the mid-1960s.” In 2002 Nikolai people expressed similar concerns about the general decline of all three species of salmon. For example, many people thought there has been a general decline in Chinook salmon at Salmon River and throughout the region.¹ They gave several reasons for this. A common theme was over fishing by commercial harvesters from Bethel, south to the mouth of the Kuskokwim. One elder maintained that commercial fishing and high-seas

¹ Most of the text on pages 82-96 is from Williams et al. 2005.

Figure 10-5. Nikolai Salmon Harvests, 1981-2002



poachers were affecting fish populations, including Chinook salmon. He also stressed that increasing numbers of bears and wolves are consuming increasing amounts of salmon. A woman said the chinook salmon have never bounced back since a fire near the spawning area in the late 1970s. One man said that not only are there less chinook salmon, but those that do return are much smaller than in the past. People also said that coho salmon are getting harder to harvest because they do not seem to be there. One elder said in the past, at Nikolai, they used to see 100 chum and coho per day during the fall run. This year, he said his son had checked his net repeatedly and harvested only four coho:

I used to remember lots and lots of salmon at this time [October]...And now, there is hardly anything out there...Most he got was four...he took four out of there yesterday and this morning there was nothing again. That shows there's no salmon. We get 'em up here about this time, August, September and October, yeah.

Falling water levels and warmer water temperatures were two another reasons given for the decline in fish. One elder said the freshwater spawning areas of the Kuskokwim River drainage are drying up:

What I think what really happens down there, back there, is that there creeks got dried out, you know, no water comes out, and nothing. One time not too long ago, few years ago maybe - around the mouth of the Kuskokwim we used to get lots of freshwater spawning area, and that's going down, cause we got no water coming down. Yeah, that'll make it go down too because there are no salmon there too you know [fish populations will go down].

Another concern is how rod and reel fishing has influenced the nature of the salmon fishery. According to some Nikolai people the changes in the salmon harvest are connected, not only to actual decline in fish, but to the loss of traditional values both in terms of respect for animals and of sharing and working together. When fish wheels and fish traps were used, large amounts of fish were harvested and everyone had to work together. Rod and reel has changed a joint effort into more of an individual effort. One woman said when they stopped using the fish wheel, they stopped sharing and that is when the fish became less abundant.

In traditional Athabaskan culture wasting animals is tantamount to a sin. The general belief is that if a person wastes the resources given to them the fish or animal will be offended and not allow itself to be harvested. There is also the belief that animals or fish are offended if their remains are not treated with the proper respect after they are harvested. Nikolai people said that they took as much fish as they needed but the priority was not to waste fish. People said that whenever the trap or net was full,

they pulled the gear, processed the fish in that load and did not put the gear back into the water until that batch was processed. One elder said, "We did not waste fish, we kept what we wanted and we store it, that is the way." Another elder said his parents told him to watch and make sure fish do not die out, to keep a clean camp, and to not throw anything away. Part of having a clean camp included not walking on fish bones or blood and disposing of it properly. One elder said, "You can get as much as you want to use. If bones aren't burned, that is how it gets lonely, the birds or fish or whatever, getting caught less and less, everything." Another elder spoke of the events that followed the arrival of the first chinook salmon of the year and the loss of values regarding the proper care of food.

...people would cook it up and eat it together, all sharing, I saw one time sort of like an Eskimo dance when I was a kid. But they stopped that. But they used to get together quite a bit and they talked about how they lived long ago. How to take care of your food, don't throw anything away, don't waste... what they do in the wintertime, like Christmas, everybody cook and put lotta things together, then they get together and eat together. And what they do after that, them old people tell 'em stories about how they used to live long, long ago. You listen to them like you might be interested you know, there's lot of different stories from us older people. But nowadays, you know, it's all gone...Most of that was about how to take care of your food. Don't throw anything away that you wouldn't take care of, don't waste nothing, that's how it used to be... Here, I'm still that way, even today.

The Salmon River is probably the most important salmon fishing area for the majority of Nikolai residents. Stokes (1985: 256,226) reported that in 1984 a good portion of Nikolai's chinook harvest came from the Salmon River and that local concerns about the upriver salmon fishery were especially acute concerning the condition of the king salmon stocks, particularly in the Salmon River drainage. In 2002 Nikolai residents were still concerned about this fishery. They were worried about the increased boat traffic and that the Salmon River had become increasingly popular with sport fishers from McGrath (a concern expressed in 1984 as well). The increased boat traffic stirs up the water, which is usually very clear, so Nikolai people now have to fish around the boat traffic. One person said that instead of fishing all day, they got up early to fish before the boats stirred up the water and made it murky because the chinook do not bite in murky water. There are also rumors of someone building a sport-fishing lodge at Salmon River. Another concern relates to a new program that allows Alaska Native veterans from the Viet-Nam War era to apply for Native allotments. A case was cited of a non-local person expressing an interest in an allotment on the Salmon River.

Freshwater Fish

Fresh water fish made up 7.3 percent of the total Nikolai harvest in the study year. The total community harvest of non-salmon fish was 2,830 pounds or 88.4 pounds per household. This was a substantial increase over the 722 pounds harvested in 1984 (Scott et al. 2001). Over 81 percent of households reported using some species of non-salmon fish and the same percentage reported a harvest. At the same time 55.6 percent of households said they gave away freshwater fish and 37 percent said they received such fish. The harvest of non-salmon fish was composed primarily of sheefish (997 pounds), pike (725 pounds), whitefish (676 pounds), grayling (286 pounds) and burbot (110 pounds) (Table 10-2). These harvests are all higher than those reported in 1984: whitefish (500 pounds), pike (150 pounds), grayling (50 pounds) and sheefish (22 pounds) (Scott et al. 2001).

Many Nikolai residents complained of a recent scarcity of whitefish and they cited two suspected causes: increasing numbers of beavers and a decrease in the water table. Several people said the community does not trap beaver as much as they used to because of the decline in fur prices and the high cost of fuel. They added that many people still eat beaver but not as much as they did in the past. In the past hunters broke open beaver dams to allow the passage of whitefish and high water pushed fish over the dams during the spring, but now, according to one elder, beaver dams are obstructing the movement of whitefish and lower water has further inhibited their movement.

Whitefish we don't have anymore up here. Beaver mess it up. Like, here, where it's spawning area, it's messed up with beaver dam, never get out or something, or never come in or whatever, you know. High water will bring it in you know, but in the springtime, after the breakup. A lot of years we get they're the only one that will ...But nobody take care of it. They have to break the dam out and get it out.

Never have that trouble before. Lately it [beaver] started making dams in those places. I don't know what happened. They're just making dams and dams and there's water in there. Water can't go out, yeah. That lake used to be up there at Telida, they got lake up there... whitefish down there. They used to get lots of whitefish in the spring and in the fall. Now, beavers mess it up. Some don't know what to do with that, cause they don't hunt beavers. Yeah, long time ago, there was hunters you know? I guess but they just don't want to go anymore for skin. Been true that nobody use beaver like they use to. ...All dying out, and all the fish dying out...

Several people were planning to go out and remove certain beaver dams to free the whitefish. One woman in her fifties told of her father doing this when she was a child.

During a fall trip up the North Fork of the Kuskokwim River she and her husband showed researchers a place where a small lake outlet feeds into the main river. She said that in the spring whitefish went up the creek and were washed over a beaver dam by the spring flood. When the water receded the fish became trapped so in the fall her father breached the dam to let the whitefish out.

Other people said the water in the lakes is warmer and the lakes are drying up. Some of these changes are attributed to the 1964 earthquake. People said the lakes used to be deeper and there were no weeds. Some people said there were less fish because the water was warmer. They said land that was once hilly is now flat and the permafrost is melting. Dryness is affecting the berry patches, and there have not been berries in the past four or five years. One woman said her dad told her the area down by the river [in Nikolai] used to be swamp. She said it has changed; they used to pick salmon berries down there, and they grow where it is wet. Now they are not there. Other people see a decrease in muskrats as another symptom of widespread dryness. One woman said she thinks the reason the environment has changed is because no one has respect any more – respect for the land and the animals. She talked about old rules and beliefs that have disappeared – and she said that is what made the people Athabascan.

Harvest Methods

Nikolai residents currently harvest salmon using only two types of gear: set net and rod and reel. No one reported using a fish wheel or dip net in the 2002 study year (Table 10-7). Just over 40 percent of households reported using rod and reel to catch Chinook salmon while only 22.2 percent reported using a set net. By contrast 25.9 percent of households reported using set nets to catch coho salmon and only 7.4 percent said they used a rod and reel. No household harvested chum salmon with a rod and reel (Table 10-8). Most freshwater fish were caught using rod and reel, either fishing in the summer or by ice fishing in the winter (Table 10-9).

As we document, historically Chinook salmon were harvested with fish traps, fences, fish spears, and nets. Fish wheels were introduced around the turn of the century. When Alaska became a state in 1959 it became illegal to block up a stream and impede the movement of salmon. Under current state regulations it is not illegal to use a fish trap, but it is illegal to use a trap in conjunction with a fence or weir that impedes the movement of salmon upstream. However, the people in the Nikolai area continued to use weirs and fish traps until 1966, when the law was enforced and the use of the fish weir eliminated (Stokes 1982: 20). Since then Nikolai people have been using rod and reel to harvest subsistence Chinook salmon at Salmon River and elsewhere. According

Table 10-7. Estimated Salmon Harvest by Gear Type, Nikolai, 2002

Species	Harvest Unit	Set Net		Dip Net		Fishwheel		Subsistence Gear		Rod and Reel		Any Method	
		Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean
Salmon	ea.	782	24.4	1	0.0	0	0.0	783	24.5	340	10.6	1,124	35.1
	lbs.	7,205	225.1	8	0.3	0	0.0	7,213	225.4	3,823	119.5	11,035	344.9
Chum Salmon	ea.	149	4.7	1	0.0	0	0.0	151	4.7	0	0.0	151	4.7
	lbs.	1,036	32.4	8	0.3	0	0.0	1,045	32.6	0	0.0	1,045	32.6
Coho Salmon	ea.	196	6.1	0	0.0	0	0.0	196	6.1	26	0.8	222	6.9
	lbs.	1,038	32.5	0	0.0	0	0.0	1,038	32.5	138	4.3	1,177	36.8
Chinook Salmon	ea.	437	13.7	0	0.0	0	0.0	437	13.7	314	9.8	751	23.5
	lbs.	5,130	160.3	0	0.0	0	0.0	5,130	160.3	3,684	115.1	8,814	275.4
Sockeye Salmon	ea.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	lbs.	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2003

Table 10-8. Estimated Percentages of Salmon Harvest by Gear Type, Resource, and Total Salmon Harvest, Nikolai, 2002

Resource	Percent Base	Subsistence Methods											
		Removed from Commercial Catch		Set Net		Dipnet		Fish Wheel		Other		Subsistence Gear	
		No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.	No.	Lbs.
Salmon	geartype resource total	0.00%	0.00%	100.00%	100.00%	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
	geartype resource total	0.00%	0.00%	69.62%	65.29%	0.11%	0.07%	0.00%	0.00%	0.00%	0.00%	69.73%	65.36%
Chum Salmon	geartype resource total	0.00%	0.00%	19.09%	14.38%	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%	19.21%	14.48%
	geartype resource total	0.00%	0.00%	99.21%	99.21%	0.79%	0.79%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%
Coho Salmon	geartype resource total	0.00%	0.00%	13.29%	9.39%	0.11%	0.07%	0.00%	0.00%	0.00%	0.00%	13.40%	9.47%
	geartype resource total	0.00%	0.00%	25.00%	14.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	24.96%	14.40%
Chinook Salmon	geartype resource total	0.00%	0.00%	88.24%	88.24%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	88.24%	88.24%
	geartype resource total	0.00%	0.00%	17.41%	9.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	17.41%	9.41%
Pink Salmon	geartype resource total	0.00%	0.00%	58.20%	58.20%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	58.20%	58.20%
	geartype resource total	0.00%	0.00%	38.92%	46.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	38.92%	46.49%
Sockeye Salmon	geartype resource total	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
	geartype resource total	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 2003

to Stokes (1985:230-231) the Chinook rod and reel fishery at Salmon River has been refined over the years and is now considered by Nikolai people to be a customary and traditional use. Rod and reel is the most effective method for harvesting Chinook salmon in the Salmon River because it is a clear water stream and the fish can see the nets, making them ineffective. Fishers at Little Tonzona also use a rod and reel to catch Chinook salmon. In occluded waters such as the South Fork or the North Fork of the Kuskokwim Nikolai people use gill nets set in eddies to catch salmon. Currently no one in Nikolai uses a fish wheel. In the past they were used for all species including Chinook salmon but primarily for chum or dog salmon that were harvested for dog food. Today, many people in Nikolai who are in their early fifties and older recall using the fish fence and fish trap. They expressed sadness that they are no longer able to fish in a traditional manner, because blocking a salmon stream is illegal.

Table 10-9. Estimated Harvest of Fish Other Than Salmon by Gear Type, Nikolai, 2002

Species	Harvest Unit	Unspecified Gear		Subsistence Gear*		Rod and Reel		Ice Fishing		Any Method	
		Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean	Total	HH Mean
Non-Salmon Fish	Lbs	0	0.0	1,141	35.6	1,187	37.1	502	15.7	2,830	88.4
Herring Spawn on Kelp	Lbs	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Burbot	Lbs	0	0.0	5	0.2	100	3.1	5	0.2	110	3.4
Dolly Varden	Lbs	0	0.0	0	0.0	36	1.1	0	0.0	36	1.1
Grayling	Lbs	0	0.0	19	0.6	94	2.9	173	5.4	286	8.9
Pike	Lbs	0	0.0	206	6.4	224	7.0	295	9.2	725	22.7
Sheefish	Lbs	0	0.0	274	8.6	724	22.6	0	0.0	997	31.2
Sucker	Lbs	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Whitefish	Lbs	0	0.0	637	19.9	10	0.3	29	0.9	676	21.1

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 2002

* Subsistence gear is a gill net

Though many people fish with rod and reel, one woman said she refuses to use a rod and reel because, in her view, it is not traditional; “it is not the Athabascan way to catch fish.” She is incredulous that fish weirs and traps were outlawed because they were considered “too efficient”. She and others described how “escapements” were part of traditional fishing practices. They said it was not possible for fences/traps to be left in the water for an entire run. The traps had to be taken from the water frequently for repair and to clean the fence. This family and several others talked about keeping their traps out of the water until that “trap full” was processed. People removed their gear from the water and stopped fishing when they had enough to process.

That fish trap doesn't hold very much. It wasn't a huge thing, you know? It's only about that long and so wide. When it gets full you have to take it out. So there's a fish path. I think people know how to take care of what they live on, you know?

According to another family, people have to use rod and reel at Salmon River because the water is clear and the fish swim right past the nets - this family does not like to use a rod and reel either. They said using a rod and reel isn't a good technique for

catching fish as the salmon are so far into their spawning cycle that they will not bite the bait since they have stopped eating. As they only fish a few days a year, usually with relatives, they will fish with nets because they feel that “the fish net is the Native way.” For them, using nets is similar to using fish traps. They also related that once their net is full, they pull it out of the water and process all the fish in it before putting it back in the water.

Elders and many middle-aged people shared memories of the past when fish fences and fish traps were used at Tonzona River, Salmon River, and Blackwater Creek. They talked about the abundant harvests of Chinook salmon that provided the mainstay of their diets. Some people said they were raised on fish; there were no moose when they were children. One person said all her family ate were fish and oats. The Chinook salmon harvest was and still is a major effort for Nikolai residents. Many families worked together and people recalled the endless work of cutting fish. Several people described an assembly line type process in which everyone did a particular job. Today, Nikolai residents say harvests are smaller because of the requirement to use rod and reel at Salmon River and because there are reportedly less fish and smaller fish.

In the view of some residents, not only has the rod and reel requirement led to a lower harvest, it has led to a different “view” of fishing. In the past fishing was a communal effort, in which the entire community had to work together to prepare the weir and trap and then process the catch. One elder recalled harvesting quantities of salmon using a fish weir and trap in the Tonzona and Salmon rivers. The whole group worked together, cutting up to 100 fish a day, and then sharing the catch. Fishing was equated with life because people fished for their food and it was the only work they had to do. Now people fish with rod and reel. This elder also believes there are less fish now than in the past.

No, I don't know... far's I know - getting less fish all the time...Caught almost same, but very few big salmon they get up here Tonzona. Not too many. ...They put fence across Salmon River or Tonzona up here. They get lots, lots in those days, because they had a fence all the way across - and trap, they spear it. The only way get ready for fish is they go up there before fish get in... and they prepare their fish rack and everything like that. There was a time they use fish trap, but ...They share the fish. Not probably just one family. The whole group had to get together and fish.

Well this is the time they fence across creek...fish the whole group - they can share it. It's lot of work - all we did those times - when I grew up and lived at Big River - we had to put fish away for our own use and we had to do that from the morning till all day we had cut maybe hundred fish in one day and that's all we do - there was no other work anyway. We used to get enough fish, but now days, it's maybe less fish now, and I don't think there's hardly any big, lots of fish long time ago came out...The kids don't now days, they don't know how to

fish. When I grow up my parents gave me their own fish net. And, that's their life. Now days, kids using fishing reel and that's the only way they fish right now.

Another elder who did not want to be taped shared her memories of Salmon River. Her memories highlight the abundance of fish during a particularly good year and the shock of being told to use a hook instead of the fence and trap. She said when she and her husband arrived at Salmon River, they took green spruce and cut them into thin strips and made a fish trap that was almost as long and as big as her current house. She said the trap had to be made so that Chinooks could not turn in the trap and break it. They would build a big fence across the river to make the fish trap. When the fish came, they would constantly have to reinforce the fence to keep it from breaking. Early in the season, they would get a few Chinook salmon per day. When the run began in earnest, she said there would be a lot of noise. The river would get high and everything would rise, red, and the whole fish trap would fill with about one hundred Chinook salmon. She would hang fish all day and all night. Then she said they had to stop because they were no longer allowed to put a fence in the river (Salmon River). She said "they" told them they had to use a hook but they did not know how.

Another elder also recalled the large fish traps that had to be built so that fish, particularly Chinook salmon were not able to turn around and break the traps. He said the Upper Kuskokwim word for this trap literally means something along the lines of "they can't turn and break it"...

...it's narrow fish trap, it just go in there and get stuck you know, don't back out you know, that's what is meant by that... that way it won't break up the thing.

When asked how people decided when to stop fishing the common answer was "when we have enough." One of these families said they only keep one third of their female chinook salmon because they want them to lay their eggs but they also like to harvest eggs for their consumption. Two families said they released females when possible. Another family said they did not do this as it was "a white man's rule."

One person described a method of assessing water levels for the season. He said that when the first chinook salmon of the year is caught, it should be boiled and the boiled water indicates river water levels for the season: if the boiled water is cloudy, the river water will be high that year; if the boiled water is clear, the river water will be low that year.

Most people said they harvest coho salmon with gill nets and rod and reel. People said that at night, when the water is low, they catch silver salmon with a net set close to the Nikolai boat launch. People also harvest silvers at the "second sand bar," a popular

fishing spot a few bends down the Southfork from Nikolai. It did not appear that people went to fish camp to harvest coho during our visits since they were available close to the village. Chum salmon are harvested with gill nets set in eddies in the South Fork near the second sand bar from Nikolai. One resident said he wanted to use a dip net to harvest chums at the second sand bar but the water was too high.

Whitefish are harvested using gill nets, dip nets and rod and reel. People also use gill nets and hand lines to ice fish for whitefish in winter. When dog teams were still used, people also used fish wheels for whitefish harvests. In the past whitefish were taken in fish traps when the fish moved to and from rivers to lakes. One elder said the same fish traps were used for whitefish and salmon. He said he used to make a fish trap with a smaller mesh than that of his brothers. He would set his trap behind his brothers' trap because they like big whitefish and he liked the small ones.

Sheefish continue to be harvested using gill nets set underneath the ice, as depicted by Stokes (1985:288). They are also caught incidentally and intentionally with gill nets at fish camps throughout the summer during salmon fishing and with rod and reel. Depending upon the season, grayling are caught using hand lines for ice fishing, gill nets, and rod and reel. At one time, traps and weirs were used to harvest grayling, often in conjunction with whitefish. One resident spoke of the fishing techniques he had learned from his father, including how to make fish traps:

I learned a lots from dad too, you know, I grew up with my dad. ... like, the fishing, you know, under the ice, you know, out on some of those creeks...fish trap You know what that is? Square, like this, but it fits right against the cylinder here. Fish goes down here and gets stuck in there, there's no way out. Only through hole in there. But it's small, wood just like this huh? With, all kinds of funnel like. And the only way out is the middle of this, like, and that, that's how we used to make fish trap. Little smaller creek too you know, used to put fence across there and put a fish trap.

Q: Was that around Vinasale?

Yeah.

Q: What kind of fish would you get in those traps?

Oh, grayling. Yeah, mostly, you know. Go, go up in those creeks summertime, come back in fall, after freezeup, I think. Summer too we used to get lots, and lots on the river, like whitefish. Those are really good, big ones, yeah, fat you know. They used to trap them under the ice on the river, yeah, and lush. Big, those are big around Vinasale. I don't know what happened to it, but never showed up here. And down around Stony, around Vinasale, it's only maybe, like this.

Fishing gear used for pike depends upon the season, and is similar to gear used for other freshwater varieties of fish: gill nets for use in both summer and winter fishing (underneath the ice), hand lines, rod and reel. Historically, traps and nets were used,

My parents yeah - way down there -they used a net early. Down at that big lake that I was showing you on that (indicates map) - There used to be pike in there in the summertime, there's lots of 'em out there— we used to catch lots— what they have in those big tub, we'd carry two of those tub, and we carry them full you know— me and my brother, but we just paddle, three or four miles to that fish.

Preservation and Storage of Fish

Respondents stressed the importance of preparing the fish camp long before the fish arrive. The fish rack (the rack fish are dried on), also called the “fish camp,” must be repaired and made ready after winter, and the spruce sticks used to hang fish need to be collected and sharpened at both ends. Most fish camps have a roof and open sides with horizontal poles across the top and open shelves on one side. The base of the shelves is chicken wire. Once fish are dried they are placed on the shelves as a new fish are hung from the poles. Fish eggs are also placed on the chicken wire to cure. Fish heads are hung from the top poles to dry. (Stokes 1985 includes detailed descriptions and photos that are still relevant.) Specific types of wood are gathered for drying and smoking fish. Some people use cottonwood. Others said alder is the best because it seals in the moisture of the fish while the fish are drying. Because of time constraints, some people do not dry their fish at fish camp and instead take them back to the village to dry. Others prefer to dry their fish at the fish camp because dry fish are lighter to transport and because if they try to dry fish in the village they get sandy and gritty because of four-wheeler traffic.

Many households have a fish table overlooking the river at their fish camp. People related that Chinook salmon should always be processed on a fresh layer of spruce bark or a gunnysack. The rough surface of spruce bark is used as a slip-free cutting board for slippery fish. More than one household said that after chinook salmon are harvested they should be left to soak in the river overnight prior to cutting. Two households said the reason for this is to allow the fish to soften for easier cutting the next day. Another household said this is to allow the spirits of the fish back into the river.

When asked if there was a “Nikolai” method to cutting fish, several women responded “no.” They said each person has their own method and skill levels vary according to amount of experience. Each person/family cuts their fish a little differently due to personal preferences for a variety of preservation methods. For example, some people separate the belly meat from the upper part of the fillet because the belly

flesh contains more oil and has a slower drying rate than the upper, drier meat. Some people leave the backbone in; others cut it out. Some people cut their fish in half for “strips.” Others cut their fish along the belly only to make “flat fish.” In this process, the fish are heavily scored horizontally and vertically. Some people sling their fish directly over a horizontal fish rack pole. Others use sharpened spruce sticks to hold fish open and hang the sticks from the horizontal poles of the fish rack. Both of these processes are described in detail in Stokes (1985: 237). Retention of oil and optimal drying to prevent spoilage is the desired outcome of both processes. Some people turn their fish over as it dries so the oil does not drip on the ground but re-coats the drying fish.

Prior to the first visit to Nikolai, an elderly woman had recently passed away. While out picking berries, several women brought dried Chinook salmon as a snack. The conversation turned to fish cutting. They said not only did they miss the deceased woman but lamented they would never have fish like that again in their lives. They described her as an expert who created some of the best tasting fish available due to her skill at cutting.

Not only is fish “meat” smoked and dried but also fish heads and fish eggs are preserved in the fish camp. People eat both and also use them as trap bait. One person said fish heads make excellent trap bait because they are hard and greasy which makes it difficult for creatures such as mice to steal the bait before the intended prey finds it. One elder said they saved everything. He said that fish eggs dry fast and keep well and his family used them for dogs and people. Fish heads spoil easily, and are very attractive to bugs, much more so than eggs. Also yellow jackets have increased lately and a lot of smoke is required to keep bugs off fish. A few people said they were afraid to eat fermented foods after they heard stories of botulism in other areas of the state. Many related they like the eggs fermented. People also mentioned fermented Chinook salmon:

We used to, over Salmon River, we run out of room in fish camp, no place to put ‘em. So, towards ‘bout August - dig a big hole and start throwing them down there. When you get back there, the snow will be melted off on top. Frosted on the trees too right there, a lot of heat.

This family said that as children, they did not particularly like the fermented fish but anything different was a welcome change.

One elder recalled his parents salting fish:

My time, we used to salt them. My parents used to use a keg, wooden keg. It was good. I’d do it here too, but not anymore. I can’t get any fish.

All parts of the Chinook salmon and most other fish species are eaten by many

households. A semi-diagrammatic drawing (Appendix B) of an adult female salmon was used to record the Upper Kuskokwim words for the internal parts of salmon. The bilingual teacher at the school provided terms she knew and that she had obtained through research with elders. There are innumerable methods of preparation and consumption of Chinook salmon. One elder said he loves fish livers, Chinook salmon livers...any livers. Chinook salmon fish heads are a delicacy. Many people told researchers they save their best foods for Russian Christmas; Chinook salmon fish heads are often saved for this celebration. The heads are dried at fish camp, later frozen and then served boiled. Another family described a meal of Chinook salmon eggs and hearts sautéed together in Crisco as a favorite meal. A young mother said her families' favorite foods are fish egg soup, salt salmon, pickled and fried salmon, and crackled salmon skins. She peels the skin, salts it and puts it in a pan over a fire until it is crunchy. She dries all her fish at fish camp and makes half dried salmon cut in segments, partially smoked, then freezes it and pulls it out and either boils it or puts it in the oven. Many people talked about traveling with dried fish now and in the past. They said it is very important to have when hunting and traveling because it is light and when people eat it, they do not get hungry.

The use of coho salmon is similar to Chinook salmon. Some people dried theirs, others froze theirs and some families half dry theirs and freeze them for use in winter. In October, the family that harvested a large amount of chum salmon had them stacked in their yard for later use. They use some as dog food and some for themselves. They like to serve it baked and they also use it to make *agutak*, Eskimo ice cream. This family, like a few others in Nikolai, has origins in Crooked Creek, a Yup'ik community downriver.

People in Nikolai described putting up whitefish in the same ways as salmon: scoring for drying and half or completely dried. Half dried fish is frozen in a freezer for later use. Some people freeze their fish whole. Almost every part of the whitefish is consumed: the meat, livers, stomachs, and eggs, and some "little bag with a rock in it".

There's little bag in there, about in the middle of throat. It's got rock in it, and whatever, whatever it eats, it grinds up in there, yeah, and it's got rocks in there. Clean that out, and I like, I like those, you know...

One family related of a recent treat when they caught two whitefish. They like the stomachs boiled and fried. They said they were very careful about cleaning them first and that they knew of a woman who died from eating improperly cleaned whitefish. Another person also recalled whitefish stomachs. He said after they were cooked they tasted like clams. His wife said there used to be a belief that they should not be eaten. She said she thought the older people used to say this because they wanted them all

for themselves. Several people said they loved whitefish eggs and cranberries smashed together. Whitefish are also used for *nemaje*, Indian ice-cream (Collins and Petruska n.d.:50). Most people emphasized it was not the same as Yup'ik *agutak*. They said *nemaje* has much more fish, is much more pulpy, has less sugar and is mixed with a stick, not a mixer. Some people said only men could make it. A very popular way to prepare whitefish is to smash whitefish eggs with cranberries. One woman said that they needed that fat, there was no sugar. Regarding the introduction of sugar, she added that until recent times, she had never seen overweight people.

Many people still receive whitefish from nearby communities. A former teacher in Nikolai and Minchumina used to fly his plane from Minchumina to Nikolai with a planeload of whitefish for the elders. He knew they loved it and that the village was in short supply. The last time he did this was about 1997 - he and his family have since left the community. Other Nikolai residents also said they receive whitefish from Lake Minchumina residents.

People use sheefish in the some of the same ways they use whitefish as described above; for *nemaje* and the eggs are smashed with berries. We heard several times that grayling are often prepared or preserved just like whitefish. Grayling are reported to be "very fat" in the winter. Some people enjoy cutting them up fresh and frying them. Many of the same methods described for preparing other freshwater fish, were described in reference to pike. People freeze it and later boil or fry it. Pike is also used for *nemaje*.

Large Land Mammals

Large land mammals provided 57.4 percent of the total subsistence harvest of Nikolai residents in 2002. No one reported harvests of Dall sheep, bison, or brown bear. In 1984 large land mammals comprised 43.2 percent of the total harvest (Scott et al. 2001). According to Stokes and Andrews (1982:14) moose are a more important source of food than all other species of large game, as well as salmon. Caribou are not widely available and salmon... "cannot substitute for moose as a food resource." While salmon provides seasonal protein "dried salmon is often considered a between-meal food or side food, and seldom serves as the center of a meal." Moose is important and people expend considerable energy in harvesting moose.

Harvest Amounts: Moose and Caribou

As measured in pounds edible weight, moose made the largest contribution to the Nikolai community's wild resources harvest in 2002. The total community harvest of moose was 38 animals or 18,963 usable pounds, which amounts to 592.6 pounds per household. Moose represented 49 percent of the total harvest and 85 percent

of all large land mammal harvests. Overall, 100 percent of households used moose meat and 74.1 percent reported they harvested moose (Table 10-2). In 1984 moose represented 38.6 percent of the total harvest and Nikolai residents reported harvesting 50 moose for a total of 32,500 pounds or 1,120 pounds per household (Scott et al. 2001). Andersen (1995) reported a harvest of 21 moose for Nikolai and Telida for the 1994 season.

In 2002 caribou were 5.6 percent the total harvest. The total community harvest of caribou was 17 animals for a total of 2,157 pounds. The average household harvest was 67.4 pounds. Of the sampled households, 63 percent said they used caribou and 33.3 percent reported a harvest (Table 10-2). In 1984 caribou was less than 1 percent of the total harvest (Scott et al. 2001). According to Stokes (1985:132) Nikolai hunters focused almost all their effort on hunting the Big River/Blackwater herd of caribou. In 1984 this herd had declined from historic levels because of shifts in range, predation and aerial hunting prior to the implementation of same-day-airborne regulations in the 1970s. Because of their continued scarcity, caribou, in 2002, are still not a primary resource of food for Nikolai residents.

Nikolai Moose Harvests over Time

As discussed earlier, 96.8 percent of Nikolai moose harvests in the 2002 study year occurred in Unit 19D along the North Fork of the Kuskokwim River. The lower portion of the North Fork is within the Upper Kuskokwim Controlled Use Area. During regulatory year 2001 (July 2001-June 2002) hunters were required to obtain a registration permit, bag limits were set at one bull moose and two hunting periods were allowed: August 20 through September 20 and December 1 through the 15 (the December season was closed by emergency order). The area was open to all Alaska residents but closed to non-residents.

Table 10-10 provides information on Nikolai moose harvests over a 36-year period, from 1977 to 2003. Note that data are missing for 1980. The information is derived from harvest tickets (designated as GM000), and registration permits (RM 655 for GMU 19C, RM650 for GMU 19D). Figure 10-6 shows the same information in the form of a graph. A registration hunt was established by the Board of Game for a portion of Unit 19D for the fall 2001 season in order to obtain better data on the harvest (ADF&G Division of Wildlife Conservation n.d.:295). Permits could be obtained in Nikolai. Based on reports of successful hunts the community averaged 11.2 moose a regulatory year over the 33-year period.

Since the early 1970s residents of upper Kuskokwim communities have been concerned about the effect of predators on local moose populations. Prior to

Table 10-10. Nikolai Moose Harvests 1977-2003*

Year	Hunt	Did not report	Unsuccessful	Successful	Total No. Hunters
1977	GM000	24	2	6	32
1978	GM000	23	9	17	49
1979	GM000	33	3	12	48
1981a	GM000	14	12	24	50
1982b	GM000	23	8	8	39
1983c	GM000	20	7	19	46
1984	GM000	17	2	29	48
1985	GM000	29	2	13	44
1986	GM000	33	1	7	41
1987	GM000	34	n/a	11	45
1988	GM000	33	1	9	43
1989	GM000	17	7	20	44
1990d	GM000	5	n/a	4	9
1991	GM000	27	8	11	46
1992	GM000	24	14	7	45
1993	GM000	22	6	9	37
1994	GM000	4	2	5	11
1995	GM000	13	14	14	41
1996	GM000	20	14	15	49
1997	GM000	25	8	8	41
1998	GM000	21	10	13	44
1998	RM655	n/a	1	1	2
1999	GM000	23	10	14	47
1999	RM655	1	1	n/a	2
2000	GM000	29	9	9	47
2000	RM655	n/a	1	4	5
2001	RM650	16	26	18	60
2001	RM655	3	1	5	9
2002	GM000	n/a	1	n/a	1
2002	RM650	6	27	26	59
2002	RM655	5	6	6	17
2003	RM650	12	26	19	57
2003	RM655	10	5	9	24

Source: ADF&G Division of Wildlife Conservation database

*These numbers do not include hunters who bought a license but did not pick up any moose paperwork (either a general season harvest ticket or a permit).

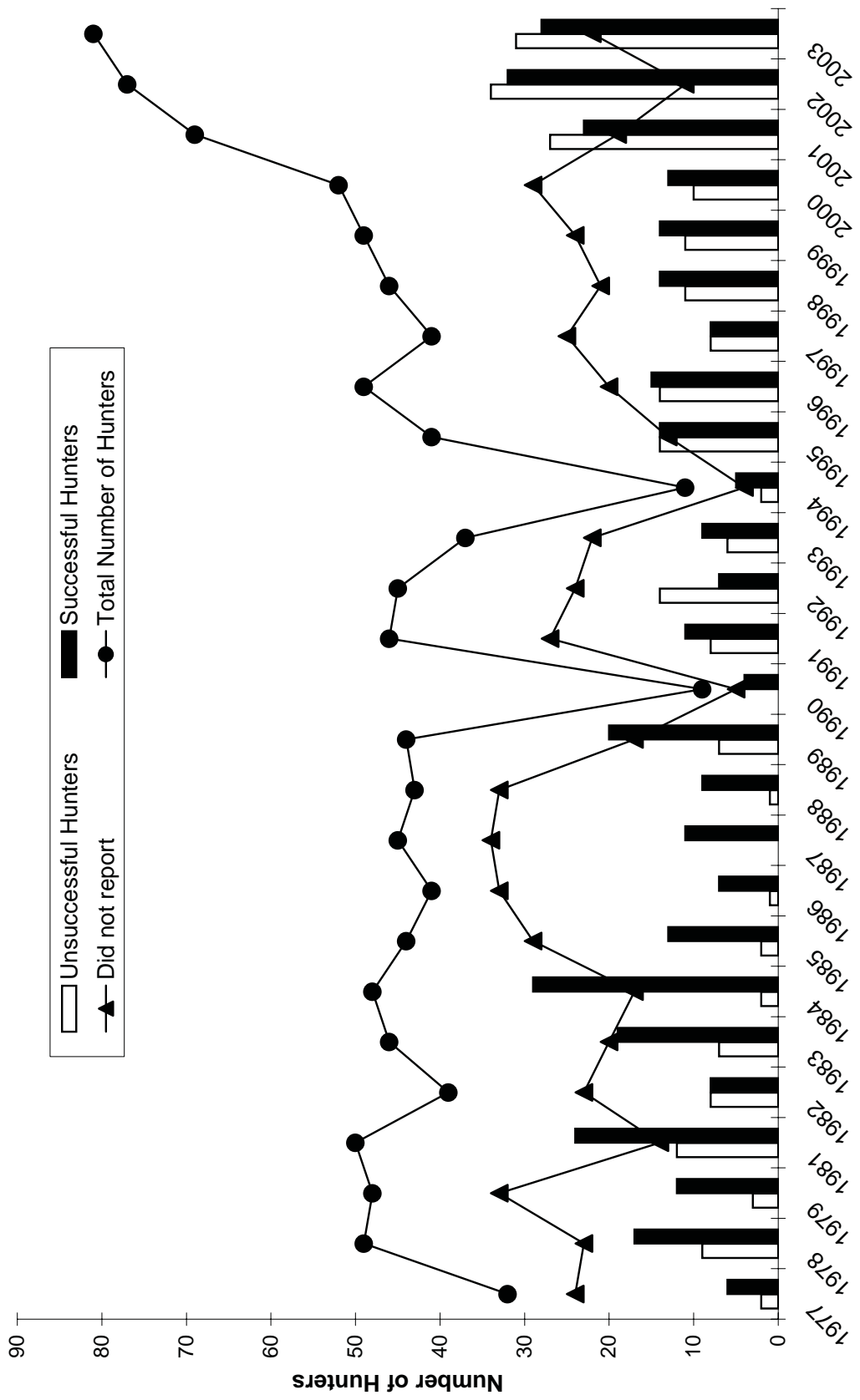
a. 1981-82 season, a reported 56 moose taken by Nikolai and Telida Households, (52 +/-10 taken during the fall, and 4 reported taken in winter)(Andrews and Stokes 1984:1). Because of cool weather bull moose had moved out of the foot hills of the Alaska Range and were available along the river (Stokes and Andrews 1982:11). Few moose were taken during the winter hunt but "many households" harvested a second antlerless moose in the spring (ibid 12).

b.1982-83 season, 52 moose reported harvested, most taken in the winter because of poor conditions in the fall (37 moose taken in the fall hunt and 15 in the winter)(Andrews and Stokes 1984:4).

c. 1983-84 season 40 to 50 moose taken by households in both communities. Because of warm weather bull moose remained in the foothills of the Alaska Range - but the winter hunt was more successful (20 to 25 moose taken in each season)(Andrews and Stokes 1984:4).

d. The effects of previously harsh winters took a toll on the moose population and early freezeup inhibited boat travel (personal communication to Simeone from Jack Whitman).

Figure 10-6. Nikolai Moose Hunts, 1977-2003



statehood the federal government put a bounty on wolves and allowed aerial hunting and the poisoning of wolves. Following statehood the state suspended the bounty and prohibited poisoning. Between 1967 and 1972 the state did allow aerial wolf hunting by the public, but stopped issuing those permits in 1972 (Regelin 2002). In the late 1960s and early 1970s moose populations on the upper Kuskokwim were high and Nikolai residents could harvest two moose of either sex any time between mid-August and mid-March. However, severe winters in 1971 and 1972, along with predation, combined to reduce moose populations. So beginning in 1974-75, the Department tightened bag limits and hunting time, and attempted some predator control (Stokes 1985 109-113; Regelin 2002).

Persistent concerns about moose populations, as well as increased fly-in hunting activities prompted the Alaska Board of Game, in 1981, to establish the Upper Kuskokwim Controlled Use Area (Stokes 1985:111). According to Stokes establishment of the Controlled Use Area may have brought about a slight increase in moose populations, but in 1984 Nikolai hunters continued to express concern that severe winters and predation were still having an effect on the moose populations, especially on the North Fork of the Kuskokwim (Stokes 1985:307).

During the summer of 1995 the Department conducted an opinion survey among upper Kuskokwim residents on the issue of predator control (Andersen 1995). A majority of respondents thought predators had an influence on moose populations and favored wolf control either through aerial hunting or trapping. But several Nikolai residents also pointed out that there is pressure from an increasing number of hunters from “down river” (from McGrath and Bethel) as well as the increasing number of sport hunters in the Alaska Range. In addition, over 70 percent of Nikolai residents said that bears were a problem and several suggested that the state change regulations regarding the hunting of grizzly bears (ibid: 17).

Nikolai residents thought local people should benefit from a predator control program and that the state should set a bounty on wolves of between \$200 and \$250. There was also a suggestion that the state help local trappers by flying them far out into the bush. Another suggestion was to have a “barren-cow” season to reduce the hunting pressure on bulls. Andersen reports that according to one Nikolai resident moose were fairly plentiful and holding steady in 1980s but that in the 1990s moose declined with the bad winters so that now he sees mostly cow moose. This person also pointed out that while most local hunters got their moose in 1994 they had to hunt longer and go farther and spent more money on gas.

Nikolai residents echoed similar sentiments in 2002. Predation from both wolves and

bears was still a problem, as was increasing competition from sports hunters in the foothills of the Alaska Range. Shooting wolves from an airplane was considered the only effective means of control because wolves are smart and it is difficult to hunt them from a snow machine in thick brush. It is also very expensive since gasoline costs 5 dollars a gallon.

Processing Moose and Caribou Meat

On the harvest survey residents were asked how they processed the caribou and moose they had harvested and what parts of the animal they used. The responses to these questions are listed in Tables 10-11 and 10-12. Not surprisingly the majority of households in Nikolai freeze their caribou meat (59.3 percent) and moose meat (88.9 percent). However, over 60 percent of households said they dry moose meat. Almost half of the households surveyed said they made hamburger with their moose meat. Over 80 percent of households said they used the heart, liver, stomach, bone, fat and head of the moose and about 40 percent said they used the heart, liver, kidney, bone, fat, and head of caribou.

According to one resident the lower legs, neck and scraps are made into hamburger. One method for preparing hamburgers is to roll the ground meat out and use a cookie cutter to make the patties and gravy. They will then freeze the meat and gravy together. Meat from the back of the animal is made into steaks while the upper legs (i.e. the back legs) and upper arms (i.e. forelegs) are cut into stew meat and steaks. The shoulder blades are used for stew meat, the nose is boiled, cooled and the hair pulled off before eating. All the meat is removed from the head and made into moose head soup or sometimes into headcheese. The hooves are boiled then cooled and eaten or canned. All of the moose is used when they are not in rut. The intestines are cleaned, stuffed with fat, boiled, and then frozen or they can be dried. This is food eaten when on the trail in wintertime. The heart is made into soup or fried. The tongue is boiled or sometimes chopped up and boiled. The liver is fried with bacon, and residents say it should not be overcooked! On occasion people will make hotdogs, liverwurst, pepperoni, and breakfast sausage out of moose meat.

Dall Sheep

No household reported a harvest of Dall sheep in 2002. Stokes (1985:157) noted that sheep meat was highly prized by Nikolai residents but that changes in the seasonal round had resulted in the decrease of sheep hunting among Nikolai residents. State hunting regulations for Dall sheep have also inhibited traditional sheep hunting practices. In the 1960s, for example, Nikolai residents took dog teams up the Little Tonzona River to hunt sheep and moose in the Alaska Range. They went in November

Table 10-11. Estimated Number and Percentage of Households Using Various Preservation Methods for Large Land Mammals

Preservation Method		Caribou	Moose
Freeze	Number	19.0	28.4
	Percent	59.3%	88.9%
Dry	Number	7.1	20.1
	Percent	22.2%	63.0%
Sausage	Number	0.0	2.4
	Percent	0.0%	7.4%
Hamburger	Number	5.9	15.4
	Percent	18.5%	48.1%
Salt	Number	0.0	0.0
	Percent	0.0%	0.0%
Smoke	Number	0.0	1.2
	Percent	0.0%	3.7%
Can	Number	0.0	0.0
	Percent	0.0%	0.0%
Corn	Number	0.0	0.0
	Percent	0.0%	0.0%

Source: Alaska Dept. of Fish and Game, Div. Of Subsistence, Household Surveys, 2002

Table 10-12 . Estimated Number and Percentage of Households Using Various Parts of Large Land Mammals, Nikolai, 2002

Parts Used		Caribou	Moose
Heart	Number	13.0	26.1
	Percent	40.7%	81.5%
Liver	Number	11.9	24.9
	Percent	37.0%	77.8%
Kidney	Number	13.0	26.1
	Percent	40.7%	81.5%
Stomach	Number	10.7	26.1
	Percent	33.3%	81.5%
Hide	Number	5.9	4.7
	Percent	18.5%	14.8%
Antler	Number	4.7	15.4
	Percent	14.8%	48.1%
Bone	Number	14.2	27.3
	Percent	44.4%	85.2%
Sinew	Number	8.3	14.2
	Percent	25.9%	44.4%
Hoof	Number	0.0	5.9
	Percent	0.0%	18.5%
Fat	Number	11.9	27.3
	Percent	37.0%	85.2%
Head	Number	11.9	27.3
	Percent	37.0%	85.2%

Source: ADF&G, Division of Subsistence, Household Surveys, 2002

when there was enough snow for the sleds but not too much that they would have to break trail and it took about three days to get into the mountains, to a place called Dry Creek that is east of the Dillinger River. The hunters went into the canyons to get sheep as the snowfall accumulated and pushed them off the high mountains. They hunted both ewes and rams. Currently in GMUs 19 and 20 sheep can only be hunted from August 10 to September 20 and only mature rams with a full curl horn can be harvested.

Other Large Land Mammals

No Nikolai household reported a harvest of brown bear, or bison. Regulations pertaining to grizzly bear in Unit 19D are one bear every regulatory year and the season is from September 1 to May 31. Bison in Unit 19 can be taken once every five years and the hunt is determined through a drawing. Residents reported a harvest of 18 black bears. Under state regulation there is no closed season for black bear in GMU 19 and the limit is three animals.

Stokes (1985:150) wrote that Nikolai residents attach great supernatural significance to black and grizzly bears. Bears are believed to be more intelligent than other animals. According to one Nikolai hunter interviewed for this project, bears are considered tricky and have to be watched. If a bear becomes wounded they will run away from you, then double back and attack you from the side. Whereas other animals run in a straight line, bears run in a zig-zag pattern, so that it is difficult to shoot them.

Nuisance bears in or near settlements or fish camps are often killed to minimize potential confrontations. When berry picking or wood cutting, individuals usually carry a gun for defense. The remains of processed fish are often hauled away from fish camps and dumped on sandbars to keep the bears out of camp (cf. Stokes 1985:154). Bears also compete with humans by preying on moose.

In 1995 Andersen (1995:34) recorded the comments of Nikolai hunters regarding bears. According to one person the regulations on grizzly bears are too strict. Another said the state should eliminate the fees and tags required to hunt grizzly bears, but another cautioned that the state should be careful when liberalizing bear regulations “because they breed so slowly” and “they don’t bounce back like wolves.” Another said that there were more bears than ever and that pressure from sport hunters in the Alaska Range had pushed grizzly bears down into the flats. The grizzly bear population in Unit 19C “skyrocketed” according to another hunter and they prey on moose that move out of Unit 19D and into 19C during the fall. Brown bears have also pushed the black bears out of Unit 19C and into unit 19D, which is a moose

calving area (black bears take mostly moose calves according to another hunter). Grizzly bears are also moving into 19D and preying on both moose calves and adult moose.

Furbearing Animals

In 2002, 74.1 percent of Nikolai households reported using furbearing animals and 70.4 percent reported harvesting them. Nikolai residents reported a harvest of every species of small land mammal listed in Table 10-2. Stokes (1985:185) said that Nikolai trappers sought marten more than other fur bearing species and this was the case in 2002 (Nikolai trappers took 416 marten). Stokes also mentioned that wolves were rarely taken, but in 2002 Nikolai hunters reported taking 20 wolves.

In terms of edible pounds Nikolai residents harvested 705 pounds of beaver, 247 pounds of porcupine, and 24 pounds of snowshoe hare. Beaver meat is much esteemed by Nikolai people and is often served at potlatches and memorial dinners. Beaver are usually hunted in the spring when, according to one hunter, they take only large male lake beavers, which is one way to insure there will always be beaver. Only the males are away from the beaver house in the spring. This hunter also said that one method for taking beaver is to grab them by the cheeks and pull them from the beaver house through a hole made by the hunter. This person also observed that river beaver are disappearing because the river goes up and down and when the river retreats the beavers get stranded and are separated from their food caches. He thought that lake beaver were doing better but no one traps them so they are eating themselves out of house and home. He also said that ermine and mink have disappeared.

Historically spring muskrat trapping was an important way to earn cash. However, according to one resident, after the 1964 earthquake the habitat changed as the land dropped and became wetter causing a decline in the muskrat population. This happened mainly downriver and to the south of the village near Salmon River. Later forest fires burned out several trap lines. The fire also warmed the soil and this coupled with the loss of ground cover caused the permafrost to melt creating even wetter conditions, which creates a poor environment for fur bearing animals. The older generation has stopped trapping and many younger people are discouraged by low fur prices and the high price of gasoline. For these reasons most Nikolai people no longer see trapping as a major source of income and the young people, while they know how to trap, do not see it as a way to make a living. Several men do trap during the winter to make extra income. One said that he took the year off from trapping to let his trap line recover. He didn't think marten populations were depressed but he just wanted to give the animals a break. He usually gets between 30 and 60 marten

a year and a half dozen wolves. Another said he traps during the winter and works construction in the summer, a common yearly work pattern seen among Nikolai residents.

Birds

Almost 93 percent of Nikolai households reported using birds and eggs during 2001-2002 and over 85 percent reported a harvest. The total community harvest was 968 pounds or 25.3 pounds per household (Table 10-2). Nikolai residents harvested more migratory species than upland birds. Various species of geese were the most frequently harvested migratory birds and grouse the most frequently harvested upland bird. The total community harvest of migratory birds was 679 pounds and for upland birds it was 290 pounds. The 2002 harvest of birds was less than half of that reported in 1984 (ADF&G CPDB).

Edible Plants And Wood

The reported harvest of berries in 2002 was well below that of 1984. One reason for the decline in the berry harvest is because conditions are now much drier. Nikolai residents reported harvesting only 511 pounds of berries, which is slightly over 5 pounds per person (Table 10-2). In 1984 the community reported a harvest of almost 25 pounds per person. Almost 67 percent of households reported using berries and almost 52 percent reported a harvest. Stokes (1985:295-297) provides a list of berries harvested by Nikolai people. These include blueberries, salmonberries, lowbush cranberries, blackberries, highbush cranberries and raspberries. The community reported harvesting 128 cords of wood, which is 4 cords per household. Much of this wood was used to heat steam baths. There is a large communal steam, which is used by both men and women almost every day of the week. People harvest mostly white spruce but also paper birch and cottonwood.



CHAPTER ELEVEN
SUMMARY AND CONCLUSION



LAKE MINCHUMINA

Lake Minchumina residents harvested a total of 7,906 pounds of wild resources or 296 pounds per capita. Over half of the harvest (57.7 percent) was composed of non-salmon fish species, mainly northern pike and whitefish. Just over 33 percent of the harvest was made up of large land mammals. The estimated community harvest was five moose and three black bears, with no harvest of caribou, grizzly bear or Dall sheep. Small land mammals, birds and eggs and vegetation each made up less than one percent of the total harvest (see Figure 4-1). A majority of species in the small land mammal category was harvested for their fur. For example, the estimated community harvest was 327 marten, 23 lynx, and seven wolves. Most of the birds harvested were grouse (57 birds) and the community reported a harvest of 50 gallons of berries.

Following is a summary of comments made by residents about the abundance of moose and fish in the vicinity of Lake Minchumina. According to residents interviewed for this project moose are plentiful in the area surrounding Lake Minchumina. Many commented that they do not need to go outside the established regulatory season to hunt moose and more than one resident commented that they can hunt near their house and do not need to go far to find moose. Caribou used to be plentiful in the area 30 years ago but are rarely seen today. Now only a few scattered caribou will make their way up to the lake, the herd having joined the Mulchatna herd to the west. The major predators are bears. Wolf numbers have started to decline, and according to one resident, the wolves are more desperate now and can be seen near homes and will even come into their yard to scavenge for food. Brown bears are increasing at the same time as wolf numbers decline. This can be measured by numerous tracks observed on the trails and damage done to trapping cabins.

According to most residents the ability of Lake Minchumina to support the local population with freshwater fish has diminished over the past 20 years and climatic and local ecosystem change will be the determining factors regarding freshwater fish abundance in the future. The effect of non-local users is at present minimal due to low numbers of non-local people reaching the lake.

The environment around Lake Minchumina is undergoing a transition similar to other areas of interior Alaska. These changes are having an effect on subsistence resources. Winters in the Minchumina Basin have become milder over the past 30 years, following

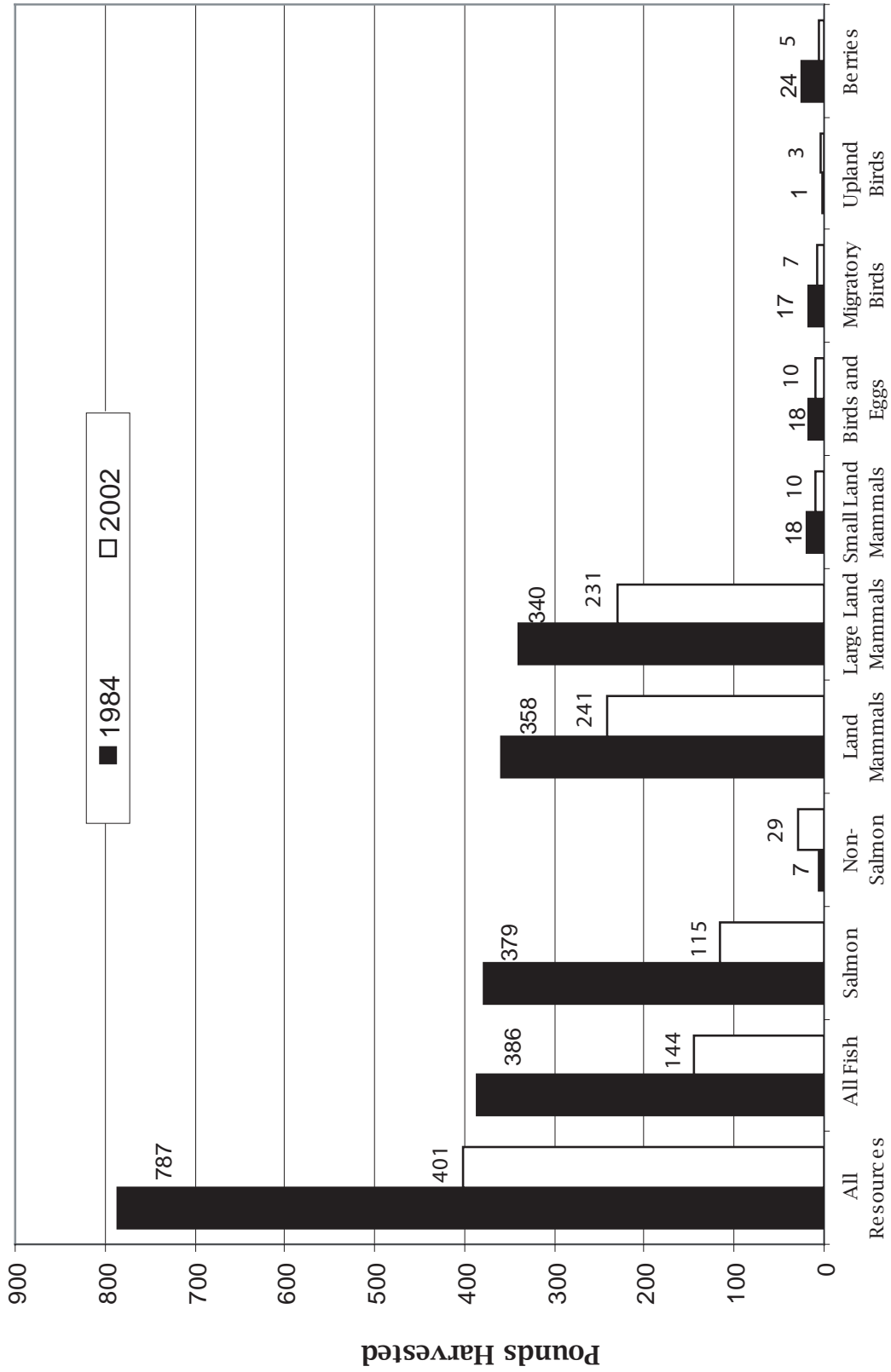
a trend seen in many parts of Interior Alaska (Alaska Regional Assessment Group 1999). This warming trend has not as yet altered the distribution of plants in the area, although Lake Minchumina residents say that some tree species are stressed. As the permafrost melts the water table has changed significantly causing ponds and lakes to dry up and eliminating freshwater fish habitat. In addition, after the 1964 earthquake the water level in Lake Minchumina dropped eight feet. Fishing for all freshwater species declined after this and the swamp surrounding Lake Minchumina drained, which was a prime location of whitefish habitat. In October 2002 another earthquake occurred and since then the lake has dropped another two feet (the drop in the water level could also be assisted by two dry winters). Whether the current drop is related to the earthquake is uncertain since there was little snowfall during the winter of 2002-2003, and little rain the following summer. Low water is also having an adverse affect on berries, which need abundant groundwater to thrive; berry abundance is a local indicator of a healthy ecosystem.

Coupled with the drop in water level is a shift in the channel of the Foraker River that occurred in 1992. A change in the river channel caused large amounts of silt to be deposited into Lake Minchumina. In 2001 the river shifted back to its normal channel emptying into the mouth of the Muddy River clearing up the water and the population numbers of fish are starting to grow according to local residents. But the effect of the addition of large amounts of soil material in the lake created thicker weed beds, disrupting fish habitat. This can be beneficial for some species, such as pike, that thrive in habitat that is rich in weeds, but too much vegetation can decrease the amount of oxygen in the water, which will kill fish, or at least make certain areas such as weed beds that were once productive habitat dead habitat for fish.

NIKOLAI

Nikolai subsistence harvests in 1984 were higher in every major resource category, except non-salmon fish and upland game birds, than harvests in 2002. The total community harvest in 2002 (38,533) was less than half of what it was in 1984 (84,165 pounds). The per capita harvest of all resources declined by 49 percent. Overall per capita fish harvests declined by 62 percent. Per capita salmon harvests declined by almost 70 percent, large land mammal harvests dropped 32 percent, harvests of small land mammals and birds and eggs dropped 45 percent, and the harvest of berries and other vegetation declined by 79 percent. On the other hand, the per capita harvest of non-salmon fish species increased by 95 percent and upland bird harvests by 97 percent (Figure 11-1). In terms of the two primary species, the community harvested approximately 50 moose in 1984 and 38 moose in 2002. Chinook harvests for both years were about the same; in 1984 the community harvested 10,971 pounds of Chinook salmon or about 795 fish while in 2002 it harvested about 751 Chinook or

Figure 11-1. Comparison of Nikolai Per Capita Subsistence Harvest Harvestes



8,841 pounds. The principal reason Nikolai residents gave for the drop in harvest levels was that resources were not as abundant as they used to be. People provided various reasons for this decline including environmental change, competition from outsiders or non-locals, predation by wolves and bears, and changes in traditional values. The discussion will focus on the different resource categories.

Fish

Williams et al. (2005:73-81) report that there appears to be general consensus among Nikolai residents that there are less fish than there used to be. One reason given for this decline was falling water levels. Other people said the water in the lakes is warmer, which has a detrimental effect on fish, and that lakes are drying up. Some of these changes are attributed to the 1964 earthquake that altered the lay of the land and may have caused some lakes to drain. People said the lakes used to be deeper in this area, and there were no weeds. They also pointed out that land that was once hilly is now flat and the permafrost is melting. Another woman said she thinks the reason the environment has changed is because no one has respect any more – respect for the land and the animals. She talked about old rules and beliefs that have disappeared – and she said that is what made the people Athabascan.

In particular Nikolai residents reported a decrease in the numbers of whitefish, due in part to warmer water and a general drying up of lakes. Someone also made a comment that small fish, especially small grayling, get sucked up into the jet intakes of outboard engines. People also noted that the increase in beaver dams, which they associated with a decrease in trapping, has blocked the movement of fish. They said they have not had this problem before and this was not something reported in Stokes' 1985 report. Another change since the time of Stokes' study is the perceived disappearance of Dolly Varden.

All three species of salmon were also thought to be in decline because of environmental changes and over fishing by commercial fishermen and “high-seas poachers.” One elder said the freshwater spawning areas of the Kuskokwim River drainage are drying up:

What I think what really happens down there, back there, is that there creeks got dried out, you know, no water comes out, and nothing. One time not too long ago, few years ago maybe – around the mouth of the Kuskokwim we used to get lots of freshwater spawning area, and that's going down, cause we got no water coming down. Yeah, that'll make it go down too because there are no salmon there too you know [fish populations will go down].

While people have concerns about salmon abundance in general they are especially concerned about the Salmon River Chinook fishery. Increased competition from

sport fishermen, the regulatory prohibition against the fish trap, and the forced use of rod and reel are the same issues identified by Stokes in 1985. As the popularity of sport fishing increased, the question of Nikolai people using sport fish gear illegally for subsistence arose. Initially, it was not considered legal to use rod and reel as subsistence gear because sport fish gear regulations and bag limits applied. The people in the Bethel-AVCP (Association of Village Council Presidents) region had the same problem. In 1993, they submitted a proposal to the Board of Fisheries (BOF) to recognize rod and reel as legal subsistence gear. The BOF tabled the issue until about 1997 or 1999 when it adopted hook and line (rod and reel gear) as legal subsistence gear in “the AVCP region” (that is it included only that portion of the Kuskokwim River drainage downstream of and including the Tatlawiksuk River drainage, thus no change in the McGrath-Nikolai area that year). Later, however, in Spring 2002, the BOF adopted hook and line attached to a rod or pole and handline as legal subsistence gear in the remainder of the Kuskokwim drainage. So, since July of 2002 hook and line gear, line attached to a rod or pole (rod and reel gear) has been subsistence gear in the upper Kuskokwim area. Later, the Federal Subsistence Board adopted a similar proposal (Coffing, personal communication 2004).

Another concern is how rod and reel fishing has influenced the nature of the Salmon River fishery. According to some Nikolai people the changes in the Chinook harvest are connected, not only to actual decline in fish, but to the loss of traditional values both in terms of respect for animals and of sharing and working together. When fish wheels and fish traps were used, large amounts of fish were harvested and everyone had to work together. Rod and reel has changed a joint effort into more of an individual effort. One woman said when they stopped using the fish wheel, they stopped sharing and that is when the fish became less abundant.

Large Game

Similar concerns were discussed when people talked about game populations. They pointed out that on occasion game has been wasted when people did not eat every part of the animal or did not eat what they had killed. One elder recounted a story that illustrates how wasting and abusing animals can lead to their disappearance.

Sometime around the beginning of the 20th century a man shot caribou at Big River with the purpose of catching wolves, so he left the caribou carcasses untouched along the riverbank. But the remains floated down the river and a couple of years later the caribou disappeared. Medicine man said that the reason caribou disappeared was because they were wasted. The rule was that people were not to shoot the caribou on the river.

While Nikolai elders believe that not upholding traditional values may have some effect on the abundance of game they also understand that the current scarcity of moose is a

multifaceted problem tied to predator control, competition from subsistence hunters down river, and competition from sports hunters in the Alaska Range. Older people in Nikolai agree that when there was a bounty on wolves there were more moose and when asked, most thought that both wolves and bears had an influence on moose populations and they favored some sort of predator control. But several Nikolai residents also pointed out that another part of the problem is pressure from “down river” hunters, as well as an increasing number of sport hunters in the Alaska Range. Harvest ticket data for the 2002 moose-hunting season indicate that of the 113 hunters who hunted in GMU 19D over 25 percent came from outside the region (Table 11-1). Of the 98 hunters who received a RM650 permit to hunt on the Upper Kuskokwim and within the Controlled Use Area in 2002, 15 percent came from outside the region and just over 60 percent were residents of McGrath. In terms of the effect of sport hunters on local moose populations, Nikolai residents point out that before bull moose move into the river corridors of the lowlands they stay in the foot hills of the Alaska Range where they are prey to sport hunters. Some Nikolai residents thought that sport hunting in the Alaska Range should not be allowed to grow because commercial hunters compete with subsistence hunters.

Table 11-1. Residence of moosehunters who hunted in GMU 19D

regyear	hunt	rescomm	mooseharvest
2002	GM000	NON-RESIDENT	8
2002	GM000	ANCHORAGE	3
2002	GM000	BETHEL	3
2002	GM000	GLENNALLEN	1
2002	RM650	RESIDENCY UNKNOWN	1
2002	RM650	ANCHORAGE	3
2002	RM650	BETHEL	1
2002	RM650	CHUGIAK	1
2002	RM650	EAGLE RIVER	1
2002	RM650	HOMER	2
2002	RM650	JUNEAU	2
2002	RM650	NAPASKIAK	1
2002	RM650	PALMER	2
2002	RM650	WASILLA	1
Total non-locals			30
2002	RM650	MCGRATH	51
2002	RM650	MEDFRA	1
2002	RM650	NIKOLAI	26
2002	RM650	TAKOTNA	5
Total locals			83

Source: ADF&G Division of Wildlife Conservation

Berries

Environmental change was also thought to have affected the berry crop. Dryness has affected the berry patches and there have not been berries in the past four-to-five years. One woman said her dad told her the area down by the river [in Nikolai] it used to be swamp. She said it has changed; they used to pick salmon berries down there, and they grow where it is wet. Now they are not there.

Small Game

Historically trapping was an important way for Nikolai people to earn cash. But environmental changes, including a general drying in some areas that has affected muskrat populations; and forest fires that have destroyed trap lines, removed ground cover and warmed the soil, have created unfavorable conditions for fur bearing animals. In addition many younger people, while they have been taught to trap, are discouraged from trapping because of low fur prices and the high price of gasoline. For these reasons most Nikolai people no longer see trapping as a major source of income.

CONCLUSION

The communities of Lake Minchumina and Nikolai have a long history of use of natural resources in and around the present boundaries of Denali National Park and Preserve. In recent years many of the areas and resources have come under increasing use and environmental pressures. The goal of this project was to update and expand information about the use of all subsistence resources traditionally utilized by residents of these two communities. Nikolai residents appear to be feeling the effect of increasing use pressure on subsistence resources from non-local residents, but according to the residents of both communities the entire Minchumina Basin is undergoing environmental changes that may have far reaching effects on subsistence resources.



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Appendix A: Survey Instrument

DENALI PARK COMMUNITY PROFILES

HH ID: _____ START TIME: _____ INTERVIEWER: _____
 COMMUNITY: Nikolai 74 DATE: _____
 ID # OF PERSON RESPONDING TO SURVEY: _____ CODER: _____
 FIELD SUPERVISOR: _____

HOUSEHOLD INFORMATION. WHO WERE MEMBERS OF THIS HOUSEHOLD BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002 ?

IN THE STUDY YEAR, DID YOU HUNT/PROCESS:

PERSON ID#	M/F	RELATION TO HH HEAD	BIRTHDATE (MM/DD/Y)	RESIDENCE OF PARENT WHEN BORN	TOTAL YEARS IN COMM.	ETHNICITY	GAME/MM/BIRDS*		FISH/MI**		FURBEARERS		PLANTS	
							HUNT? Y/N	PROCESS? Y/N	FISH? Y/N	PROCESS? Y/N	HUNT/TRAP? Y/N	PROCESS? Y/N	GATHER? Y/N	PROCESS? Y/N
HEAD 1														
1		1												
HEAD 2														
2		2												
3														
3														
4														
4														
5														
5														
6														
6														
7														
7														
8														
8														
9														
9														
10														
10														

* GAME/MM/BIRDS - should include harvesting/attempting to harvest large and small game, birds, and marine mammals.

** FISH/MI - should include harvesting/attempting to harvest marine invertebrates, eg., clam digging, etc.

NIKOLAI (247) HH: _____ STRATUM: R

DEMOGRAPHY (0,1)

DENALI PARK COMMUNITY PROFILES

COMMERCIAL FISHING - SALMON.

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL SALMON FISHING BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002? YES ___ NO ___
 IF YES: PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS, IF POUNDS THEN EDIBLE WEIGHT):
 IF NO: DID YOU INCIDENTALLY HARVEST SALMON WHILE COMMERCIAL FISHING OTHER SPECIES?

SPECIES	COMMERCIAL FISHED?		REMOVED FOR OWN USE NUMBER	GAVE AWAY		UNITS	ID #'S OF FISHERS	NOTES:
	Y/N	INCIDENTAL*		TO CREW NUMBER	TO OTHERS NUMBER			
CHINOOK SALMON 113000001						IND 1		
CHUM SALMON 111000001						IND 1		
SOCKEYE SALMON 115000001						IND 1		
PINK SALMON 114000001						IND 1		
COHO SALMON 112000001						IND 1		
UNKNOWN SALMON 119000001						IND 1		

* Incidental harvest - use only if household was not engaged in any commercial salmon fishing.

NOTES:

NIKOLAI (247) HH: _____

COMMERCIAL FISHING - SALMON (3A)

COMMERCIAL FISHING - NON-SALMON FISH

DENALI PARK COMMUNITY PROFILES

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL FISHING (OTHER THAN SALMON) BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002?

Yes: _____; No: _____

IF YES: PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT):

IF NO: DID YOU INCIDENTALLY HARVEST OTHER FISH WHILE COMMERCIAL FISHING FOR SALMON?

SPECIES	COMMERCIAL FISHED?		FOR OWN USE NUMBER	TO CREW NUMBER	TO OTHERS NUMBER	UNITS	ID #S OF FISHERS		NOTES:
	Y/N	INCIDENTAL					PERMIT HOLDER	CREW	
HERRING 120200001						GAL 4			
SPAWN ON KELP 120306001						GAL 4			
HERRING SAC ROE 120304001						GAL 4			
STURGEON 125899001						IND 1			
LINGCOD 121606001						IND 1			
PACIFIC COD (GRAY) 121004001						IND 1			
SABLEFISH (BLACK COD) 122800001						IND 1			
UNKNOWN FLOUNDER 121499001						IND 1			
SOLE 123699001						IND 1			
HALIBUT 121600001						LBS 2			
BLACK ROCKFISH* 122602001						IND 1			
RED ROCKFISH* 122604001						IND 1			
UNKNOWN ROCKFISH 122699001						IND 1			

* BLACK ROCKFISH = DARK DUSKY, BLACK, LIGHT DUSKY, SILVERGRAY, WIDOW, YELLOWTAIL, "SEA BASS" OR "BLACK BASS".

** RED ROCKFISH = YELLOWEYE (RED SNAPPER), ROUGHYE, PACIFIC OCEAN PERCH, DARK BLOTCHED, HARLEQUIN, NORTH, COPPER, QUILLBACK, ROSETHORN, REDSTRIFE, CANARY, SHORTTRAKER, BLACKQUILL, RED BANDED, TIGER, AND "IDIOTFISH" OR "SHORTSPINE THORNYHEAD".

COMMERCIAL FISHING - NON-SALMON FISH

NIKOLAI (247) HH: _____ COMMERCIAL FISHING - NON-SALMON FINFISH (3B)

DENALI PARK COMMUNITY PROFILES

COMMERCIAL FISHING - MARINE INVERTEBRATES

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMM. FISHING FOR MARINE INVERTEBRATES BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002?
 Yes: _____; No: _____
 IF YES: PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD BE EDIBLE WEIGHT):
 IF NO: DID YOU INCIDENTALLY HARVEST MARINE INVERTEBRATES WHILE COMMERCIAL FISHING FOR OTHER SPECIES?

SPECIES	COMMERCIAL FISHED?		FOR OWN USE NUMBER	TO CREW NUMBER	TO OTHERS NUMBER	SHELLS ON? Y/N	ID #'S OF FISHERS		NOTES:
	Y/N	INCIDENTAL					PERMIT HOLDER	CREW	
RAZOR CLAMS 500612001									
PACIFIC LITTLENECK CLAMS (STEAMERS) 500608001									
DUNGENESS CRAB 501004001									
KING CRAB 501008991									
TANNER CRAB 501012991									
OCTOPUS 502200001									
SHRIMP 503400001									
SCALLOPS 502699001									

NOTES:

NIKOLAI (247) HH: _____

COMMERCIAL FISHING - MARINE INVERTEBRATES (3C)

DENALI PARK COMMUNITY PROFILES

NON-COMMERCIAL FISHING: SALMON.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SALMON BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002? YES: _____ NO: _____
 IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS UNLESS NOTED OTHERWISE. POUNDS SHOULD BE EDIBLE WEIGHT):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	SET NET #	DIP NET #	FISH WHEEL #	ROD & REEL* #	NUMBER HARVESTED BY:		RECEIVED	GAVE AWAY	NOTES
							OTHER TYPE	#			
CHINOOK SALMON 113000002								IND 1			
CHUM SALMON 111000002								IND 1			
SOCKEYE SALMON 115000002								IND 1			
PINK SALMON 114000002								IND 1			
COHO SALMON 112000002								IND 1			
LANDLOCKED SALMON 116000002								IND 1			
UNKNOWN SALMON 119000002								IND 1			

* 'ROD & REEL' INCLUDES TROLLING IN OPEN WATER

NIKOLAI (247) HH: _____

SALMON (4A)

DENALI PARK COMMUNITY PROFILES

NON-COMMERCIAL FISHING: NON-SALMON FINFISH.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE FISH OTHER THAN SALMON BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002?

Yes: _____; No: _____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS UNLESS NOTED OTHERWISE. POUNDS SHOULD BE EDIBLE WEIGHT):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	ROD & REEL #	DIP NET #	HAND LINE #	SET NET #	ICE FISHING #	OTHER TYPE	OTHER #	UNITS	RECEIVED Yes/No	GAVE AWAY Yes/No	NOTES
DOLLY VARDEN 125006002										IND 1			
LAKE TROUT 125010002										IND 1			
RAINBOW TROUT 126204002										IND 1			
TROUT UNKNOWN 126299002										IND 1			
GRAYLING 128200002										IND 1			
PIKE 125499002										IND 1			
WHITEFISH 126499002										IND 1			
BURBOT 124800002										IND 1			
HERRING 120200002										GAL 4			
SPAWN ON KELP 120306002										GAL 4			
EULACHON (HOOLIGAN) 120404002										GAL 4			
SMELT 120499002										GAL 4			
SABLEFISH (BLACK COD) 122800002										IND 1			
PACIFIC COD (GRAY) 121004002										IND 1			
LINGCOD 121606002										IND 1			
PACIFIC TOMCOD 121008002										IND 1			

NIKOLAI (247) HH: _____

NON-SALMON FINFISH (6A)

DENALI PARK COMMUNITY PROFILES

NON-COMMERCIAL FISHING: MARINE INVERTEBRATES (SHELLFISH).

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE MARINE INVERTEBRATES BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002? YES: _____ NO: _____

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS UNLESS NOTED OTHERWISE. POUNDS SHOULD BE EDIBLE WEIGHT):

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	HARVESTED		RECEIVED Yes/No	GAVE AWAY Yes/No	NOTES
			NUMBER #	UNITS			
FRESHWATER CLAMS				GAL 4			
BUTTER CLAMS 500602002				GAL 4			
RAZOR CLAMS 500612002				GAL 4			
LITTLENECK CLAMS (STEAMERS) 500608002				GAL 4			
PINKNECK (SURF) CLAMS 500610002				GAL 4			
HORSE CLAMS (GAPER) 500606002				GAL 4			
UNKNOWN CLAMS 500699002				GAL 4			
DUNGENESS CRAB 501004002				IND 1			
KING CRAB 501008992				IND 1			
TANNER CRAB, BAIRDI (SNOW CRAB) 501012022				IND 1			
UNKNOWN CRABS 501099002				IND 1			
COCKLES 500899002				GAL 4			
SCALLOPS 502699002				LBS 2			
MUSSELS 502099002				GAL 4			

NIKOLAI (247) HH: _____

MARINE INVERTEBRATES (8A)

DENALI PARK COMMUNITY PROFILES

LARGE LAND MAMMALS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE LARGE LAND MAMMALS BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002? YES: _____ NO: _____
 IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD BE INDIVIDUALS):

SPECIES	USED? Y/N	TRIED TO		HARVESTED			RECEIVED Y/N	GAVE AWAY Y/N	LOCATION OF HARVESTS (GMU SUBUNITS)				NOTES	
		HARVEST Y/N	FOR FOOD/ FOOD & FUR Number	FUR ONLY Number	TOTAL Number	UNITS			ANIMAL 1 GMU	ANIMAL 2 GMU	ANIMAL 3 GMU	ANIMAL 4 GMU		
BLACK BEAR 210600000						IND 1								
BROWN BEAR 210800000						IND 1								
CARIBOU 211000000						IND 1								
MOOSE 211800000						IND 1								
DALL SHEEP 212200000						IND 1								
DEER 211200000						IND 1								
BISON 210400000						IND 1								
ELK 211400000						IND 1								
MOUNTAIN GOAT 211600000						IND 1								
						IND 1								
						IND 1								
						IND 1								
						IND 1								

NIKOLAI (247) HI: _____

LARGE LAND MAMMALS (10A)

DENALI PARK COMMUNITY PROFILES
SMALL LAND MAMMALS/FURBEARERS.
 DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SMALL LAND MAMMALS/FURBEARERS BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002?

YES: _____; NO: _____
 IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS).

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	FOOD NUMBER	NUMBER HARVESTED		UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NUMBER SOLD	AVERAGE PRICE	NOTES
				FUR ONLY NUMBER	TOTAL NUMBER						
RED FOX 220804000					IND 1						
BEAVER 220200000					IND 1						
COYOTE 220400000					IND 1						
SNOWSHOE HARE 221004000					IND 1						
LAND OTTER 221200000					IND 1						
LYNX 221600000					IND 1						
MARMOT 221800000					IND 1						
MARTEN 222000000					IND 1						
MINK 222200000					IND 1						
MUSKRAT 222400000					IND 1						
PORCUPINE 222600000					IND 1						
WEASEL 223000000					IND 1						
WOLF 223200000					IND 1						
WOLVERINE 223400000					IND 1						
TREE SQUIRREL (RED) 222804000					IND 1						
PARKA SQUIRREL (GROUND) 222802000					IND 1						

NIKOLAI (247) HH: _____

FURBEARERS (14A)

DENALI PARK COMMUNITY PROFILES

BIRDS AND EGGS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE BIRDS OR EGGS BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002? YES: _____ NO: _____
 IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD BE INDIVIDUALS).

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED BY SEASON (MONTHS)												RECEIVED Yes/No	GAVE AWAY Yes/No	
			SPRING			SUMMER			FALL			WINTER					UNIT
			A	M	J	J	A	A	S	O	N	D	J	F			
GOLDENEYE (COPPERHEAD) 4:102:10990															IND 1		
BUFFLEHEAD (BUTTERBALL) 4:10202000															IND 1		
GOLDEN EYE (COPPERHEAD) 4:30299000															IND 1		
MALLARD 4:102:14000															IND 1		
PINTAIL 4:10220000															IND 1		
AMERICAN WIGEON 4:102:36020															IND 1		
SHOVELER 4:10230000															IND 1		
DUCKS, UNKNOWN 4:10299000															IND 1		
WHITE-FRONTED GEESE 4:104:10000															IND 1		
SNOW GOOSE															IND 1		
CANADA GEESE, LESSER 4:10404080															IND 1		
CANADA GEESE, DUSKY 4:10404060															IND 1		
CANADA GEESE, UNKNOWN 4:10404990															IND 1		
UNKNOWN GEESE 4:10499000															IND 1		
TUNDRA SWAN (WHISTLING) 4:10604000															IND 1		
SANDHILL CRANE 4:10802000															IND 1		

NIKOLAI (247) HH: _____

BIRDS (15A)

DENALI PARK COMMUNITY PROFILES

LOONS 411216990								IND 1	
GROUSE 421802000								IND 1	
PTARMIGAN 421804990								IND 1	
GEESE EGGS 430499000								IND 1	
DUCK EGGS, UNKNOWN 430299000								IND 1	

DENALI PARK COMMUNITY PROFILES

WILD PLANTS.
 DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE WILD PLANTS (INCLUDING FIREWOOD) BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002? YES: _____ NO: _____
 IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (POUNDS SHOULD INDICATE EDIBLE WEIGHT).

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	AMOUNT HARVESTED		RECEIVED Y/N	GAVE AWAY Y/N	NOTES
			NUMBER	UNIT			
BERRIES 601000000				GAL 4			
PLANTS/GREENS/MUSHROOMS 602000000				GAL 4			
WOOD 604000000				GAL 4			
				CORDS 6			

NIKOLAI (247) HH: _____

PLANTS (17A)

DENALI PARK PROFILES

EMPLOYMENT.

PLEASE INDICATE THE FOLLOWING INFORMATION FOR ALL JOBS HELD BY THE EMPLOYED PERMANENT HOUSEHOLD MEMBERS 16 OR OLDER LISTED ON PAGE 1 BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002.

FOR THOSE NOT EMPLOYED, PLEASE SPECIFY RETIRED, UNEMPLOYED, DISABLED, STUDENT, OR HOME/MAKER.

PERSON

ID #	JOB #	JOB TITLE	SOC	EMPLOYER CATEGORY	SIC	TYPE**	LOCATION	WHICH MONTHS WORKED IN 2001-2002		HRS/DAY	DAYS/ WEEK	WORK SCHEDULE ***	PERSONAL GROSS INCOME****
								O N D J F M A M J J A S	O N D J F M A M J J A S				
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					
								O N D J F M A M J J A S					

* PERSON ID # = PERSON NUMBER FROM FIRST PAGE OF SURVEY.

** TYPE: (1) NATIVE PROFIT or (2) NATIVE NON-PROFIT; OTHERWISE LEAVE BLANK.

*** WORK SCHEDULE = (1) FULL-TIME (35+ HOURS/WK) (2) PART-TIME (<35 HOURS/WEEK) (3) SHIFT (2 WEEKS ON/2 OFF, 1 WEEK ON/1 OFF, ETC.) (4) COMMERCIAL FISHING, AND OTHER IRREGULAR; AS REQUIRED POSITIONS (5) SHIFT - PART TIME

**** COMMERCIAL FISHING AND BUSINESS OWNERS - ADJUSTED GROSS AFTER EXPENSES. IF LESS THAN ZERO, ENTER 0.

NIKOLAI (247) HH: _____

EMPLOYMENT (23)

DENALI PARK COMMUNITY PROFILES

CUSTOMARY TRADE ITEMS

DO MEMBERS OF YOUR HOUSEHOLD MAKE, SELL OR TRADE TRADITIONAL HANDCRAFTS OR TRADITIONAL FOODS YES: ___ NO: ___
 IF YES: PLEASE COMPLETE THE FOLLOWING TABLE

ITEMS	MAKE	SELL	PRICE	TRADE IN VILLAGE	TRADE OUT OF VILLAGE	NOTES:
	Y/N	Y/N		Y/N	Y/N	
BEADWORK						
TANNED MOOSE/CARIBOU SKINS						
FUR CLOTHING, I.E. HATS, MITTENS						
SNOWSHOES						
WOODEN SPOONS OR BOWLS						
BIRCHBARK BASKETS						
SMOKED OR DRIED SALMON						
DRIED WHITEFISH						
DRIED MOOSE OR CARIBOU MEAT						
BERRIES						

NIKOLAI (247) HH: _____

CUSTOMARY TRADE

DENALI PARK COMMUNITY PROFILES

PLEASE CHECK ALL THAT APPLY FOR THE PERIOD BETWEEN OCTOBER 1, 2001 AND SEPTEMBER 30, 2002.
WHAT PARTS OF THE MOOSE DID YOU USE? WHAT PARTS OF THE CARIBOU DID YOU USE?

- (1) MEAT
- (2) HEART
- (3) LIVER
- (4) KIDNEYS
- (5) STOMACH
- (6) HIDE
- (7) ANTLERS
- (8) BONES
- (9) SINEW
- (10) HOOVES
- (11) FAT
- (12) HEAD

- (1) MEAT
- (2) HEART
- (3) LIVER
- (4) KIDNEYS
- (5) STOMACH
- (6) HIDE
- (7) ANTLERS
- (8) BONES
- (9) SINEW
- (10) HOOVES
- (11) FAT
- (12) HEAD

HOW DID YOU PRESERVE MOOSE?

- (1) FREEZING
- (2) DRYING
- (3) SAUSAGE
- (4) HAMBURGER
- (5) OTHER TECHNIQUE, SPECIFY:

- (1) FREEZING
- (2) DRYING
- (3) SAUSAGE
- (4) HAMBURGER
- (5) OTHER TECHNIQUE, SPECIFY:

NIKOLAI (247) HH: _____

LARGE MAMMAL USE PREPARATION

Appendix B

Conversion Factors for Subsistence Resources Harvested by Residents of Lake Minchumina & Nikolai

Resource	Conversion Factor*
Chum Salmon	6.94 Lbs/Ind
Coho Salmon	5.31 Lbs/Ind
Chinook Salmon	11.73 Lbs/Ind
Sockeye Salmon	4.46 Lbs/Ind
Non-Salmon Fish	1 Lbs/Lbs
Herring Roe	7 Lbs/Gal
Herring Spawn on Kelp	7 Lbs/Gal
Halibut	1 Lbs/Lbs
Burbot	4.2 Lbs/Ind
Char	3 Lbs/Ind
Dolly Varden	3 Lbs/Ind
Grayling	1 Lbs/Ind
Pike	3 Lbs/Ind
Unknown Pike	3 Lbs/Ind
Sheefish	5.5 Lbs/Ind
Sucker	1 Lbs/Ind
Whitefish	1.75 Lbs/Ind
Unknown Whitefish	1.75 Lbs/Ind
Bison	0 Lbs/Ind
Black Bear	58 Lbs/Ind
Brown Bear	200 Lbs/Ind
Caribou	130 Lbs/Ind
Moose	500 Lbs/Ind
Dall Sheep	65 Lbs/Ind
Beaver	8.75 Lbs/Ind
Fox	0 Lbs/Ind
Red Fox	0 Lbs/Ind
Hare	2 Lbs/Ind
Snowshoe Hare	2 Lbs/Ind
Land Otter	0 Lbs/Ind
Lynx	0 Lbs/Ind
Marten	0 Lbs/Ind
Mink	0 Lbs/Ind
Muskrat	0.5 Lbs/Ind
Porcupine	8 Lbs/Ind
Squirrel	0.5 Lbs/Ind
Tree Squirrel	0.5 Lbs/Ind
Weasel	0.5 Lbs/Ind
Wolf	0 Lbs/Ind
Wolverine	0 Lbs/Ind
Bufflehead	0.4 Lbs/Ind
Goldeneye	0.8 Lbs/Ind
Unknown Goldeneye	0.8 Lbs/Ind
Mallard	1 Lbs/Ind
Northern Pintail	0.8 Lbs/Ind
Northern Shoveler	1.09 Lbs/Ind
Wigeon	0.7 Lbs/Ind
American Wigeon	0.7 Lbs/Ind
Unknown Ducks	0.7 Lbs/Ind
Lesser Canada Geese (taverner/parvipes)	1.2 Lbs/Ind
Unknown Canada Geese	2.12 Lbs/Ind
White-fronted Geese	2.4 Lbs/Ind
Unknown Geese	2.2 Lbs/Ind
Swan	11.2 Lbs/Ind
Tundra Swan (whistling)	11.2 Lbs/Ind
Crane	8.4 Lbs/Ind
Sandhill Crane	8.4 Lbs/Ind
Seabirds & Loons	0 Lbs/Ind
Loons	0 Lbs/Ind
Unknown Loon	0 Lbs/Ind
Other Birds	0.7 Lbs/Ind
Upland Game Birds	0.7 Lbs/Ind
Grouse	0.7 Lbs/Ind
Ptarmigan	0.7 Lbs/Ind
Unknown Ptarmigan	0.7 Lbs/Ind
Marine Invertebrates	3 Lbs/Gal
Clams	3 Lbs/Gal
Freshwater Clams	3 Lbs/Gal
Vegetation	1 Lbs/Lbs
Berries	4 Lbs/Gal
Plants/Greens/Mushrooms	4 Lbs/Gal
Wood	0 Lbs/Cords

* Conversion factors of 0 indicate 0Lbs of edible weight per Unit