

**The Subsistence Harvest and Use of  
Wild Resources in Akiachak, Alaska, 1998**

**Technical Paper No. 258**

by

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## TABLE OF CONTENTS

LIST OF TABLES .....	iii
LIST OF FIGURES .....	v
ACKNOWLEDGEMENTS .....	vii
CHAPTER 1. PROJECT BACKGROUND AND METHODS.....	1
INTRODUCTION.....	1
RESEARCH METHODS.....	2
Objectives.....	2
Community Review and Approval .....	2
Key Respondent Mapping.....	5
Systematic Household Surveys.....	7
Sampling Design.....	8
Data Analysis.....	9
CHAPTER 2. DESCRIPTION OF THE COMMUNITY, DEMOGRAPHY AND ECONOMY.....	11
HISTORY .....	11
COMMUNITY DESCRIPTION .....	12
DEMOGRAPHY .....	14
EMPLOYMENT AND WAGE INCOME.....	15
CHAPTER 3. SUBSISTENCE USE AND HARVEST OF FISH AND WILDLIFE.....	27
PARTICIPATION IN HARVESTING AND USING RESOURCES .....	27
Household Participation Levels.....	27
Individual Participation Levels in Harvesting and Processing Resources .....	28
SEASONAL ROUND OF HARVEST ACTIVITIES .....	40
COMPOSITION AND LEVELS OF HARVEST .....	44
COMMERCIAL FISHERIES AS A SOURCE OF WILD RESOURCES .....	45
SALMON.....	49
Regulations.....	49
Harvest and Use .....	50
Areas Used for Harvesting Salmon.....	62
NON-SALMON FISH .....	63
Regulations.....	64
Harvest and Use .....	64
Areas Used for Harvesting Non-Salmon Fish.....	73

LARGE LAND MAMMALS.....	80
Overview of Large land Mammal Harvest and Use .....	80
Caribou: Regulations, Harvest and Use.....	81
Moose: Regulations, Harvest and Use.....	93
Black Bear: Regulations, Harvest and Use .....	100
Brown Bear: Regulations, Harvest and Use.....	102
SMALL MAMMAL HUNTING AND TRAPPING .....	110
Regulations .....	110
Harvest and Use.....	111
Areas Used for Harvesting Small Land Mammals.....	121
MARINE MAMMALS .....	122
Regulations .....	122
Harvest and Use.....	122
Areas Used for Harvesting Marine Mammals.....	127
BIRDS AND EGGS .....	128
Regulations .....	128
Harvest and Use.....	130
Areas Used for Harvesting Birds and Eggs.....	137
WILD PLANTS, BERRIES AND WOOD .....	137
Harvest and Use.....	137
Areas Used for Harvesting Wild Plants, Berries and Wood .....	139
CHAPTER 4. SUMMARY.....	145
PARTICIPATION IN HARVEST AND USE OF RESOURCES .....	146
HARVEST AMOUNTS .....	147
EMPLOYMENT AND INCOME.....	148
COMMERCIAL FISHING, INCOME AND WILD RESOURCE HARVEST .....	149
AREAS USED TO HARVEST WILD RESOURCES .....	150
REFERENCES .....	159
APPENDIX A. AKIACHAK RESOLUTION AUGUST 7, 1997.....	161
APPENDIX B. AKIACHAK SURVEY INSTRUMENT, 1999.....	163
APPENDIX C. CONVERSION FACTORS, AKIACHAK, 1998.....	193
APPENDIX D. STANDARD INDUSTRIAL CODES (EMPLOYER TYPE) .....	195

## LIST OF TABLES

Table 1.	Sampling and Participation: Akiachak, 1998 .....	10
Table 2.	Populations of Several Lower Kuskokwim Communities, 1880 – 1990 .....	17
Table 3.	Demographic Characteristics of Households, Akiachak, 1998 .....	19
Table 4.	Population Profile: Akiachak, January 1999 .....	20
Table 5.	Individual and Household Employment Characteristics, Akiachak, 1998.....	22
Table 6.	Employment by Industry, Akiachak 1998 .....	24
Table 7.	Community, Household and Per Capita Incomes, All Sources and by Employer Types, Akiachak, 1998 .....	25
Table 8.	Community, Household and Per Capita Non-Wage Income, by Source, Akiachak, 1998 .....	26
Table 9.	Resource Harvest and Use Characteristics, Akiachak, 1998.....	29
Table 10.	Wild Resources Used by Residents of Akiachak, 1998.....	30
Table 11.	Estimated Harvest and Use of Fish, Game, and Plant Resources, Akiachak, 1998 .....	35
Table 12.	Participation in the Harvest and Processing of Wild Resources, Akiachak, 1998 .....	39
Table 13.	Estimated Quantities of Fish Removed From Commercial Harvest for Subsistence Use, Akiachak, 1998 .....	48
Table 14.	Characteristics of Household Salmon Harvests, Akiachak, 1998 .....	55
Table 15.	Percent of Households Harvesting Salmon by Gear Type Combinations, Akiachak, 1998.....	55
Table 16.	Estimated Percentages of Salmon Harvest by Species and Gear Type, Akiachak, 1998 .....	57
Table 17.	Estimated Quantity of Salmon Harvest by Gear Type, Akiachak, 1998.....	58
Table 18.	Percentage of Households Subsistence Fishing for Salmon by Location, Akiachak, 1998 .....	61
Table 19.	Percentage of Households Harvesting Fish Other Than Salmon, by Gear Type, Akiachak, 1998.....	68

Table 20.	Percentage of Households Using Only Certain Gear Types to Harvest Fish Other Than Salmon, Akiachak, 1998 .....	69
Table 21.	Estimated Percentage of Fish other Than Salmon Harvested, by Gear Type, Akiachak, 1998.....	70
Table 22.	Estimated Pounds of Fish Other Than Salmon Harvested, by Gear Type, Akiachak, 1998 .....	71
Table 23.	Percentage of Households Harvesting Fish Other Than Salmon, by Month, Akiachak, 1998.....	72
Table 24.	Estimated Percentage of Resources Harvested Each Month, Akiachak, 1998 .....	85
Table 25.	Estimated Number and Percentage of Akiachak Households Harvesting Large Land Mammals, by Game Management Unit, Akiachak, 1998.....	86
Table 26.	Percentage of Households Harvesting Large Land Mammals, by Location, Akiachak, 1998 .....	87
Table 27.	Estimated Number of Large Land Mammals Harvested, by Location, Akiachak, 1998 .....	88
Table 28.	Harvest and Sale of Furbearers, Akiachak, 1998.....	114
Table 29.	Hunting Seasons and Bag Limits for Birds, Game Management Unit 18, 1998 – 1999. ....	129
Table 30.	Estimated Number and Percentage of Birds and Eggs Harvested, by Season, Akiachak, 1998 .....	133
Table 31.	Estimated Annual Food Purchase Expenses and Contribution of Meat, Fish and Birds from Wild Resources, Akiachak, 1998.....	153
Table 32.	Comparison of Mean Harvests and Mean Incomes for Households Having Commercial Fishing Permits and Households Not Having Commercial Fishing Permits, Akiachak, 1998 .....	153
Table 33.	Comparison of Mean Harvests and Mean Incomes of Households Based on Harvest of Resources in Game Management Unit 19, Akiachak, 1998 .....	155
Table 34.	Comparison of Harvests of Large Land Mammals from Game Management Unit 19 for Households Having Commercial Fishing Permits and Households Not Having Commercial Fishing Permits, Akiachak, 1998 .....	155

## LIST OF FIGURES

Figure 1.	Location of Akiachak in Western Alaska .....	3
Figure 2.	Population of Akiachak, 1890 - 1990 .....	18
Figure 3.	Population Profile: Akiachak, January, 1999 .....	20
Figure 4.	Birthplaces of Akiachak Residents, 1998 .....	21
Figure 5.	Employment by Industry, Akiachak, 1998 .....	23
Figure 6.	Household Participation in Resource Harvest and Use by Category, Akiachak, 1998 .....	34
Figure 7.	Seasonal Round of Subsistence Harvest Activities, Akiachak, 1987 - 1998 .....	41
Figure 8.	Pounds of Wild Resources Harvested by Akiachak Households, 1998 .....	46
Figure 9.	Composition of Wild Resource Harvest, Akiachak, 1998 .....	47
Figure 10.	Contribution of Each Salmon Species to the Overall Number of Salmon Harvested for Subsistence, Akiachak, 1998 .....	53
Figure 11.	Contribution of Each Salmon Species to the Total Pounds of Salmon Harvested for Subsistence, Akiachak, 1998 .....	54
Figure 12.	Methods Used by Akiachak Households to Harvest Subsistence Salmon, 1998 .....	56
Figure 13.	Subsistence Salmon Fishing Areas Used by Akiachak Residents, 1988 - 1997 .....	59
Figure 14.	Contribution of Each Non-Salmon Fish Species to the Total Pounds of Non-Salmon Fish Harvested for Subsistence, Akiachak, 1998 .....	67
Figure 15.	Subsistence "Trout" Fishing Areas Used by Akiachak Residents, 1988 - 1997 .....	75
Figure 16.	Subsistence "Other Fish" Fishing Areas Used by Akiachak Residents, 1988 - 1997 .....	77
Figure 17.	<i>Contribution of Each Large Land Mammal Species to the Overall Number of Large Land Mammals Harvested, Akiachak, .....</i>	<i>83</i>
Figure 18.	<i>Contribution of Each Large Land Mammal Species to the Overall Pounds of Large Land Mammals Harvested, Akiachak, .....</i>	<i>84</i>

Figure 19.	Subsistence Caribou Hunting Areas Used by Akiachak Residents, 1988 - 1997 .....	91
Figure 20.	Subsistence Moose Hunting Areas Used by Akiachak Residents, 1988 - 1997 .....	95
Figure 21.	Subsistence Black Bear Hunting Areas Used by Akiachak Residents, 1988 - 1997 .....	103
Figure 22.	Subsistence Brown Bear Hunting Areas Used by Akiachak Residents, 1988 - 1997 .....	105
Figure 23.	Estimated Number of Small Land Mammals Harvested, Akiachak, 1998.....	112
Figure 24.	Contribution of Small Land Mammals Harvested for Food, Akiachak, 1998.....	113
Figure 25.	Subsistence Furbearer Hunting and Trapping Areas Used by Akiachak Residents, 1988 - 1997 .....	117
Figure 26.	Subsistence Small Game Hunting Areas Used by Akiachak Residents, 1988 - 1997 .....	119
Figure 27.	Estimated Number of Marine Mammals Harvested, Akiachak, 1998.....	124
Figure 28.	Subsistence Marine Mammal Hunting Areas Used by Akiachak Residents, 1988 - 1997 .....	125
Figure 29.	Contribution of Each Bird Category to the Overall Pounds of Birds Harvested, Akiachak, 1998.....	132
Figure 30.	Subsistence Waterfowl Hunting Areas Used by Akiachak Residents, 1988 - 1997 .....	135
Figure 31.	Subsistence Plant and Berry Gathering Areas Used by Akiachak Residents, 1988 - 1997 .....	141
Figure 32.	Subsistence Wood Gathering Areas Used by Akiachak Residents, 1988 - 1997 .....	143
Figure 33.	Per Capita Income for Selected Alaska Communities, 1989.....	152
Figure 34.	Pounds of Resources Harvested by Households and Presence of Commercial Salmon Fishing Permits, Akiachak, 1998.....	154
Figure 35.	Areas Used by Akiachak Residents for Subsistence Hunting, Fishing and Gathering, 1988-1997 .....	157

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CHAPTER 1  
PROJECT BACKGROUND AND METHODS

INTRODUCTION

This report describes the subsistence use of fish and wildlife by residents of Akiachak, Alaska during 1998. Akiachak is a Yup'ik Eskimo community located on the Kuskokwim River in western Alaska (Fig. 1.) The stimulus for the research described in this report came primarily from the need to have adequate information to evaluate proposed changes to Customary and Traditional use determinations proposed by the community to the Federal Subsistence Board. On January 6, 1998, the Akiachak Native Community council passed a resolution requesting that a study be undertaken in their community to gather information that would be useful for evaluating regulatory proposals (Appendix A). The resolution was made available to both the Division of Subsistence, Alaska Department of Fish and Game and the Office of Subsistence Management, US Fish and Wildlife Service.

Shortly thereafter, Division of Subsistence staff and Federal subsistence management staff discussed ways that they might coordinate their efforts to conduct a subsistence research project in the community. During the summer of 1998, residents of Akiachak met with the contracting officer's technical representative of the Service to continue these discussions. The Service and the Subsistence Division felt that combining the research expertise of the Subsistence Division staff living in the region with the financial capability and planning oversight of the Service would be the best approach to produce the desired information. In addition to gathering subsistence harvest and use information, part of the intent was to incorporate Akiachak residents in the data gathering and research process. While the project had already been agreed to

by all parties, it was not until February 1999 that the Department of Fish and Game and the U.S. Fish and Wildlife Service entered into an agreement to conduct a subsistence study in Akiachak. Fieldwork on the project commenced in early April 1999.

## RESEARCH METHODS

### Objectives

The objectives of this study were to gather information on the subsistence harvest and use of wildlife resources and to identify the degree of household participation in subsistence harvest and use activities during 1998. Objectives also included identifying the kinds of resources harvested, the times of the year that particular subsistence activities were undertaken, the amount of each resource harvested, the general location of harvest areas, the degree of dependence the community had on subsistence resources, and the demographic and economic characteristics of the community. Additional objectives included identifying areas used for hunting, fishing, trapping and gathering during the period 1988 through 1997; as part of this effort subsistence land use areas were also mapped.

### Community Review and Approval

In November 1998, the principal investigator (PI) attended a general membership meeting of the Akiachak Native Community and Akiachak Indian Reorganization Act Council held in Akiachak. Although the community had already given approval for the study, this meeting provided the PI with the opportunity to meet several community residents as well as the newly elected Council members. Efforts to conduct the key

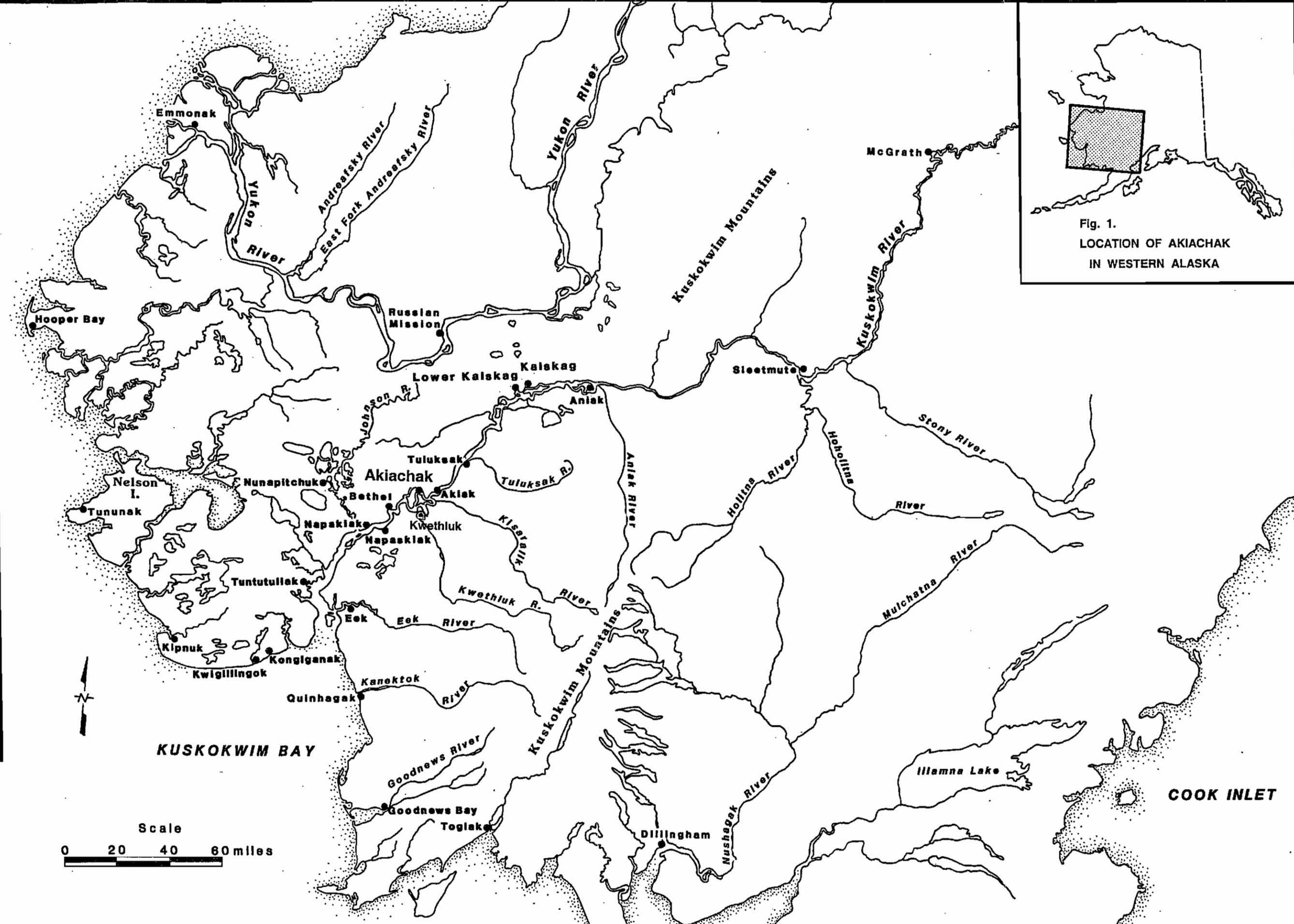


Fig. 1.  
 LOCATION OF AKIACHAK  
 IN WESTERN ALASKA



respondent mapping and the hiring and training of local survey staff was delayed until March 1999 after the formal approval of the funding agreement between ADFG and USFWS. In addition, because the Akiachak Native Community was in the process of hiring a Natural Resource Director who was to help facilitate the project in the community, they requested that the project be delayed until that position was filled. Three Akiachak residents were hired as technicians on April 6. Household surveys and key-respondent mapping began immediately.

### Key Respondent Mapping

Staff of the Native Community of Akiachak, including the Natural Resource Director, was asked to recommend six to ten individuals who could be interviewed about the areas in which they hunted, fished, trapped, and gathered subsistence resources while residing in Akiachak. The objective of the mapping component was to identify subsistence areas used by residents of the community over the previous 10-year period. Towards this end, seven individuals chosen on the basis of their active involvement in subsistence activities were interviewed. All of the respondents were men between 30 and 45 years of age. The list of species used on the household survey form was used to develop a list of thirteen resource categories to be mapped. Resources mapped included moose, caribou, black bear, brown bear, furbearers, small game, waterfowl, salmon, trout, other freshwater fish, marine mammals, plants/berries, and wood. Because the goal of the mapping was to identify areas used in the previous 10 years, individuals who had not been recently active in hunting activities, such as elders, were not included in mapping the communities use areas depicted in this report.

Mapped data was recorded using United States Geological Survey (USGS) 1:250,000 topographic maps covered with clear inking film. Colored permanent marker pens were used to record information on the inking film. Data were gathered using polygons to identify areas used, with a separate color pen used for each resource category. In most instances, multiple overlays were used to capture all of the 13 categories. The mapping interview began with an explanation of why the information was being gathered and the period of time on which the interview was focusing (1988 - 1997). The respondent was also informed that his specific land use information would be compiled with information from the other key respondents and that the compiled information would be used as a basis for gathering additional information from other subsistence users in the community. Once the key-respondent interviews were completed, the data was compiled category by category and transferred to blue-line copies of 1:250,000 USGS maps.

These maps, some of which measured six feet by eight feet, were taken back to the community where they were posted on the walls of the Elders and Youth Center from August 31 through September 27. During this time, the Akiachak Native Community Natural Resource Director spread the word throughout the community that the maps were posted for community review. The director also contacted individual hunters and asked them to review the maps to ensure that the maps included their individual use areas. The PI was on hand while some hunters examined the maps and identified areas that needed to be added. During this time, the PI also showed the director how to add information to the maps and how to properly record the source for each item added to the maps. Over the next four weeks several community residents reviewed the community land use maps. Unfortunately, not all individuals that participate in hunting, fishing and gathering were available to review the map data. Eleven community

residents that reviewed the map data identified additional areas which were subsequently added to the database.

The data was then redrawn on clear inking film. Registration marks were included so that the overlays could be re-registered onto USGS topographic maps before they were digitized. Once the data was digitized, the cartographer prepared draft plots and sent them to the PI for review. This final review phase was primarily focused on ensuring that the lines were edge matched where lines crossed USGS quads. These refinements were made directly on the paper plots and returned to the cartographer for use in preparing the final digitized map data. In addition to creating the digitized map data, the cartographer also prepared fourteen individual 11" x 17" paper maps to be used in this report; one map for each resource category and one showing the community's total subsistence use area.

#### Systematic Household Surveys

A survey instrument of the type typically used by the Division of Subsistence was used to gather information for the study. In addition to asking questions about the demographic and economic characteristics of community households, the survey also asked households about the types of resources used, shared and received, the quantities of resources harvested, the month or season of harvest, and the general harvest locations. The time period chosen for this data was the calendar year 1998 (January 1 through December 31). Prior to initiating the survey, the PI met with staff of the ANC and developed a list of resources, species by species, that were thought to be used by the community. This resource list was not limited to resources found in the proximity of Akiachak, but also included species such as halibut, herring, walrus, and sea ducks that may have been either harvested or received by any of the community

households. In total, 108 resources were listed on the survey instrument with room for additional resources to be added if necessary. Yup'ik names of the resources were also included on the survey form to aid during the interview process. When completed, the survey instrument consisted of 30 pages (Appendix B).

The Akiachak Natural Resource Director identified three individuals in the community that were interested in working on the project. He arranged for the PI to meet with them and describe the overall project and the role of the survey staff. Three individuals were hired and trained by the PI. A training manual similar to the type used for other Division of Subsistence research projects was prepared by the PI and served as the foundation of the training. Following the training, each technician was provided with a copy of the training manual, survey forms, a picture-key to be used during the surveys to identify the various species of waterfowl, timesheets to keep track of the hours worked, and a folder to keep the survey materials together. Each technician was also provided with copies of a letter prepared by the PI describing the scope of the project and names of persons to be contacted if there were questions about the project.

### Sampling Design

The goal of the project was to survey as many households as possible. Before beginning the surveys, the PI developed a complete listing of households. To develop this list, the PI first took aerial photographs of the community during mid-March. The first task of the survey technicians was to use the aerial photographs to list the names of the household heads in each of the occupied houses. This household list was then entered into a personal computer and a random number was assigned to each household. This community survey list was then divided up between the three survey technicians. In addition to the household list, each technician also received a tracking sheet to use for

checking off the individual households as they were surveyed, record the number of times an attempt was made to make contact a particular household, and identify households that declined to participate in the survey. Households that were unable to be contacted after three attempts were categorized as a “no contact.”

A total of 118 households were identified in the community (Table 1). Eighty-one households were successfully contacted and surveyed, representing approximately 69 percent of the community. Fourteen households (12 percent) declined to participate in the project and 23 households (19 percent) could not be contacted. It is likely that many of the households that could not be contacted were actively involved in subsistence activities at the time survey staff visited their household. On average, the household surveys took 1 hour and 10 minutes each to complete with a range of from 15 minutes to 2 hours 45 minutes.

### Data Analysis

Once the surveys were completed, the PI reviewed each survey form and coded the data for computer entry and analysis. On the survey form, households were asked how much of each resource they harvested. These were usually reported in numbers of animals or fish. To facilitate data analysis, each resource was converted to pounds usable weight using standardized conversion factors (Appendix C). Other data on the survey forms such as duration of employment, job title, etc were coded using categories defined by the Alaska Department of Labor (Appendix D). Data entry and analysis was done by the data management staff of the Division of Subsistence. The Statistical Package for Social Sciences (SPSS) was used to conduct the data analysis. Summaries of the community data are summarized in the Community Profile Database (Alaska Department of Fish and Game, 1999b).

Table 1. Sampling and participation: Akiachak, 1998

Variable	Households in Community
Initial Estimated Households	118
Non-Residential Structures Encountered	0
A Revised Estimate of Households	118
B Interview Goal	118
C Households Interviewed	81
D Households Failed to Contact	23
E Households Refused	14
F Moved/Vacant/Non-Resident Household *	0
G Total Households Attempted	118
H Refusal Rate	14.74%
I Interview Goal (Percentage)	68.6%
J Final Households	118
K Percentage Interviewed	68.64%
L Interview Weighting Factor	1.457
M Sampled Population	359
N Estimated Population	522.99

Formulae

$G = C + D + E + F$	Total HH attempted = sum of interviews, unavailable, refused, and non-resident HH.
$H = E / (E + C)$	Refusal rate = refusals divided by refusals and surveyed households.
$I = B / J$	Interview goal percentage = interview goal divided by estimated permanent households.
$J = ((C + D + E) / G) * A$	Final Native households = estimated households multiplied by resident hh rate.
$K = C / J$	Percentage interviewed = households interviewed divided by total permanent households.
$L = J / C$	Interview weighting factor = total permanent households divided by households interviewed.
$N = M * L$	Estimated population = sampled population multiplied by household weighting factor.

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

\* Non-resident households are households which were not present during the study year or which were resident less than the required number of months. Also households which have moved from the community.

## CHAPTER 2

### DESCRIPTION OF THE COMMUNITY, DEMOGRAPHY AND ECONOMY

#### HISTORY

Early written accounts of Akiachak indicate that many of the community's early residents moved there in the 1890s from the neighboring community of *Kihtagamiut*, located slightly upriver from the present community (Oswalt 1980). By 1895, the Moravian Church had established a presence in the community with the assistance of a church helper named Ivan Lomuck. According to the early Moravian missionaries, a typhoid epidemic during the spring of 1900 killed more people in Akiachak than in any other community in the lower Kuskokwim River area (Oswalt 1980). A widespread influenza epidemic also hit many villages in the Yukon-Kuskokwim Delta during mid-summer 1900. About the same time, epidemics of measles and whooping cough also struck many villages in the region. These epidemics severely affected many of the communities along the Kuskokwim River.

In the late winter of 1901, a herd of 175 reindeer arrived in Bethel from Teller Reindeer Station on Seward Peninsula. From 1906 through 1908, some of the animals from the growing Kuskokwim reindeer herd were taken to Quinhagak, Nushagak, and as far as Copper Center (Henkleman and Vitt 1985). In time, residents of Akiachak became involved in reindeer herding. Reindeer were herded in the vicinity of Mt. Hamilton, located southeast of Whitefish Lake as well as areas of the Kilbuck Mountains and other tundra regions adjacent to Akiachak. In the late 1920s all of the Native herders joined the Kuskokwim Reindeer Company (The Company), consolidating the smaller herds into one larger organization. The herders were issued stock in the Company. Some Akiachak residents living in the community during the time of this study once owned

stock in the Company. Over time and for a variety of reasons the reindeer herds declined and by 1943 only a small number of the Akiachak reindeer herd remained.

In 1916, a Moravian Chapel was completed in the community and a Bureau of Education school was started in 1930. A Post Office opened in 1934. In 1943. A Bureau of Indian Affairs teacher described the community as consisting of about 30 log and frame houses in 1943 (Oswalt 1980). In 1948, the village organized as the Akiachak Native Community under the terms of the Indian Reorganization Act. In 1974 the community incorporated as a Second Class City. In 1990, Akiachak residents voted to dissolve the State funded municipal government.

#### COMMUNITY DESCRIPTION

Akiachak is located on the Yukon-Kuskokwim Delta of Western Alaska, on the north bank of the Kuskokwim River approximately 105 miles upstream from the river's mouth and about 27 miles upstream of Bethel (Fig. 1). The community of Kwethluk lies to the east and Akiak lies to the north. West of the community are the Gweek and Johnson River drainages which wind northward across the tundra towards Lower Kalskag. The entire area is dotted with freshwater lakes and numerous small streams. To the east, approximately 50 miles, are the Kilbuck Mountains, an extension of the Kuskokwim Mountain Range separating the Bristol Bay drainage from the Kuskokwim drainage. The Tuluksak, Kisaralik, Kasigluk, Kwethluk and Eek rivers have their origin in these mountains and flow in a westerly direction, emptying into the Kuskokwim River.

The Kuskokwim River serves as the primary travel corridor from Akiachak to other communities as well as to many of the upriver areas where Akiachak residents travel to hunt and fish. Often by mid May, the Kuskokwim River ice near Akiachak breaks up, allowing residents access to subsistence harvest areas by boat. Breakup

has occurred as early as April and as late as June. The Kuskokwim River is usually frozen over from early November through early May. The freezing of the Kuskokwim River, commonly called "freezup," generally occurs during mid to late October. During these times, travel on the river ceases for a couple of weeks and air transportation is the only way to travel between Akiachak and other communities. On occasion, runways are too muddy and soft for aircraft to land. Boats, snowmachine or ATV are a primary method of privately owned transportation throughout the region. Travel by air is available on a daily basis from several Bethel-based air taxis and air-charter companies that serve Akiachak and the surrounding communities. Akiachak currently has a 1,600 foot gravel runway. Freight and transportation from Akiachak to Bethel is also available via Alaska Hovercraft, which operates from December through mid-April and late May through mid October. There were a few trucks in the community, however, most residents either walk or use ATVs or snowmachines to get around the community.

The Yupiit School District serves the communities of Akiachak, Akiak, and Tuluksak and has its District offices in Akiachak. In 1999, 161 students filled grades K through 12 in the Akiachak school which employed 10 certified staff and numerous teacher aids and other support staff (Alaska Department of Community and Economic Development, 1999). Two stores in the community sold groceries and general merchandise including boats and snowmachines. A community owned utility provided electricity to Akiachak residents, and Akiachak Native Community provides and maintains water and sanitation services throughout the community. Most households haul their water from watering faucets located several places in the community. According to the 1990 federal census information, 61 percent of households used oil as a primary source of heat and 32 percent used wood to heat their homes. In addition sixty-three percent of the houses did not have a telephone. Akiachak has an Alaska Native Claims Settlement Act (ANCSA) village corporation (Akiachak Limited) and most

residents were members of the village corporation as well as shareholders in Calista, the regional ANCSA Corporation which has its headquarter offices in Anchorage.

## DEMOGRAPHY

Table 2 provides historic population estimates for Akiachak and other communities in the Lower Kuskokwim River area. Population data for many of the communities in the region are sparse until the 1940s when U.S. census data was routinely collected in many of the communities. Figure 2 illustrates changes in Akiachak's population from 1900 until 1990. Since 1950, the population has steadily increased and it more than doubled from 1960 to 1990. The 1990 federal census identified 112 occupied housing units in Akiachak with an average household size of 4.29 persons. All but one of the households was a single-family dwelling (Alaska Department of Labor 1993). The Alaska Department of Labor estimated Akiachak's 1998 population to be 569 residents, up 88 people (18 percent) from the 1990 population of 481 (Alaska Department of Labor 1999).

A summary of the demographic information from the household surveys is shown in Table 3. During 1998, there were 118 occupied households in the community. The number of persons per household ranged from one to thirteen, with a mean household size of 4.43. The average length of residency for the overall population was 24.6 years and 41.2 years for household heads. All of the households had at least one Alaska Native as a household head. The 1990 federal census data reported that 95 percent of the population was Alaska Native, the majority of which were Yupik. Data obtained during this survey indicates that the population in the community was 99 percent Alaska Native. The 1999 population for Akiachak was 54 percent male and 46 percent female (Table 4 and Fig. 3). The average age was 26.2 years (Table 3).

Eighty-eight percent of the residents of the surveyed households were born in Akiachak (Fig. 4). In addition to those born in Akiachak and 10 percent were born in communities within the local region. These "local region" communities included Tuluksak, Akiak, Kwethluk, Bethel, Napakiak, Napaskiak, Nunapitchuk, Kasigluk, Kwigillingok, Nightmute, Toksook Bay, Tununak, Chevak, Russian Mission, and Stony River. Approximately one percent of the residents were born in other Alaska communities of Dillingham, Anchorage, and Ketchikan and one percent were born outside of Alaska.

#### EMPLOYMENT AND WAGE INCOME

Of the estimated 320 adults in the community (16 years of age or older), 62.3 percent were employed sometime during 1998 (Table 5). Residents in the community worked a total of 293 jobs in calendar year 1998. On average, adults having jobs were employed for 8.33 months. Some adults worked a single job while others worked as many as five different jobs during the year. Overall, 33 percent of the employed adults were employed year-round, the remainder were employed only seasonally or part time. Eighty-nine percent of the households were employed sometime during 1998. The mean number of jobs held per household was 2.8, while the maximum number of jobs held by a single household was 11. Households had an average of 2 adults employed sometime during 1998.

Jobs in the commercial fishing, local government, and services sectors provided the majority of the employment (Fig. 5). The largest percentage of the jobs was in commercial fishing. Local government provided 30 percent of the jobs, many of which were in the education sector.

The majority of Akiachak households (76 percent) had at least one member involved in commercial fishing activities (Table 6). Local government employment was reported by 61 percent of the households surveyed and many households (40.3 percent) reported individuals employed in local education jobs. The services sector provided employment for approximately 35 percent of households.

Income information for Akiachak in 1998 is summarized in Table 7. Approximately 60 percent of the overall community income came from jobs, including commercial fishing. Households had an average total income of \$32,433. In comparison, the 1990 federal census estimated the average household income of \$23,750 (Alaska Department of Labor 1993). Income from jobs during 1998 averaged \$19,537 per household and \$4,408 per capita. Nearly 41 percent of the total earned income was derived from jobs with local government (Table 6). Forty percent of the earned income also came from jobs in the services, retail trade and utilities sectors. Commercial fishing provided only 10 percent of the community's earned income during 1998 (Table 6).

Income from sources other than jobs also contributed significantly to the economy. Household income from non-wage sources averaged \$12,897 in 1998 (Table 8). Approximately half (49.8 percent) of the non-wage income came from the Alaska Permanent Fund Dividend distributions. Income from food stamps and Supplemental Security Income contributed \$635 per capita.

Table 2. Populations of several lower Kuskokwim River communities, 1880 – 1990.

Community	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
Tuluksak	150	62			73	96	88	116	137	195	236	358
Akiak	175	97			150	228	209	168	187	171	198	285
Akiachak		43	165				156	179	229	312	438	481
Kwethluk	75				136	193	186	242	325	408	454	558
Bethel		20		110	221	278	376	651	1,258	2,416	3,576	4,674
Napakiak			66	166	173		113	139	190		262	318
Napaskiak	196						67	121	154	259	244	328
Tuntutuliak	257		209		100	76		68	144	158	216	300
Eek					119		170	141	200	186	228	254

Sources: Rollins 1978 for 1880 – 1970; Alaska Department of Labor 1990 for 1980; Alaska Department of Labor 1993 for 1990.

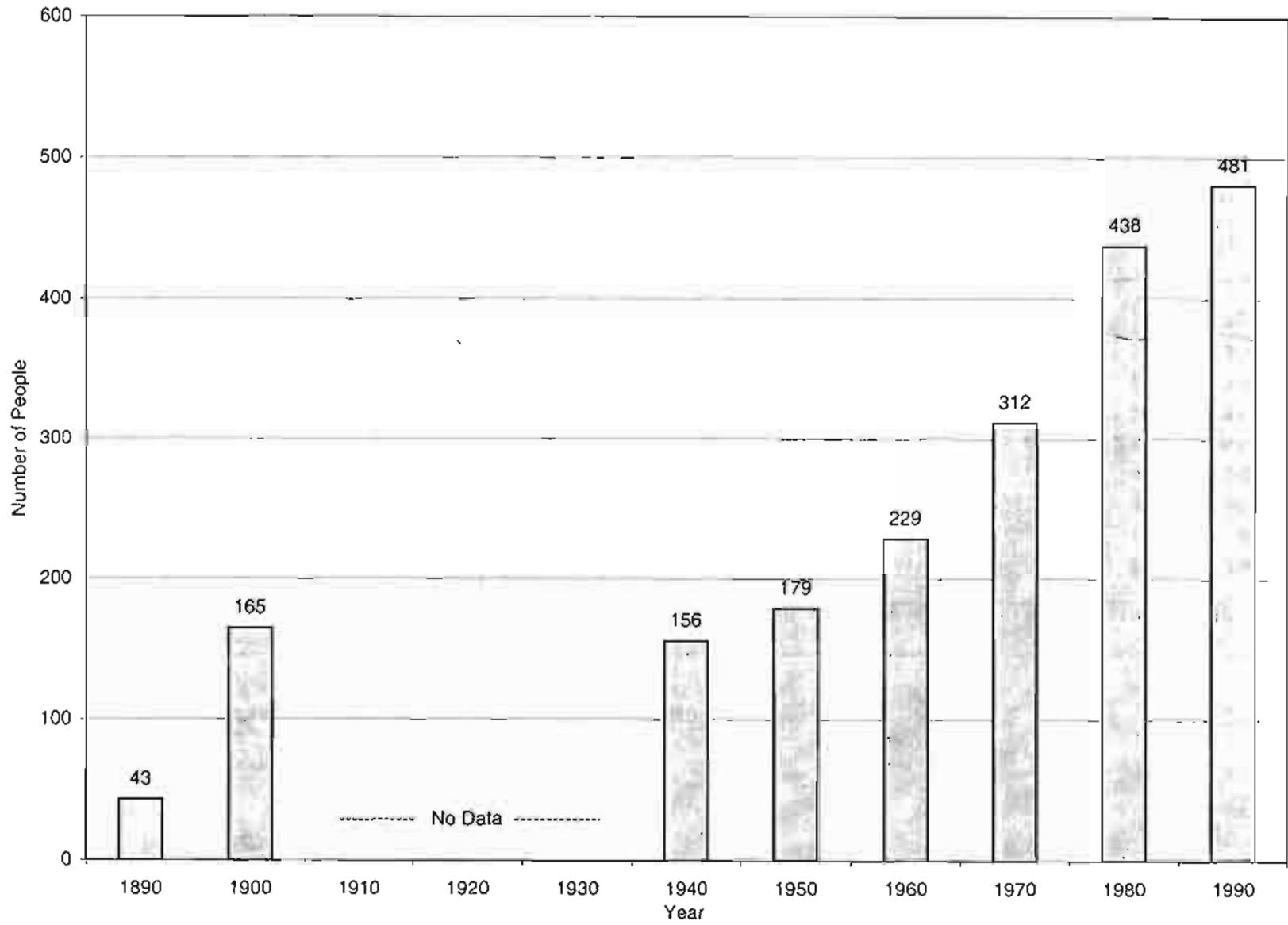


Fig. 2. Population of Akiachak, 1890 - 1990.

Table 3. Demographic characteristics of households, Akiachak, 1998

Sampled Households	81
Number of Households in the Communi	118
Percentage of Households Sampled	68.64
Household Size	
Mean	4.43
Minimum	1
Maximum	13
Sample Population	359
Estimated Community Population	522.99
Age	
Mean	26.17
Minimum	0.30
Maximum	90.00
Median	24
Length of Residency - Population	
Mean	24.56
Minimum	0.3
Maximum	87.00
Length of Residency - Household Heads	
Mean	41.17
Minimum	3
Maximum	87.00
Sex	
Males	
Number	282.62
Percentage	54.04
Females	
Number	240.37
Percentage	45.96
Alaska Native	
Households (Either Head)	
Number	118.00
Percentage	100.00
Estimated Population	
Number	520.07
Percentage	99.44

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999.

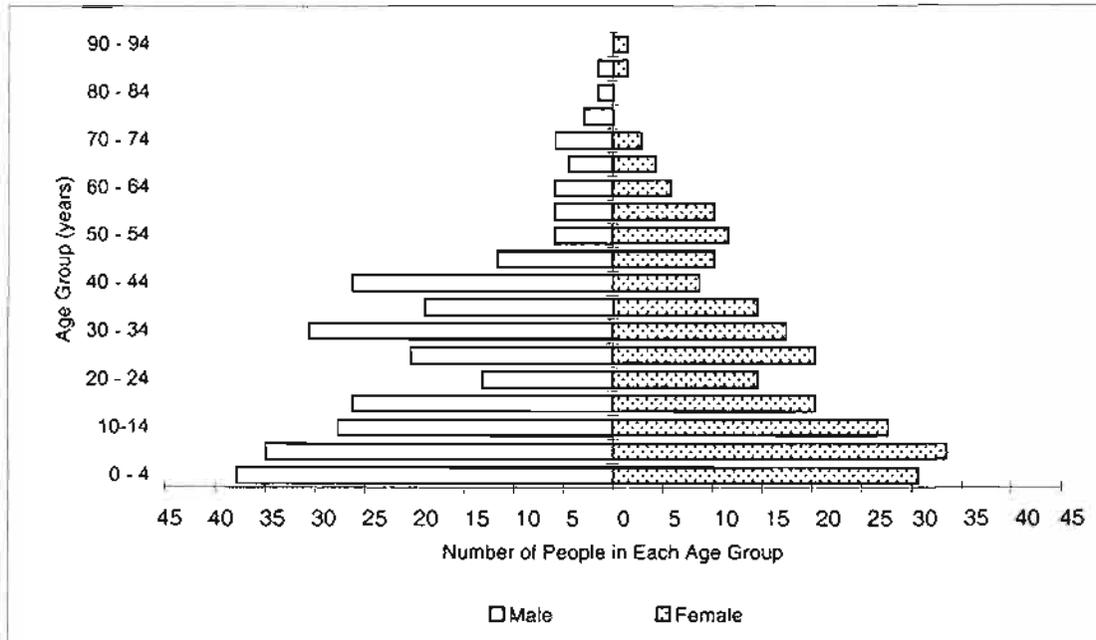


Fig. 3. Population profile, Akiachak, January 1999

Table 4. Population profile, Akiachak, January 1999

Age	Male			Female			Total		
	Number	Percent	Cumulative Percent	Number	Percent	Cumulative Percent	Number	Percent	Cumulative Percent
0 - 4	37.88	13.40%	13.40%	30.59	12.73%	12.73%	68.47	13.09%	13.09%
5-9	34.96	12.37%	25.77%	33.51	13.94%	26.67%	68.47	13.09%	26.18%
10-14	27.68	9.79%	35.57%	27.68	11.52%	38.18%	55.36	10.58%	36.77%
15 - 19	26.22	9.28%	44.85%	20.40	8.48%	46.67%	46.62	8.91%	45.68%
20 - 24	13.11	4.64%	49.48%	14.57	6.06%	52.73%	27.68	5.29%	50.97%
25 - 29	20.40	7.22%	56.70%	20.40	8.48%	61.21%	40.79	7.80%	58.77%
30 - 34	30.59	10.82%	67.53%	17.48	7.27%	68.48%	48.07	9.19%	67.97%
35 - 39	18.94	6.70%	74.23%	14.57	6.06%	74.55%	33.51	6.41%	74.37%
40 - 44	26.22	9.28%	83.51%	8.74	3.64%	78.18%	34.96	6.69%	81.06%
45 - 49	11.65	4.12%	87.63%	10.20	4.24%	82.42%	21.85	4.18%	85.24%
50 - 54	5.83	2.06%	89.69%	11.65	4.85%	87.27%	17.48	3.34%	88.58%
55 - 59	5.83	2.06%	91.75%	10.20	4.24%	91.52%	16.02	3.06%	91.64%
60 - 64	5.83	2.06%	93.81%	5.83	2.42%	93.94%	11.65	2.23%	93.87%
65 - 69	4.37	1.55%	95.36%	4.37	1.82%	95.76%	8.74	1.67%	95.54%
70 - 74	5.83	2.06%	97.42%	2.91	1.21%	96.97%	8.74	1.67%	97.21%
75 - 79	2.91	1.03%	98.45%	0.00	0.00%	96.97%	2.91	0.56%	97.77%
80 - 84	1.46	0.52%	98.97%	0.00	0.00%	96.97%	1.46	0.28%	98.05%
85 - 89	1.46	0.52%	99.48%	1.46	0.61%	97.58%	2.91	0.56%	98.61%
90 - 94	0.00	0.00%	99.48%	1.46	0.61%	98.18%	1.46	0.28%	98.89%
Unknown	1.46	0.52%	100%	4.37	1.82%	100%	5.83	1.11%	100%
Total	282.62	54%		240.37	46%		522.99	100%	

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

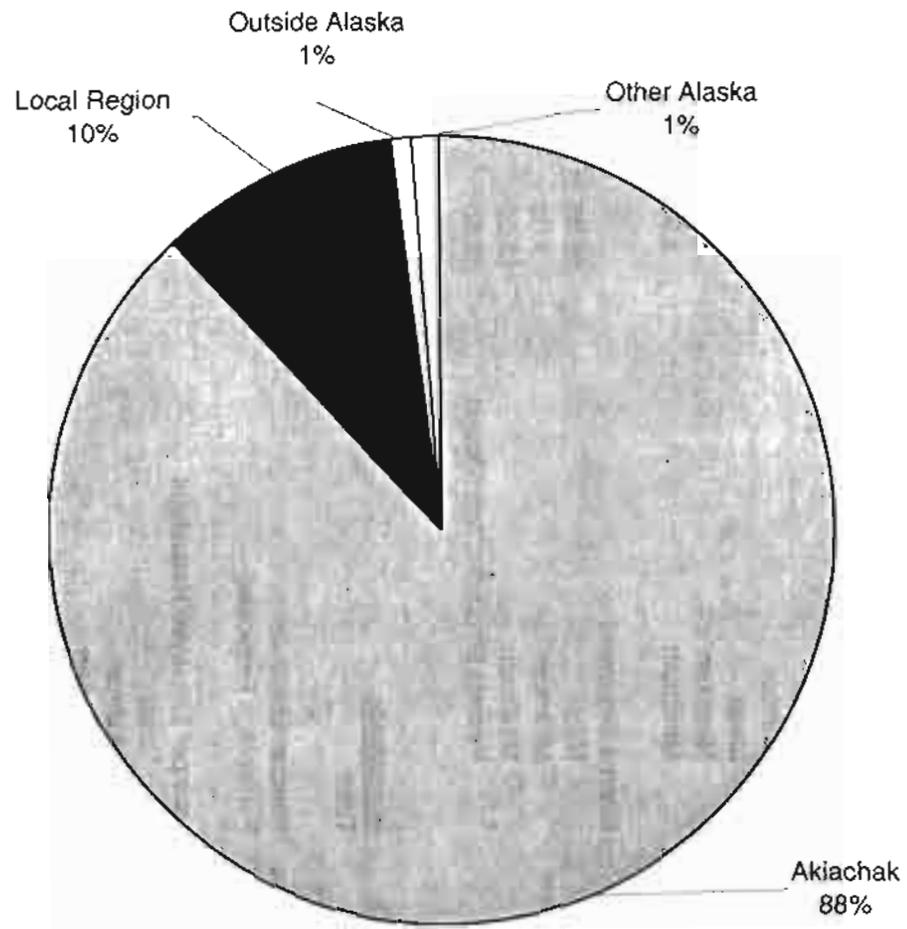


Fig. 4. Birthplaces of Akiachak residents, 1998.

Table 5. Individual and household employment characteristics, Akiachak, 1998

<u>Adults</u>	
Total	320.49
Employed Adults	
Number	199.58
Percentage	62.27
Jobs	
Number	292.81
Mean	1.47
Minimum	1.00
Maximum	5.00
Months Employed	
Mean	8.33
Minimum	1.00
Maximum	12.00
Percent Employed Year-Round	32.85
<u>Households</u>	
Total	118.00
Number Employed	104.89
Percentage Employed	88.89
Jobs per Employed Household	
Mean	2.79
Minimum	1.00
Maximum	11.00
Employed Adults per Household	
Minimum	1.00
Maximum	4.00
Mean	
Employed Households	1.90
All Households	1.69

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999.

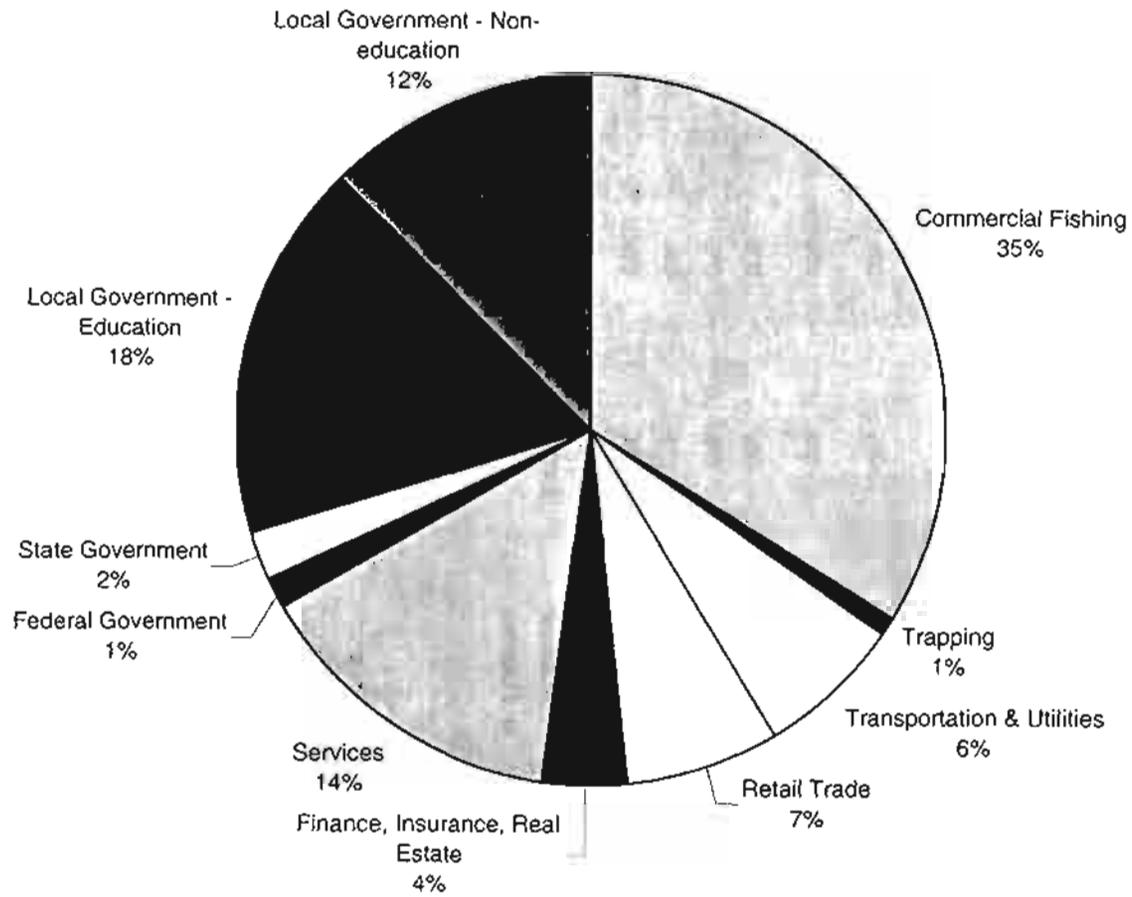


Fig. 5. Employment by industry, Akiachak, 1998.

Table 6. Employment by industry, Akiachak, 1998

Industry	Jobs	Households	Individuals	Percentage of Income
Estimated Total Number	292.81	104.89	199.58	
Agriculture, Forestry, Fishing	0%	0%	0%	10.30%
Agriculture/Forestry	0%	0%	0%	0%
Fishing, Hunting, Trapping	34.83%	76.39%	48.91%	10.30%
Commercial Fishing	33.83%	76.39%	48.91%	9.98%
Hunting/Trapping	1.00%	1.39%	1.46%	0.32%
Mining	0%	0%	0%	0%
Construction	0%	0%	0%	0%
Manufacturing	0%	0%	0%	0%
Cannery	0%	0%	0%	0%
Other Manufacturing	0%	0%	0%	0%
Logging/Timber	0%	0%	0%	0%
Transportation, Communications, and Utilities	6.47%	16.67%	9.49%	8.60%
Trade	6.97%	19.44%	10.22%	11.36%
Wholesale	0%	0%	0%	0%
Retail	6.97%	19.44%	10.22%	11.36%
Finance, Insurance, and Real Estate	3.98%	9.72%	5.11%	7.66%
Services	14.43%	34.72%	21.17%	20.08%
Government	33.33%	62.50%	42.34%	42.00%
Federal	1.49%	4.17%	2.19%	0.43%
State	1.99%	5.56%	2.92%	0.94%
Local	29.85%	61.11%	40.88%	40.63%
Local Government	12.44%	26.39%	16.79%	11.91%
Local Education	17.41%	40.28%	24.09%	28.71%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 7. Community, household, and per capita incomes, all sources and by employer types, Akiachak, 1998

Income Source	Income		
	Community Total	Average Household	Per Capita
All Sources	\$3,827,159.38	\$32,433.55	\$7,317.88
Earned Income	\$2,305,354.17	\$19,536.90	\$4,408.05
Agriculture, Forestry, Fishing	\$237,409.72	\$2,011.95	\$453.95
Agriculture	\$0.00	\$0.00	\$0.00
Forestry	\$0.00	\$0.00	\$0.00
Fishing, Hunting, Trapping	\$237,409.72	\$2,011.95	\$453.95
Commercial Fishing	\$230,052.93	\$1,949.60	\$439.88
Hunting/Trapping	\$7,356.79	\$62.35	\$14.07
Mining	\$0.00	\$0.00	\$0.00
Construction	\$0.00	\$0.00	\$0.00
Manufacturing	\$0.00	\$0.00	\$0.00
Cannery	\$0.00	\$0.00	\$0.00
Other Manufacturing	\$0.00	\$0.00	\$0.00
Logging/Timber	\$0.00	\$0.00	\$0.00
Transportation, Communications, and Utilities	\$198,298.27	\$1,680.49	\$379.16
Trade	\$261,930.86	\$2,219.75	\$500.84
Wholesale	\$0.00	\$0.00	\$0.00
Retail	\$261,930.86	\$2,219.75	\$500.84
Finance, Insurance, and Real Estate	\$176,679.51	\$1,497.28	\$337.83
Services	\$462,834.36	\$3,922.33	\$884.98
Government	\$968,201.45	\$8,205.10	\$1,851.29
Federal	\$9,928.02	\$84.14	\$18.98
State	\$21,706.17	\$183.95	\$41.50
Local	\$936,567.25	\$7,937.01	\$1,790.80
Local Government	\$274,648.64	\$2,327.53	\$525.15
Local Education	\$661,918.61	\$5,609.48	\$1,265.65
Other Income	\$1,521,805.21	\$12,896.65	\$2,909.83

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 8. Community, household and per capita non-wage income by source, Akiachak, 1998

Income Source	Non-Wage Income			
	Percentage Reporting	Community Total	Average Household	Per Capita
All Sources		\$1,521,805.21	\$12,896.65	\$2,909.83
Aid to Families with Dependent Children	11.11	\$66,036.30	\$559.63	\$126.27
Adult Public Assistance	12.35	\$68,279.75	\$578.64	\$130.56
Pension/Retirement	11.11	\$76,126.02	\$645.14	\$145.56
Longevity Bonus	16.05	\$52,298.77	\$443.21	\$100.00
Social Security	18.52	\$88,479.60	\$749.83	\$169.18
Workman's Comp./Insurance	1.23	\$8,740.74	\$74.07	\$16.71
Energy Assistance	14.81	\$8,088.10	\$68.54	\$15.47
Supplemental Security Income	20.99	\$112,665.23	\$954.79	\$215.43
Food Stamps	33.33	\$219,584.89	\$1,860.89	\$419.87
Unemployment	7.41	\$9,451.65	\$80.10	\$18.07
Native Corporation Dividend	11.11	\$14,512.54	\$122.99	\$27.75
Dividend/Interest	0.00	\$0.00	\$0.00	\$0.00
Child Support	0.00	\$0.00	\$0.00	\$0.00
Rental Income	0.00	\$0.00	\$0.00	\$0.00
Veteran Disability	0.00	\$0.00	\$0.00	\$0.00
Rental Assistance	0.00	\$0.00	\$0.00	\$0.00
Per Diem	0.00	\$0.00	\$0.00	\$0.00
Disability	0.00	\$0.00	\$0.00	\$0.00
Alaska Permanent Fund Dividend	98.77	\$758,353.95	\$6,426.73	\$1,450.04
Weatherization	0.00	\$0.00	\$0.00	\$0.00
Veteran's Assistance	0.00	\$0.00	\$0.00	\$0.00
Investments/Stocks/Bonds	0.00	\$0.00	\$0.00	\$0.00
Women, Infants, and Children Program	0.00	\$0.00	\$0.00	\$0.00
General Assistance Grant	0.00	\$0.00	\$0.00	\$0.00
Foster Care	0.00	\$0.00	\$0.00	\$0.00
Medicare/Medicaid	0.00	\$0.00	\$0.00	\$0.00
Western Alaska Fisherman Disaster	16.05	\$39,187.65	\$332.10	\$74.93

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

CHAPTER 3  
SUBSISTENCE USE AND HARVEST OF FISH AND WILDLIFE  
  
PARTICIPATION IN HARVESTING AND USING RESOURCES

Household Participation Levels

Ninety-nine percent of the Akiachak households that were interviewed reported using at least one kind of fish or wildlife resource during 1998 (Table 9). The number of resources used per household ranged from 0 to 69 and averaged approximately 41. Ninety nine percent of the households used large land mammals, plants and berries, and non-salmon fish (Table 10). More than 97 percent of households used salmon and birds, while over half (58%) used marine mammals. Very few households (3.7%) used invertebrates during the study year. Thirty-nine resources were used by more than 50 percent of the Akiachak households and an additional 16 resources were used by more than 25 percent of the households. Resource that were used by more than half of the households included several species of salmon, moose, and caribou, as well as a large variety of birds and migratory waterfowl, resident fish species, berries, small game and furbearers. Black bear, certain kinds of waterfowl, bird eggs, herring roe, and seal were among the resources used by more than 25 percent of the households.

Most Akiachak households (97.5 percent) also participated in resource harvest activities during 1998 (Table 9; Fig. 6). While individual households attempted to harvest as many as 69 different resources during the study year, on average, households attempted to harvest 37 types of wild resources. Households harvested as many as 67 different types of resources and harvested an average of about 36 resource types. Most households tried to harvest wood (96 percent), burbot (93 percent), berries

(91 percent), ducks (89 percent), salmon (88 percent), geese (88 percent), swan (86 percent), moose (84 percent), ptarmigan (84 percent), caribou (83 percent), whitefish (83 percent), pike (81 percent), smelt (76 percent), crane (76 percent), snowshoe hare (70 percent), Hudson Bay tea (65 percent), beaver (59 percent), porcupine (58 percent), and wild rhubarb (54 percent, Table 11). In general, resources were shared widely by Akiachak households during the study year. As evidence of this widespread sharing, nearly all households (91 percent) received resources from other households, and also gave resources to other households. Households received as many as 43 different resources and gave as many as 46 different resources to families in other households (Table 9). On average, households received 13 different resources and shared or gave an average of 15 different resources. Resources most commonly received included fish other than salmon (73 percent), birds and eggs (68 percent), moose (68 percent), caribou (53 percent), marine mammals (53 percent), and salmon (43 percent). Seventy three percent of households gave away birds and eggs, 65 percent gave away caribou, 59 percent gave away salmon, 51 percent gave away moose, 49 percent gave away whitefish, and 44 percent gave away burbot (Table 11).

#### Individual Participation Levels in Harvesting and Processing Resources

Overall, 84 percent of the Akiachak population participated in harvesting wild resources (Table 12). Participation in gathering berries and plants was highest (78 percent) followed by fish (57 percent), harvesting birds and game (41 percent), and harvesting furbearers (31 percent). Approximately 60 percent of the population were involved in processing resources. Participation in processing mirrored participation in

Table 9. Resource harvest and use characteristics, Akiachak, 1998

Mean Number Of Resources Used Per Household	40.9
Minimum	-
Maximum	69.0
95 % Confidence Limit (+/-)	4.3
Median	41.0
Mean Number Of Resources Attempted To Harvest Per Household	37.3
Minimum	-
Maximum	69.0
95 % Confidence Limit (+/-)	5.3
Median	40.0
Mean Number Of Resources Harvested Per Household	35.8
Minimum	-
Maximum	67.0
95 % Confidence Limit (+/-)	5.3
Median	38.0
Mean Number Of Resources Received Per Household	13.1
Minimum	-
Maximum	43.0
95 % Confidence Limit (+/-)	10.5
Median	11.0
Mean Number Of Resources Given Away Per Household	15.1
Minimum	-
Maximum	46.0
95 % Confidence Limit (+/-)	9.2
Median	15.0
Mean Household Harvest, Pounds	5,887.1
Minimum	-
Maximum	21,036.2
Total Pounds Harvested	694,675.7
Community Per Capita Harvest, Pounds	1,328.3
Percent Using Any Resource	98.8
Percent Attempting To Harvest Any Resource	97.5
Percent Harvesting Any Resource	97.5
Percent Receiving Any Resource	91.4
Percent Giving Away Any Resource	91.4
Number Of Households In Sample	81.0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999.

Table 10. Wild resources used by residents of Akiachak, 1998

Resource	Scientific Name	Yup'ik Name	Percentage of Households Using
Salmon			97.5
Chum Salmon	<i>Oncorhynchus keta</i>	<i>Iqalluk</i>	93.8
Coho Salmon	<i>Oncorhynchus kisutch</i>	<i>Qakiiyak</i>	86.4
Chinook Salmon	<i>Oncorhynchus tshawytscha</i>	<i>Taryaqvak</i>	96.3
Pink Salmon	<i>Oncorhynchus gorbuscha</i>	<i>Amaqaayak</i>	13.6
Sockeye Salmon	<i>Oncorhynchus nerka</i>	<i>Sayak</i>	92.6
Non Salmon Finfish			98.8
Herring	<i>Clupea havengus</i>	<i>Iqalluarpak</i>	16.0
Herring Roe		<i>Meluk</i>	29.6
Rainbow Smelt	<i>Osmerus mordax</i>	<i>Qusuuk</i>	84.0
Halibut	<i>Hippoglossus stenolepis</i>	<i>Natemat</i>	13.6
Lamprey	<i>Lampetra japonica</i>	<i>Nemeryaq</i>	9.9
Ninespine Stickleback	<i>Pungitius pungitius</i>	<i>Cukilek</i>	6.2
Blackfish	<i>Dalia pectoralis</i>	<i>Imangaq</i>	74.1
Burbot	<i>Lota lota</i>	<i>Manignak</i>	93.8
Dolly Varden	<i>Salvelinus malma</i>	<i>Yugyat</i>	16.0
Lake Trout	<i>Salvelinus namayacush</i>	<i>Cikigniq</i>	1.2
Grayling	<i>Thymallus arcticus</i>	<i>Culugpauk</i>	21.0
Pike	<i>Esox lucius</i>	<i>Luqruuyak</i>	82.7
Sheefish	<i>Stenodus leucichthys</i>	<i>Ciiq</i>	34.6
Sucker	<i>Catostomus catostomus</i>	<i>Cungartat</i>	6.2
Rainbow Trout	<i>Salmo gairdneri</i>	<i>Talaariq</i>	22.2
Broad Whitefish	<i>Coregonus nasus</i>	<i>Akakiik</i>	76.5
Humpback Whitefish	<i>Coregonus pidschian</i>	<i>Cingikeggliq</i>	75.3
Round Whitefish	<i>Prosopium cylindraceum</i>	<i>Caurunat</i>	2.5
Least Cisco	<i>Coregonus sardinella</i>	<i>Elluuyak</i>	7.4
Land Mammals			98.8
Black Bear	<i>Ursus americanus</i>	<i>Tan'gerliq</i>	40.7
Brown Bear	<i>Ursus arctos</i>	<i>Taqukaq</i>	11.1
Caribou	<i>Rangifer tarandus</i>	<i>Tuntuplat</i>	95.1
Moose	<i>Alces alces</i>	<i>Tuntuvak</i>	95.1
Beaver	<i>Castor canadensis</i>	<i>Paluqtaq</i>	70.4
Wolf	<i>Canis lupus</i>	<i>Kegluneq</i>	1.2
Coyote	<i>Canis latrans</i>	<i>Kayu</i>	1.2
Wolverine	<i>Gulo gulo</i>	<i>Terikaniaq</i>	1.2

Table 10. Wild resources used by residents of Akiachak, 1998 (continued)

Resource	Scientific Name	Yup'ik Name	Percentage of Households Using
Red Fox	<i>Vulpes fulva</i>	<i>Kaviaq</i>	6.2
Arctic Hare	<i>Lepus othus</i>	<i>Qayuqeggliq</i>	1.2
Snowshoe Hare	<i>Lepus Americanus</i>	<i>Maqaruaq</i>	81.5
Land Otter	<i>Lutra canadensis</i>	<i>Ciugnilnguq</i>	27.2
Lynx	<i>Felis canadensis</i>	<i>Terrtuleq</i>	7.4
Marmot	<i>Marmota caligata</i>	<i>Cikigpak</i>	0.0
Marten	<i>Martes americana</i>	<i>Qavcicuaq</i>	4.9
Mink	<i>Mustela vison</i>	<i>Imarmiutaq</i>	6.2
Muskrat	<i>Odatra zibethicus</i>	<i>Kanaqlak, tevyuli</i>	22.2
Porcupine	<i>Erethizon dorsatum</i>	<i>Issaluq</i>	70.4
Parka Squirrel	<i>Spermophilus undulatus</i>	<i>Qanganaq</i>	3.7
Tree Squirrel	<i>Tamiasciurus hudsonicus</i>	<i>Qiguq</i>	2.5
Weasel	<i>Mustela erminea</i>	<i>Narullgiq</i>	3.7
Marine Mammals			58.0
Bearded Seal	<i>Erignathus barbatus</i>	<i>Maklak</i>	17.3
Ribbon Seal	<i>Phoca fasciata</i>	<i>Qasruliq</i>	1.2
Ringed Seal	<i>Phoca hispida</i>	<i>Nayik</i>	14.8
Spotted Seal	<i>Phoca largha</i>	<i>Issurriq</i>	27.2
Seal Oil		<i>Uquq</i>	27.2
Steller Sea Lion	<i>Eumetopias jubatus</i>	<i>Uginaq</i>	1.2
Walrus	<i>Odobenus rosamarus divergens</i>	<i>Asveq</i>	22.2
Belukha	<i>Delphinapterus leucas</i>	<i>Cituaq</i>	7.4
Bowhead	<i>Balaena mysticetus</i>	<i>Arveq</i>	1.2
Birds and Eggs			97.5
Bufflehead	<i>Bucephala albeola</i>	<i>Pugtaqutaygaq</i>	16.0
Common Eider	<i>Somateria mollissima</i>	<i>Metraq</i>	2.5
King Eider	<i>Somateria spectabilis</i>	<i>Qengallek</i>	12.3
Spectacled Eider	<i>Somateria fisheri</i>	<i>Quageq</i>	2.5
Steller's Eider	<i>Polysticta stelleri</i>	<i>Caqiar (aq)</i>	0.0
Goldeneye	<i>Bucephala clangula</i>	<i>Anamiilnguq</i>	54.3
Harlequin	<i>Histrionicus histrionicus</i>	<i>Cetuskar</i>	16.0
Mallard	<i>Anas platyrhynchos</i>	<i>Uqsuqerpak</i>	88.9
Common Merganser	<i>Mergus merganser</i>	<i>Payirpaq</i>	4.9
Red-Breasted Merganser	<i>Mergus serrator</i>	<i>Payiq</i>	2.5
Long Tailed Duck	<i>Ciangula hyemalis</i>	<i>Aarraangliq</i>	55.6

Table 10. Wild resources used by residents of Akiachak, 1998 (continued)

Resource	Scientific Name	Yup'ik Name	Percentage of Households Using
Northern Pintail	<i>Anas acuta</i>	<i>Uqsuqaq</i>	81.5
Scaup	<i>Aythya marila</i>	<i>Kep'alek</i>	80.2
Black Scoter	<i>Melanitta nigra</i>	<i>Tungunqeggliq</i>	88.9
Surf Scoter	<i>Melanitta perspicillata</i>	<i>Akacakayak</i>	74.1
White-winged Scoter	<i>Melanitta deglandi</i>	<i>Akacakayak</i>	1.2
Northern Shoveler	<i>Anas clypeata</i>	<i>Curcurpak</i>	45.7
Green Winged Teal	<i>Anas crecca</i>	<i>Tengesqaar</i>	45.7
Wigeon	<i>Anas penelope</i>	<i>Qatkehliq</i>	69.1
Pacific Black Brant	<i>Branta bernicla</i>	<i>Neqlernaq</i>	12.3
Cacklers	<i>Branta minima</i>	<i>Lakcakcar</i>	80.2
Lesser Canada Geese	<i>Branta parvipes</i>	<i>Lagiq</i>	90.1
Emperor Geese	<i>Phalacrocorax auritus</i>	<i>Nacaullek</i>	9.9
Snow Geese	<i>Chen caerulescens</i>	<i>Kanguq</i>	3.7
White-fronted Geese	<i>Anser albifrons</i>	<i>Leqleq</i>	87.7
Tundra Swan	<i>Olor columbianus</i>	<i>Qugyuk</i>	96.3
Sandhill Crane	<i>Grus canadensis</i>	<i>Qucillgaq</i>	76.5
Gulls	<i>Larus sp.</i>	<i>Naruyarpak</i>	0.0
Arctic Loon	<i>Gavia arctica</i>	<i>Tunutellek</i>	28.4
Common Loon	<i>Gavia immer</i>	<i>Tuullek</i>	18.5
Red-Throated Loon	<i>Gavia stellata</i>	<i>Qaqatak</i>	4.9
Yellow-Billed Loon	<i>Gavia adamsii</i>	<i>Tuullegpak</i>	3.7
Common Murre	<i>Uria aalge</i>	<i>Alpaq</i>	0.0
Arctic Tern	<i>Sterna paradisaea</i>	<i>Teqiyaar</i>	0.0
Grouse	<i>Canachites, Bonasa</i>	<i>Egtuk</i>	29.6
Ptarmigan	<i>Lagopus sp.</i>	<i>Qangqiiq, Aqessgiq</i>	92.6
Duck Eggs		<i>Uqsuqinraat</i>	28.4
Geese Eggs		<i>Lagilinraat</i>	35.8
Swan Eggs		<i>Qugyinraat</i>	30.9
Gull Eggs		<i>Naruyinraat</i>	22.2
Invertebrates			3.7
Saltwater Clams	Species unknown	<i>Uiluq</i>	3.7
Freshwater Mussels	Species unknown	<i>Qapilaaq</i>	0.0
Plants and Berries			98.8
Blueberry	<i>Vaccinium uliginosum</i>	<i>Curaq</i>	88.9
Boysenberry	<i>Rubus arcticus</i>	<i>Puyurvat</i>	39.5

Table 10. Wild resources used by residents of Akiachak, 1998 (continued)

Resource	Scientific Name	Yup'ik Name	Percentage of Households Using
Low Bush Cranberry	Vaccinium vitis	<i>Kavirliq</i>	77.8
Raspberry	Rubus idaeus	<i>Tumaglit</i>	1.2
Salmonberry	Rubus chamaemorus	<i>Atsalluqpiq</i>	88.9
Blackberry	Empetrum nigrum	<i>Tan'gerpak</i>	51.9
Wild Rhubarb	Polygonum alaskanum	<i>Tamat</i>	56.8
Labrador Tea	Ledum palustre	<i>Ayuq</i>	66.7
Sourdock	Rumex arcticus	<i>Quagciq</i>	51.9
Wild Celery	Heracleum lanatum	<i>litut</i>	22.2
Wild Rose Hips	Rosa acicularis	<i>Tutarvat</i>	37.0
Stinkweed	Artemisia sp.	<i>Caiggluk, Qanganaru</i>	59.3
Mousefoods		<i>Qet'eq</i>	37.0
Fungus		<i>Kumakaq</i>	79.0
Wood		<i>Murak</i>	97.5

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

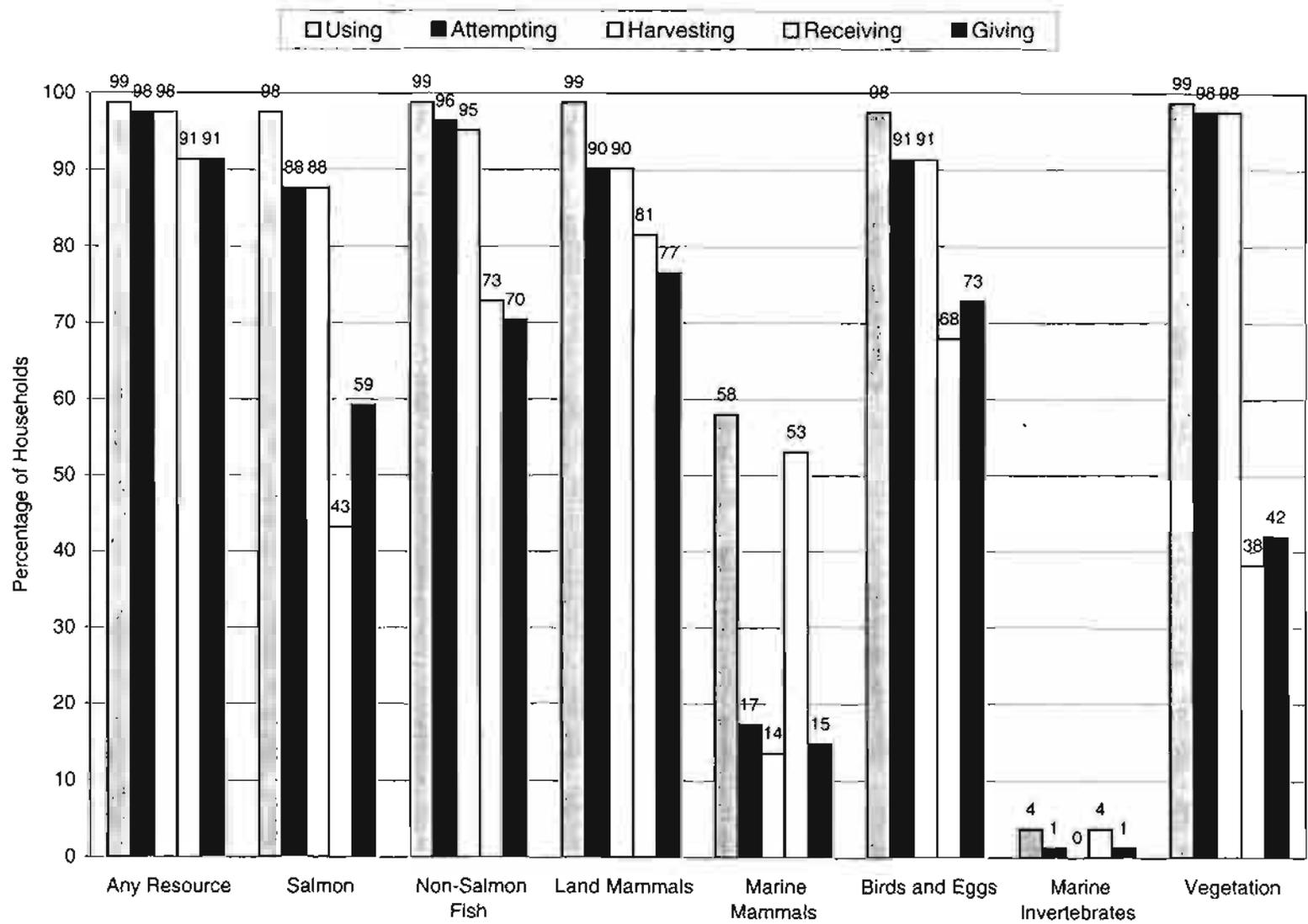


Fig. 6. Household participation in resource harvest and use by category, Akiachak 1998.

Table 11. Estimated harvest and use of fish, game, and plant resources, Akiachak, 1998

Resource	Percentage of Households					Pounds Harvested			Number Harvested		95% Conf Limit (+/-)	
	Used	Attmp	Harvest	Recvd	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
All Resources	98.8	97.5	97.5	91.4	91.4	694,675.72	5,887.08	1,328.28			8.39%	9.23%
Fish	98.8	96.3	95.1	74.1	77.8	469,321.40	3,977.30	897.39			10.22%	11.50%
Salmon	97.5	87.7	87.7	43.2	59.3	339,495.18	2,877.08	649.15	34,438.52	291.85	12.45%	13.07%
Chum Salmon	93.8	85.2	85.2	22.2	44.4	63,632.59	539.26	121.67	10,605.43	89.88	18.05%	19.48%
Coho Salmon	86.4	77.8	77.8	30.9	35.8	29,805.93	252.59	56.99	4,967.65	42.10	14.83%	15.52%
Chinook Salmon	96.3	87.7	87.7	33.3	50.6	206,221.75	1,747.64	394.31	12,130.69	102.80	11.96%	12.73%
Pink Salmon	13.6	16.0	12.3	4.9	3.7	536.54	4.55	1.03	185.01	1.57	45.49%	46.83%
Sockeye Salmon	92.6	84.0	84.0	27.2	39.5	39,298.37	333.04	75.14	6,549.73	55.51	13.77%	15.52%
Non-Salmon Fish	98.8	96.3	95.1	72.8	70.4	129,826.22	1,100.22	248.24			12.31%	13.19%
Herring	16.0	3.7	1.2	16.0	1.2	131.11	1.11	0.25	21.85 gal	0.19	111.44%	108.94%
Herring Roe	29.6	9.9	4.9	28.4	2.5	236.00	2.00	0.45	39.33 gal	0.33	61.60%	58.44%
Rainbow Smelt	84.0	76.5	76.5	24.7	25.9	14,728.15	124.81	28.16	2,454.69 gal	20.80	13.99%	16.21%
Halibut	13.6	6.2	3.7	12.3	4.9	553.58	4.69	1.06	27.68	0.23	74.78%	71.23%
Lamprey	9.9	1.2	1.2	9.9	1.2	174.81	1.48	0.33	29.14 gal	0.25	111.44%	111.48%
Stickleback (needlefish)	6.2	2.5	2.5	4.9	1.2	437.04	3.70	0.84	36.42 gal	0.31	79.89%	80.13%
Blackfish	74.1	64.2	60.5	44.4	34.6	35,557.33	301.33	67.99	2,963.11 gal	25.11	25.40%	25.11%
Burbot	93.8	92.6	91.4	24.7	44.4	23,167.33	196.33	44.30	5,090.02	43.14	10.71%	11.46%
Dolly Varden	16.0	17.3	16.0	1.2	6.2	474.19	4.02	0.91	316.12	2.68	55.00%	54.96%
Grayling	21.0	21.0	21.0	2.5	6.2	583.44	4.94	1.12	388.96	3.30	45.59%	46.91%
Pike	82.7	81.5	80.2	17.3	21.0	19,797.78	167.78	37.86	4,399.51	37.28	13.37%	14.41%
Sheefish	34.6	34.6	34.6	0.0	3.7	1,335.15	11.31	2.55	205.41	1.74	27.34%	27.05%
Sucker	6.2	6.2	6.2	0.0	1.2	8.74	0.07	0.02	8.74	0.07	51.37%	51.58%
Trout	22.2	22.2	22.2	2.5	3.7	606.02	5.14	1.16	303.01	2.57	42.84%	43.75%
Lake Trout	1.2	0.0	0.0	1.2	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Rainbow Trout	22.2	22.2	22.2	2.5	3.7	606.02	5.14	1.16	303.01	2.57	42.84%	43.75%
Broad Whitefish	76.5	71.6	71.6	25.9	23.5	16,671.51	141.28	31.88	4,167.88	35.32	24.54%	25.79%
Cisco	7.4	7.4	7.4	0.0	3.7	264.41	2.24	0.51	352.54	2.99	57.93%	56.70%
Humpback Whitefish	75.3	74.1	71.6	30.9	38.3	14,465.93	122.59	27.66	7,232.96	61.30	22.74%	23.82%
Round Whitefish	2.5	2.5	2.5	0.0	1.2	633.70	5.37	1.21	422.47	3.58	82.08%	82.71%
Land Mammals	98.8	90.1	90.1	81.5	76.5	141,666.28	1,200.56	270.88	4,087.75	34.64	14.46%	8.94%
Large Land Mammals	97.5	87.7	87.7	71.6	71.6	127,884.32	1,083.77	244.53	524.44	4.44	10.36%	9.25%
Black Bear	40.7	45.7	25.9	27.2	13.6	5,462.96	46.30	10.45	36.42	0.31	23.43%	21.33%
Brown Bear	11.1	8.6	6.2	7.4	2.5	1,456.79	12.35	2.79	7.28	0.06	48.57%	49.67%
Caribou	95.1	82.7	82.7	53.1	65.4	44,927.41	380.74	85.91	374.40	3.17	11.14%	11.51%
Moose	95.1	84.0	67.9	63.0	50.6	76,037.16	644.38	145.39	106.35	0.90	12.21%	10.71%

Table 11. Estimated harvest and use of fish, game, and plant resources, Akiachak, 1998 (continued)

Resource	Percentage of Households					Pounds Harvested			Number Harvested		95% Conf Limit (+/-)	
	Used	Attmp	Harvest	Recvd	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
Small Land Mammals	87.7	77.8	77.8	43.2	59.3	13,781.96	116.80	26.35	3,563.31	30.20	15.78%	17.45%
Beaver	70.4	59.3	59.3	25.9	35.8	6,490.00	55.00	12.41	432.67	3.67	26.70%	27.36%
Coyote	1.2	1.2	1.2	0.0	0.0	0.00	0.00	0.00	4.37	0.04	111.44%	0.00%
Arctic Fox	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Red Fox	6.2	6.2	6.2	1.2	0.0	0.00	0.00	0.00	87.41	0.74	93.25%	0.00%
Arctic Hare	1.2	6.2	0.0	1.2	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Snowshoe Hare	81.5	70.4	69.1	28.4	49.4	5,801.67	49.17	11.09	2,338.15	19.81	14.72%	15.49%
Land Otter	27.2	27.2	24.7	2.5	6.2	244.74	2.07	0.47	81.58	0.69	34.29%	32.66%
Lynx	7.4	7.4	6.2	2.5	3.7	11.65	0.10	0.02	13.11	0.11	65.93%	79.03%
Marmot	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Marten	4.9	4.9	4.9	1.2	1.2	0.00	0.00	0.00	23.31	0.20	79.55%	0.00%
Mink	6.2	6.2	6.2	1.2	0.0	32.05	0.27	0.06	23.31	0.20	54.66%	62.25%
Muskrat	22.2	21.0	21.0	4.9	6.2	155.15	1.31	0.30	206.86	1.75	34.34%	33.92%
Porcupine	70.4	58.0	56.8	19.8	27.2	1,025.58	8.69	1.96	256.40	2.17	16.26%	14.86%
Parka Squirrel	3.7	3.7	3.7	1.2	1.2	21.12	0.18	0.04	42.25	0.36	87.37%	88.12%
Tree Squirrel	2.5	2.5	2.5	0.0	0.0	0.00	0.00	0.00	17.48	0.15	79.41%	0.00%
Weasel	3.7	3.7	3.7	0.0	0.0	0.00	0.00	0.00	13.11	0.11	65.93%	0.00%
Wolf	1.2	2.5	1.2	0.0	0.0	0.00	0.00	0.00	21.85	0.19	111.44%	0.00%
Wolverine	1.2	1.2	1.2	0.0	0.0	0.00	0.00	0.00	1.46	0.01	111.44%	0.00%
Marine Mammals	58.0	17.3	13.6	53.1	14.8	16,056.74	136.07	30.70			46.76%	46.84%
Seal	55.6	16.0	13.6	49.4	12.3	9,792.54	82.99	18.72			47.50%	48.02%
Bearded Seal	17.3	11.1	6.2	13.6	6.2	4,370.37	37.04	8.36	14.57	0.12	62.20%	63.06%
Ribbon Seal	1.2	2.5	1.2	0.0	0.0	134.02	1.14	0.26	1.46	0.01	111.44%	108.94%
Ringed Seal	14.8	9.9	6.2	9.9	7.4	1,826.81	15.48	3.49	27.68	0.23	73.37%	74.11%
Spotted Seal	27.2	14.8	12.3	19.8	9.9	3,461.33	29.33	6.62	26.22	0.22	37.38%	36.93%
Unknown Seal Oil	27.2	1.2	0.0	27.2	1.2	0.00	0.00	0.00	0.00 gal	0.00	0.00%	0.00%
Unknown Seal	9.9	0.0	0.0	9.9	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Steller Sea Lion	1.2	0.0	0.0	1.2	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Walrus	22.2	7.4	3.7	18.5	8.6	4,807.41	40.74	9.19	4.37	0.04	63.53%	61.74%
Whale	8.6	1.2	1.2	8.6	1.2	1,456.79	12.35	2.79	1.46	0.01	111.44%	112.73%
Belukha	7.4	1.2	1.2	7.4	0.0	1,456.79	12.35	2.79	1.46	0.01	111.44%	112.73%
Bowhead	1.2	0.0	0.0	1.2	1.2	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Birds and Eggs	97.5	91.4	91.4	67.9	72.8	35,824.13	303.59	68.50	24,648.89	208.89	11.22%	10.13%
Migratory Birds	97.5	88.9	88.9	64.2	63.0	29,620.90	251.02	56.64	16,318.96	138.30	11.69%	11.06%
Ducks	97.5	88.9	88.9	58.0	55.6	9,209.96	78.05	17.61	10,850.17	91.95	12.10%	11.68%

Table 11. Estimated harvest and use of fish, game, and plant resources, Akiachak, 1998 (continued)

Resource	Percentage of Households					Pounds Harvested			Number Harvested		95% Conf Limit (+/-)	
	Used	Attmpt	Harvest	Recvd	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
Bufflehead	16.0	18.5	14.8	4.9	8.6	44.87	0.38	0.09	112.17	0.95	41.13%	41.77%
Common Eider	2.5	2.5	2.5	1.2	1.2	51.51	0.44	0.10	23.31	0.20	104.62%	102.10%
King Eider	12.3	7.4	7.4	8.6	3.7	285.40	2.42	0.55	199.58	1.69	89.95%	87.35%
Spectacled Eider	2.5	2.5	2.5	0.0	0.0	35.40	0.30	0.07	14.57	0.12	91.62%	89.20%
Steller Eider	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Goldeneye	54.3	55.6	53.1	13.6	24.7	461.51	3.91	0.88	576.89	4.89	19.56%	18.82%
Harlequin	16.0	18.5	13.6	3.7	2.5	45.16	0.38	0.09	90.32	0.77	42.36%	42.13%
Mallard	88.9	80.2	79.0	29.6	29.6	1,161.06	9.84	2.22	1,161.06	9.84	12.89%	13.47%
Merganser	6.2	4.9	3.7	3.7	1.2	20.13	0.17	0.04	23.31	0.20	77.68%	80.35%
Common Merganser	4.9	3.7	2.5	3.7	1.2	11.10	0.09	0.02	8.74	0.07	94.48%	94.53%
Red-Breasted Merganser	2.5	2.5	2.5	1.2	1.2	9.03	0.08	0.02	14.57	0.12	78.30%	78.14%
Long Tailed Duck	55.6	56.8	55.6	12.3	23.5	363.61	3.08	0.70	454.52	3.85	20.17%	20.59%
Northern Pintail	81.5	74.1	72.8	30.9	43.2	1,011.60	8.57	1.93	1,264.49	10.72	15.48%	16.99%
Scaup	80.2	76.5	74.1	28.4	42.0	1,455.33	12.33	2.78	1,617.04	13.70	14.43%	14.33%
Black Scoter	88.9	82.7	82.7	29.6	42.0	2,029.60	17.20	3.88	2,255.11	19.11	16.20%	14.35%
Surf Scoter	74.1	71.6	70.4	24.7	30.9	1,299.31	11.01	2.48	1,443.68	12.23	19.69%	17.87%
White-winged Scoter	1.2	1.2	1.2	0.0	0.0	11.80	0.10	0.02	13.11	0.11	111.44%	111.17%
Northern Shoveler	45.7	45.7	43.2	9.9	16.0	178.31	1.51	0.34	297.19	2.52	20.03%	20.42%
Green Winged Teal	45.7	42.0	40.7	16.0	18.5	118.00	1.00	0.23	393.33	3.33	28.39%	29.02%
Wigeon	69.1	66.7	64.2	22.2	32.1	637.35	5.40	1.22	910.49	7.72	15.49%	16.42%
Geese	95.1	87.7	86.4	44.4	51.9	7,965.44	67.50	15.23	4,016.37	34.04	14.52%	14.82%
Brant	12.3	11.1	9.9	3.7	1.2	75.17	0.64	0.14	62.64	0.53	47.10%	45.51%
Cackling Canada Geese	80.2	76.5	75.3	30.9	43.2	1,150.28	9.75	2.20	958.57	8.12	13.63%	15.01%
Lesser Canada Geese	90.1	81.5	81.5	27.2	38.3	3,206.10	27.17	6.13	1,526.72	12.94	15.65%	16.51%
Emperor Geese	9.9	7.4	6.2	3.7	3.7	349.63	2.96	0.67	139.85	1.19	75.52%	73.53%
Snow Geese	3.7	6.2	1.2	2.5	1.2	100.52	0.85	0.19	43.70	0.37	111.44%	108.94%
White-fronted Geese	87.7	81.5	79.0	28.4	48.1	3,083.73	26.13	5.90	1,284.89	10.89	17.91%	17.66%
Tundra Swan (whistling)	96.3	86.4	84.0	32.1	49.4	8,026.91	68.02	15.35	802.69	6.80	12.66%	11.71%
Crane	76.5	76.5	70.4	17.3	32.1	3,646.64	30.90	6.97	434.12	3.68	17.49%	15.66%
Sandhill Crane	76.5	76.5	70.4	17.3	32.1	3,646.64	30.90	6.97	434.12	3.68	17.49%	15.66%
Gulls	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Loons	33.3	32.1	30.9	11.1	7.4	771.95	6.54	1.48	215.60	1.83	28.89%	28.22%
Arctic (Pacific) Loon	28.4	27.2	25.9	8.6	7.4	467.63	3.96	0.89	155.88	1.32	31.71%	32.32%
Common Loon	18.5	17.3	17.3	7.4	1.2	206.05	1.75	0.39	37.88	0.32	31.00%	31.33%
Red-Throated Loon	4.9	4.9	4.9	0.0	0.0	45.83	0.39	0.09	16.02	0.14	62.43%	62.20%

Table 11. Estimated harvest and use of fish, game, and plant resources, Akiachak, 1998 (continued)

Resource	Percentage of Households					Pounds Harvested			Number Harvested		95% Conf Limit (+/-)	
	Used	Attmpt	Harvest	Recvd	Give	Total	Mean HH	Percapita	Total	Mean HH	Harvest	Percapita
Yellow-Billed Loon	3.7	3.7	3.7	0.0	0.0	52.44	0.44	0.10	5.83	0.05	67.53%	67.34%
Murre	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Tern	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00%	0.00%
Upland Game Birds	92.6	84.0	84.0	34.6	54.3	5,595.53	47.42	10.70	5,595.53	47.42	11.50%	12.65%
Grouse	29.6	29.6	29.6	4.9	11.1	145.68	1.23	0.28	145.68	1.23	30.56%	31.32%
Ptarmigan	92.6	84.0	84.0	34.6	54.3	5,449.85	46.19	10.42	5,449.85	46.19	11.46%	12.59%
Bird Eggs	39.5	38.3	37.0	12.3	25.9	607.70	5.15	1.16	2,734.40	23.17	33.96%	34.67%
Duck Eggs	28.4	28.4	27.2	6.2	14.8	100.74	0.85	0.19	671.58	5.69	39.76%	37.39%
Geese Eggs	35.8	35.8	34.6	9.9	23.5	111.88	0.95	0.21	745.88	6.32	24.70%	24.04%
Swan Eggs	30.9	30.9	29.6	7.4	19.8	102.27	0.87	0.20	340.89	2.89	25.57%	26.52%
Gull Eggs	22.2	22.2	19.8	7.4	13.6	292.81	2.48	0.56	976.05	8.27	57.01%	54.93%
Marine Invertebrates	3.7	1.2	0.0	3.7	1.2	0.00	0.00	0.00	0.00 gal	0.00	0.00%	0.00%
Clams	3.7	1.2	0.0	3.7	1.2	0.00	0.00	0.00	0.00 gal	0.00	0.00%	0.00%
Mussels	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00 gal	0.00	0.00%	0.00%
Vegetation	98.8	97.5	97.5	38.3	42.0	31,807.16	269.55	60.82			11.74%	12.31%
Berries	95.1	91.4	91.4	28.4	28.4	24,801.46	210.18	47.42	4,152.39 gal	35.19	12.32%	12.36%
Blueberry	88.9	86.4	86.4	12.3	12.3	6,004.89	50.89	11.48	1,000.81 gal	8.48	17.95%	19.14%
Boysenberry	39.5	37.0	37.0	3.7	0.0	217.76	1.85	0.42	54.44 gal	0.46	19.75%	18.68%
Low Bush Cranberry	77.8	70.4	70.4	16.0	12.3	3,772.72	31.97	7.21	838.38 gal	7.10	17.33%	18.87%
Raspberry	1.2	1.2	1.2	0.0	0.0	58.27	0.49	0.11	14.57 gal	0.12	111.44%	110.85%
Salmonberry	88.9	84.0	84.0	13.6	22.2	12,344.11	104.61	23.60	1,763.44 gal	14.94	11.29%	10.91%
Blackberry	51.9	44.4	43.2	16.0	8.6	2,403.70	20.37	4.60	480.74 gal	4.07	27.25%	26.39%
Plants/Greens/Mushrooms	93.8	92.6	92.6	29.6	27.2	7,005.70	59.37	13.40	5,437.47 gal	46.08	14.85%	17.98%
Wild Rhubarb	56.8	54.3	54.3	9.9	13.6	2,977.68	25.23	5.69	744.42 gal	6.31	19.66%	19.42%
Hudson Bay Tea	66.7	65.4	65.4	7.4	9.9	530.27	4.49	1.01	265.14 gal	2.25	20.33%	21.26%
Sourdock	51.9	46.9	46.9	6.2	6.2	984.79	8.35	1.88	246.20 gal	2.09	20.11%	20.52%
Wild Celery	22.2	21.0	21.0	6.2	6.2	547.75	4.64	1.05	136.94 gal	1.16	66.41%	67.85%
Wild Rose Hips	37.0	35.8	35.8	2.5	2.5	388.96	3.30	0.74	129.65 gal	1.10	31.74%	32.17%
Stinkweed	59.3	56.8	56.8	4.9	4.9	460.35	3.90	0.88	230.17 gal	1.95	20.93%	20.73%
Fungus	79.0	75.3	75.3	7.4	9.9	0.00	0.00	0.00	3,405.98 gal	28.86	19.78%	0.00%
Unknown Greens From Land	2.5	2.5	2.5	0.0	0.0	17.48	0.15	0.03	4.37 gal	0.04	82.64%	82.56%
Mousefoods (roots)	37.0	35.8	35.8	7.4	11.1	1,098.42	9.31	2.10	274.60 gal	2.33	38.18%	38.97%
Wood	97.5	96.3	96.3	6.2	9.9	0.00	0.00	0.00	719.65 crd	6.10	8.98%	0.00%
Other Wood	97.5	96.3	96.3	6.2	9.9	0.00	0.00	0.00	719.65 crd	6.10	8.98%	0.00%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 12. Participation in the harvest and processing of wild resources, Akiachak, 1998

Estimated Total Number of People	523.0
Hunted Game	
Number	217.1
Percentage	41.5
Processed Game	
Number	236.0
Percentage	45.1
Fished	
Number	297.2
Percentage	56.8
Processed Fish	
Number	259.3
Percentage	49.6
Hunted or Trapped Furbearers	
Number	164.6
Percentage	31.5
Processed Furbearers	
Number	193.8
Percentage	37.0
Gathered Plants	
Number	406.4
Percentage	77.7
Processed Plants	
Number	269.5
Percentage	51.5
Attempted Harvesting Any Resource	
Number	441.4
Percent	84.4
Processed Any Resource	
Number	316.1
Percent	60.4

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

harvesting; plants (51 percent) followed by fish (50 percent), birds and game (45 percent) and furbearers (37 percent).

### SEASONAL ROUND OF HARVEST ACTIVITIES

The seasonal round depicted in Figure 7 illustrates the times of the year that Akiachak residents were typically involved in resource harvest activities from 1988 through 1997. The chart is based on harvest timing information obtained through the household surveys as well as information provided by key respondents. Some migratory species such as ducks, geese, cranes and swans are only available seasonally. Some fish species, such as salmon, are anadromous making them available only seasonally. For these types of resources, harvest activity is focused in a few weeks or months of the year. During much of June and July, subsistence harvest activities were focused largely on salmon. Similarly, smelt and herring were available for a brief period during late May or early June during which time harvest effort is focused on them. In contrast, several fish species such as whitefish, pike and burbot were available on a year round basis and were harvested whenever the need and environmental conditions allow. Some of these fish were harvested throughout the winter months. Other resident fish species such as blackfish were harvested primarily during late fall and early winter as they move under the ice through shallow tributary streams to deeper water. Hunting for moose, caribou and bear occurs throughout much of the fall, winter and spring. Small game such as porcupine, hare and ptarmigan, as well as some furbearers, were harvested during late fall, throughout the winter, spring, and early summer. Marine mammals were typically harvested during spring, summer, and fall. Green plants and berries were harvested during late spring and summer, however, some plants such as Hudson Bay tea were harvested year round. Gathering wood for fuel is a year round activity.

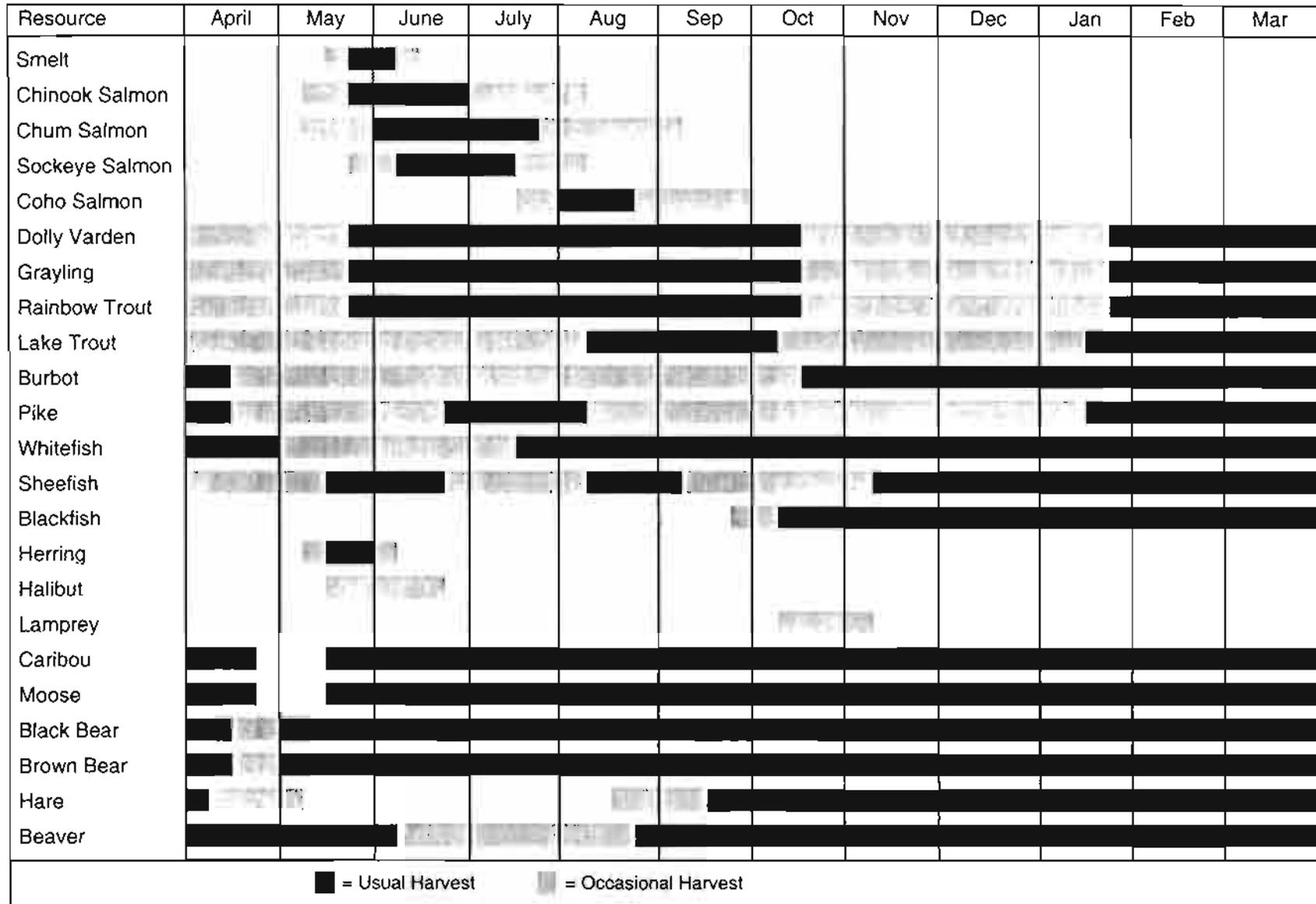


Fig. 7. Seasonal round of subsistence harvest activities, Akiachak, 1987 to 1998.

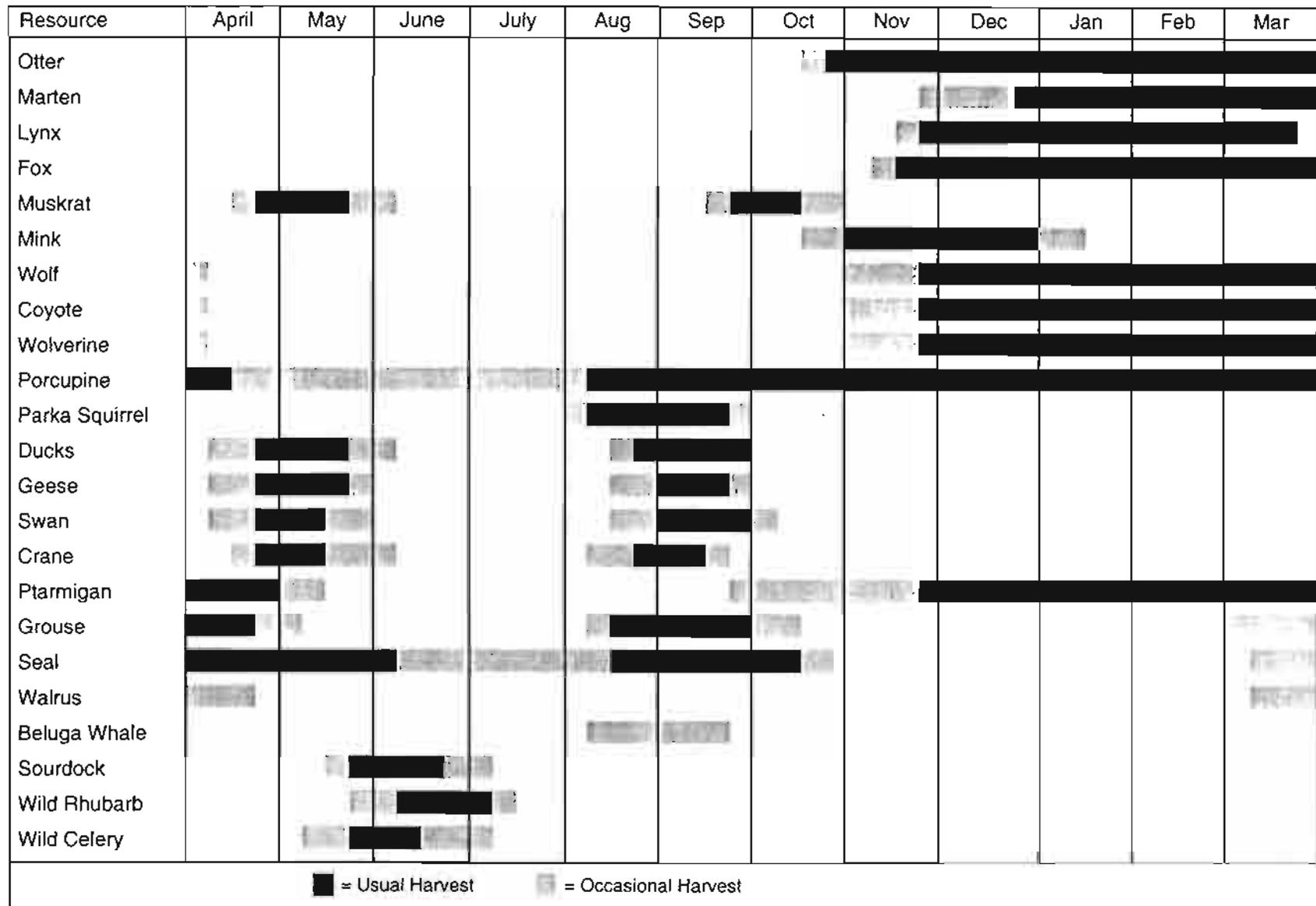


Fig. 7. Seasonal round of subsistence harvest activities, Akiachak, 1987 to 1998 (continued).

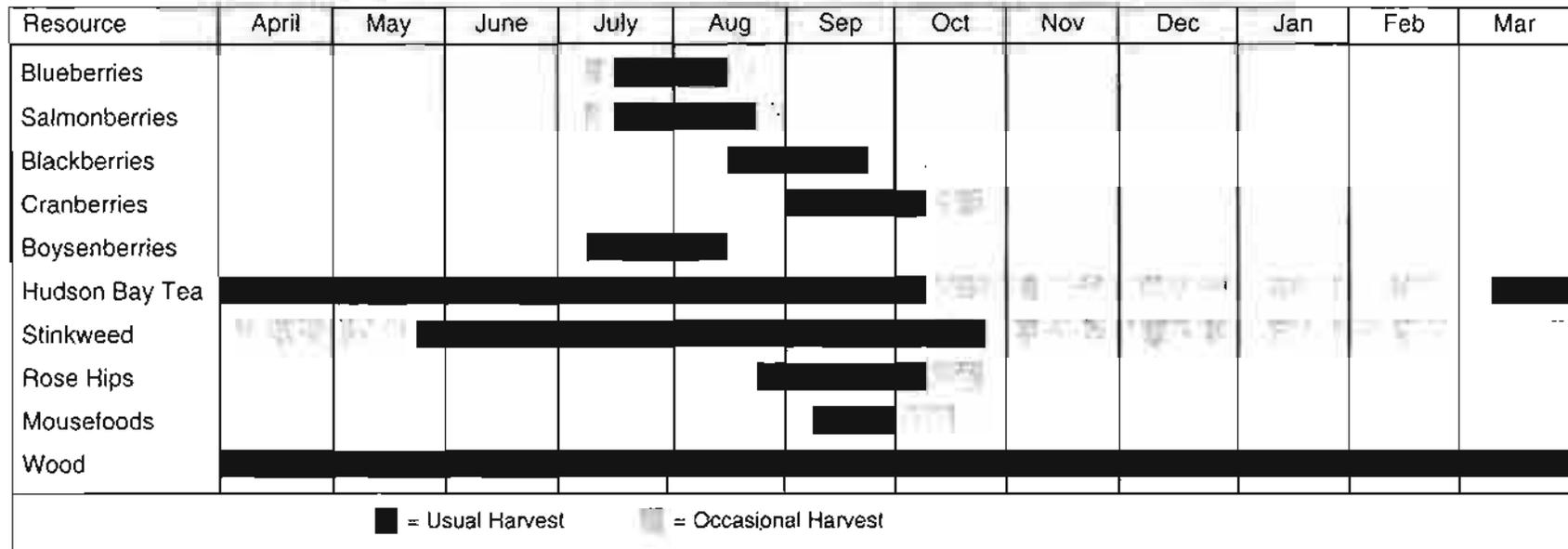


Fig. 7. Seasonal round of subsistence harvest activities, Akiachak, 1987 to 1998 (continued).

## COMPOSITION AND LEVELS OF HARVEST

Subsistence harvest of fish and wildlife contributed approximately 700,000 pounds of food to Akiachak households during 1998. Individual households harvested an average of 5,887 pounds and ranged from 0 to 21,000 pounds. Per capita harvests for the community averaged 1,328 pounds (Table 9). About 7 percent of Akiachak households harvested less than 1,000 pounds while slightly more than 7 percent harvested between 1,000 and 2,500 pounds (Fig. 8). Fifty five percent of households harvested between 2,500 and 7,000 pounds of resources. Approximately 68 percent of households harvested more than 4,000 pounds and 30 percent harvested more than 7,000 pounds usable weight.

Salmon contributed nearly half (49 percent) of the total wild food harvested (Fig. 9), averaging 649 pounds per person (Table 11). Land mammals and other fish each contributed about 20 percent of the total harvest. Moose contributed more than half of the total land mammal harvest at 145 pounds per person. Blackfish and whitefish each contributed about 60 pounds per capita and together accounted for more than half of the total non-salmon fish harvest. At 61 pounds per capita, plants and berries represented 5 percent of the community harvest. Birds and bird eggs contributed 68 pounds per capita and 5 percent of the overall community harvest. Marine mammal harvests comprised 2 percent of the total community harvest at 31 pounds per capita. Although invertebrates were reported to be harvested occasionally by some households, none were reported harvested during the study period.

Estimates of the amounts of resources harvested by Akiachak residents in 1998 are reported in Table 11. Estimates of both pounds harvested and the numbers of resources harvested are provided. Chinook salmon contributed the largest amount of

usable pounds (400 pounds per capita) to Akiachak's wild food harvest during the study period. This was followed by moose at 145 pounds per capita, chum salmon at 122 pounds per capita, caribou at 86 pounds per capita, sockeye salmon at 75 pounds per capita, and blackfish at 68 pounds per capita.

## COMMERCIAL FISHERIES AS A SOURCE OF WILD RESOURCES

During the study period, some Akiachak households retained a portion of their commercial salmon catch for subsistence use at home. The primary commercial fishery in the Kuskokwim River is for salmon. This fishery generally opens for brief (usually 6 hours) commercial fishing periods beginning in late June, continuing through late July. While salmon were the only species purchased from these commercial catches, other fish species were also caught. During 1998, about 8,719 pounds usable weight of fish were retained from the commercial catch (Table 13). This averages to 16.7 pounds per capita. Fifty-seven percent of the pounds usable weight of fish retained from the commercial catch were salmon and the remaining 43 percent were other freshwater species.

Salmon retained from commercial catches accounted for only 1.46 percent of the total pounds harvested for subsistence use (Table 13). Chinook salmon represented 77 percent of the salmon retained from commercial catch (pounds usable weight) but only 1.86 percent of all of the Chinook salmon harvested by the community. In contrast, pink salmon retained from commercial fishing comprised 16.5 percent of the total harvest of that species. The contribution of commercially caught salmon to the overall harvest of chum, sockeye, and coho salmon was less than 1 percent for each species.

Non-salmon species retained from commercial salmon fishing activities represented almost 3 percent of the total non-salmon harvest (pounds usable weight).

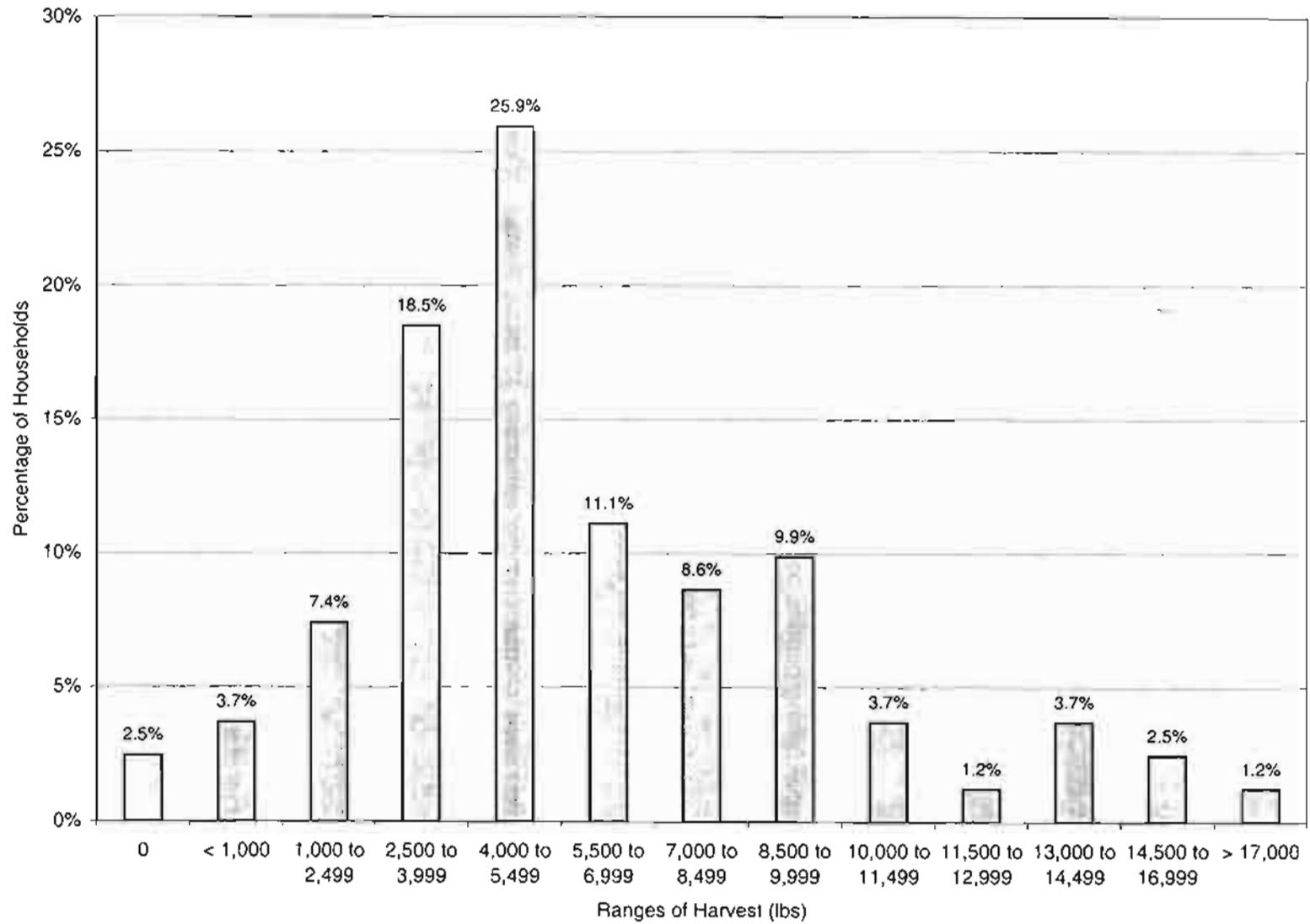


Fig. 8. Pounds of wild resources harvested by Akiachak households, 1998.

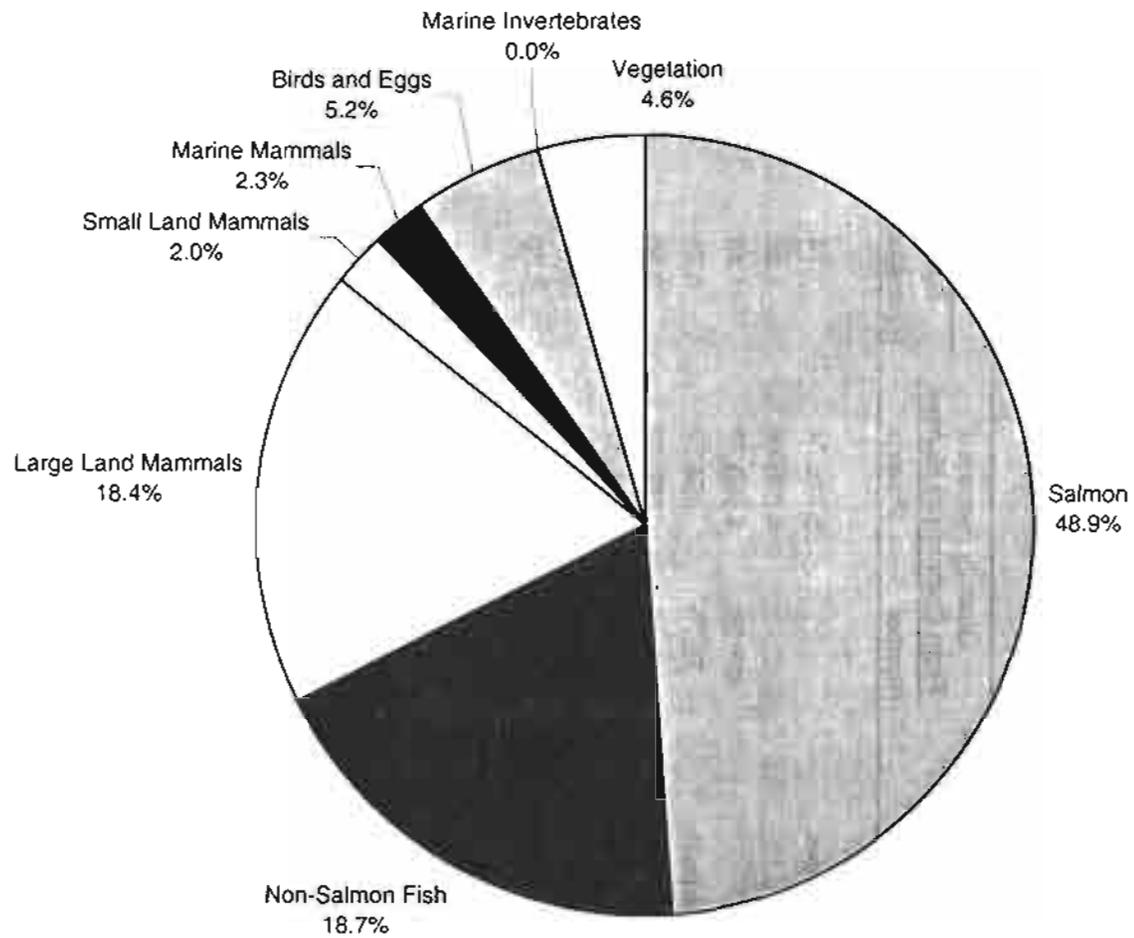


Fig. 9. Composition of wild resource harvest, Akiachak, 1998.

Table 13. Estimated quantities of fish removed from commercial harvest for subsistence use, Akiachak, 1998

Resource	Quantity Removed From Commercial Harvest		Percent of	
	Number	Pounds	Species Harvested (lbs)	All Resources Harvested (lbs)
All Fish Resources		8,718.74	1.74	1.26
Fish		8,718.74	1.86	1.26
Salmon	428.30	4,958.77	1.46	0.71
Chum Salmon	75.75	454.52	0.71	0.07
Coho Salmon	43.70	262.22	0.88	0.04
Chinook Salmon	225.80	3,838.64	1.86	0.55
Pink Salmon	30.59	88.72	16.54	0.01
Sockeye Salmon	52.44	314.67	0.80	0.05
Non-Salmon		3,759.98	2.91	0.54
Burbot	78.67	354.00	1.53	0.05
Dolly Varden	1.46	2.19	0.46	0.00
Sheefish	205.41	1,335.15	100.00	0.19
Broad Whitefish	410.81	1,643.26	9.86	0.24
Humpback Whitefish	212.69	425.38	2.94	0.06

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Whitefish accounted for 55 percent and sheefish represented 35 percent of the non-salmon harvest retained from commercial fishing. Because sheefish was inadvertently left off of portion of the subsistence harvest page in the survey, subsistence only harvest data for sheefish were not obtained. The 100 percent of sheefish identified as coming from commercial fishing activities is due to this oversight. The actual percentage would be lower were complete data for sheefish obtained. Other species retained from commercial fishing activities include burbot (354 pounds) and Dolly Varden (2 pounds).

## SALMON

### Regulations

There were no closed seasons or bag limits for salmon under subsistence regulations in the Kuskokwim Area during the study period, however, periodic subsistence salmon fishing closures occurred in association with commercial salmon fishing periods. These closures began 16 hours prior to a commercial fishing period openings and remained in effect until 6 hours after the commercial fishing period ended. During 1998, there were 12 commercial salmon fishing periods in the Kuskokwim River, with related subsistence closures. The first of these occurred on June 24 and the last on August 29 (Alaska Department of Fish and Game 1999a). Tributary streams such as the Kisaralik, Kasigluk, Kwethluk, Gweek and Tuluksak rivers were not affected by these closures and remained open for subsistence fishing. A subsistence fishing license was also not required during 1998.

Gear restrictions were in place that limited the type and amount of fishing gear that could be used. Salmon could be harvested only with gillnets, beach seines, and fishwheels under subsistence fishing regulations. According to regulations, gill nets

could not be longer than 50 fathoms in length. The depth of gillnets could be no more than 45 meshes deep if the net was a 6 inches or smaller stretched mesh and no more than 35 meshes deep for gillnets having mesh sizes larger than 6 inches. Gillnets were required to be fished with a buoy which was marked with the name of the fisher. Hook and line gear (rod and reel) were also used by Akiachak residents for harvesting salmon although that gear type was not yet recognized by the State as subsistence gear (Alaska Department of Fish and Game 1997, 1998a). When hook and line gear was used, fishers were required to have a fishing license if they were 16 years of age or older, obtain a king salmon stamp if they harvested Chinook salmon, and abide by sport fishing seasons and bag limits. Bag limits for Chinook salmon was 3 per day, with only 2 fish over 28 inches. The bag limit on all other salmon was 5 per day (Alaska Department of Fish and Game 1998b).

#### Harvest and Use

Subsistence salmon fishing is an activity that the majority the households in the Kuskokwim River area are involved in. Along the Kuskokwim River were many summer fishing camps consisting of small houses, steambaths, smoke houses, racks for drying salmon, net storage areas for drying and mending gillnets and often a garden. These summer fishcamps served as summer residences for many families. Some families did not move to a fishcamp but had a smokehouse close to their home where they processed, dried and smoked the salmon harvested during the summer. Subsistence salmon fishing, as described for the community of Kwethluk in another Division of Subsistence Technical Paper (Coffing 1991), aptly characterizes the fishing activities for Akiachak and many other Kuskokwim River communities.

The estimated harvest of salmon for subsistence use amounted to an average household harvest of 2,877 pounds and a per capita harvest of 649 pounds. Salmon contributed the single largest amount of usable resource of all categories of wild resources harvested, representing nearly half (48.9 percent) of the total harvest of all resources (Fig. 9). Ninety-seven percent of Akiachak households used salmon and 88 percent harvested salmon during 1998 (Table 11). Many households (59 percent) shared salmon with others and 43 percent of Akiachak households received salmon.

Household involvement in harvesting chinook salmon was highest (87.7 percent) followed by chum (85.2 percent), sockeye (84 percent), coho (77.8 percent) and pink salmon (12.3 percent). In terms of numbers of fish, salmon harvested included 12,131 chinook (35 percent), 10,605 chum salmon (31 percent), 6,550 sockeye salmon (19 percent), 4,968 coho salmon (14 percent) and 185 pink salmon (1 percent, Fig. 10). Chinook salmon are generally larger fish than the other salmon species and therefore contributed 60 percent of the total usable salmon weight (Fig. 11). Average household harvest of the different kinds of salmon during 1998 amounted to 103 chinook, 90 chum, 56 sockeye, 42 coho and 2 pink salmon (Table 14).

Gillnets were the primary method used to harvest salmon and both set gillnets and drift gillnets were used by Akiachak households during the study year. The majority of households used drift gillnets to harvest chum, chinook, coho, and sockeye salmon (Fig. 12). Set gill nets were used by 32 percent of households for harvesting chinook salmon and by 22 percent of households for harvesting chum and sockeye salmon. Relatively few households used set gillnets for harvesting coho (16 percent) and pink salmon (5 percent). Hook and line gear was used by 12 percent of Akiachak households when harvesting coho salmon.

Some households relied on a single gear type to harvest subsistence salmon while others employed multiple gear types. Most households used only drift gillnets to

harvest their subsistence salmon (Table 15). Approximately 10 percent of households relied solely on set gillnets when harvesting chinook salmon. Six percent of Akiachak households used only set gillnets for harvesting sockeye and coho salmon and approximately 5 percent of households used only set gillnets when harvesting chum salmon. While hook and line gear was used to harvest salmon in 1998, no Akiachak households relied solely on this gear type for catching salmon.

Estimated percentages of salmon harvested using various gear types are shown in Table 16. Twenty-one percent of all salmon harvested for subsistence use was caught with set nets and 77 percent were caught with drift gillnets. An estimated 1.2 percent were caught while commercial salmon fishing using drift gillnets and retained for subsistence use.

The total number of salmon harvested with set gillnet gear was comprised of 24 percent chum salmon, 11.9 percent coho, 46.7 percent chinook, 0.4 percent pink and 16.8 percent sockeye salmon. The total number of salmon harvested with drift gillnet gear was comprised of 33 percent chum, 14.7 percent coho, 31.9 percent chinook, 0.5 percent pink and 19.8 percent sockeye salmon.

Overall, most salmon were harvested using drift gillnets. Approximately 83 percent of chum salmon, 79 percent of coho, 70 percent of chinook and 80 percent of sockeye salmon were harvested using drift gillnets. Drift gillnet catches of chum and chinook salmon each represented about 25 percent of the total number of salmon harvested. The number of salmon and the estimated pounds usable weight by species harvested using the different gear types is shown in Table 17. An estimated 131 coho salmon, representing 2.6 percent of the total coho harvest, were the only salmon species reported as harvested using hook and line gear.

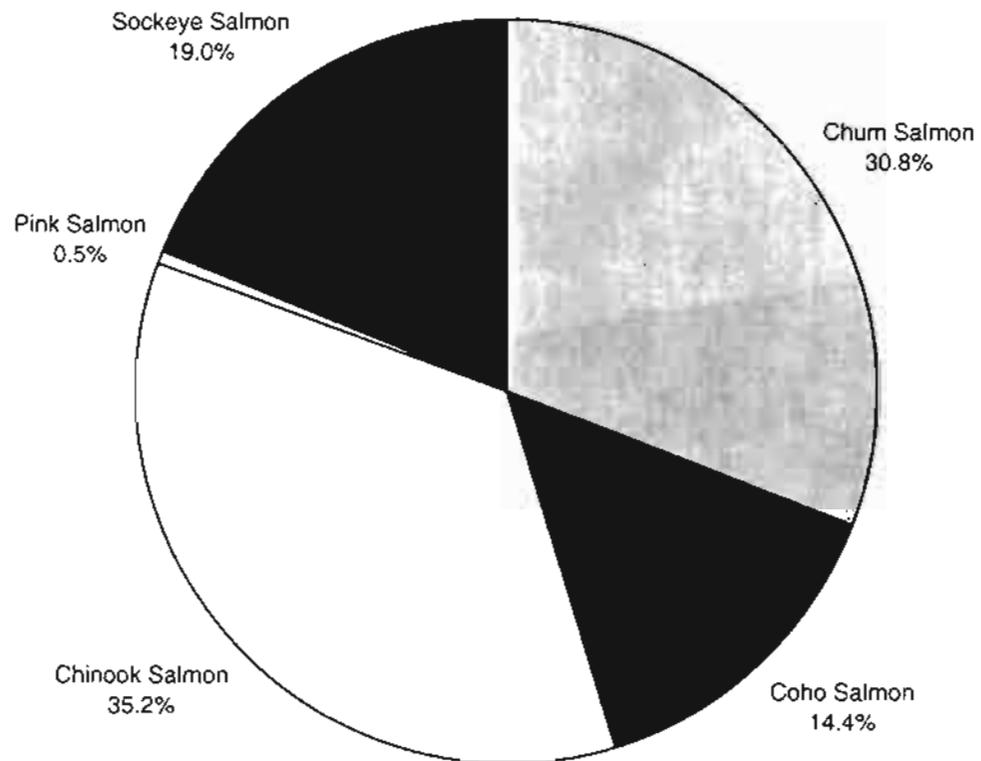


Fig. 10. Contribution of each salmon species to the overall number of salmon harvested for subsistence, Akiachak, 1998.

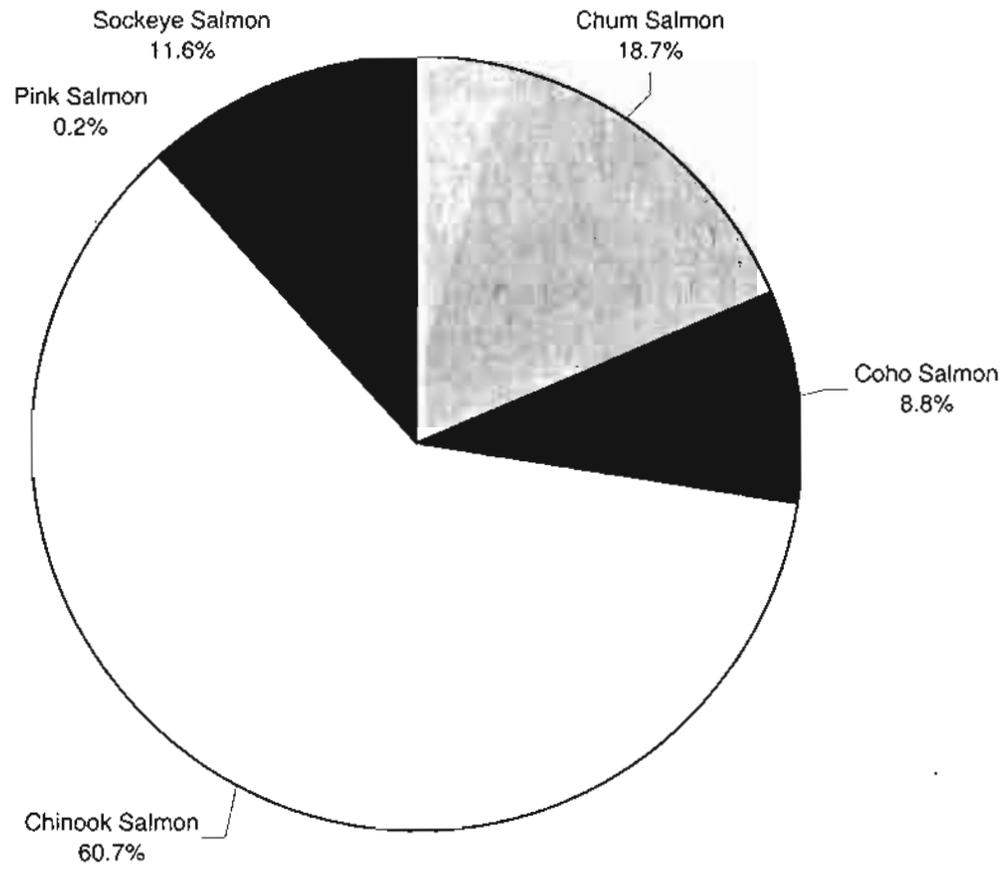


Fig. 11. Contribution of each salmon species to the total pounds of salmon harvested for subsistence, Akiachak, 1998.

Table 14. Characteristics of household salmon harvests, Akiachak 1998

Resource	Percent of Households Harvesting	Number of Salmon Harvested			
		Harvest Range	Total Harvest	Average Harvest	
				All Households	Fishing Households
Chum Salmon	85	1 - 900	10,605	90	106
Coho Salmon	78	1 - 245	4,968	42	54
Chinook Salmon	88	1 - 600	12,131	103	117
Pink Salmon	12	1 - 40	185	2	13
Sockeye Salmon	84	1 - 345	6,550	56	66

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 15. Percent of households harvesting salmon by gear type combinations, Akiachak, 1998

Resource	Percent of Households Harvesting by Gear Type			
	Drift Gill Net only	Set Gill Net only	Drift and Set Gill Net only	Rod and Reel only
Chum Salmon	61.7%	4.9%	17.3%	0.0%
Coho Salmon	53.1%	6.2%	4.9%	0.0%
Chinook Salmon	54.3%	9.9%	22.2%	0.0%
Pink Salmon	6.2%	2.5%	2.5%	0.0%
Sockeye Salmon	60.5%	6.2%	16.0%	0.0%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

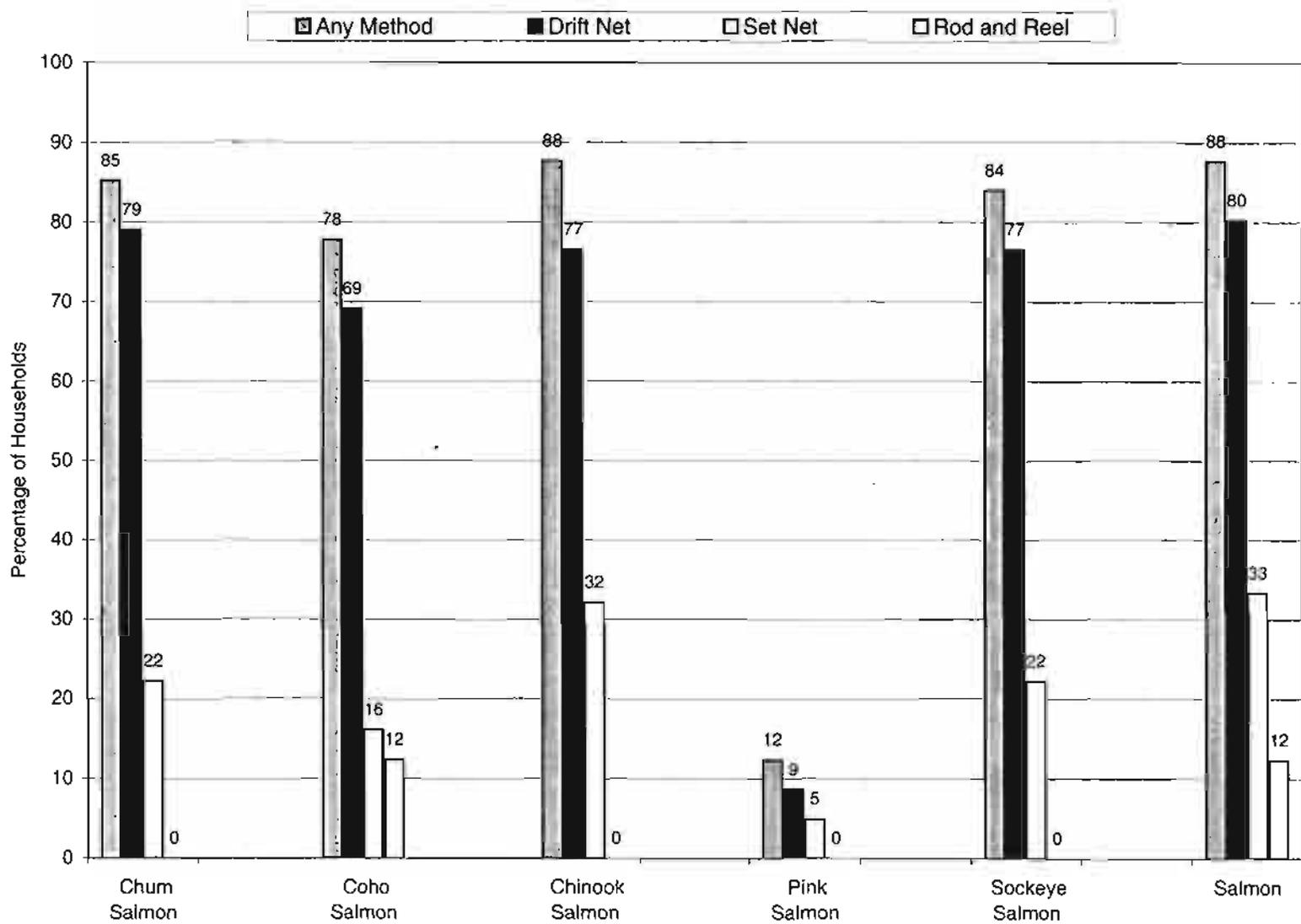


Fig. 12. Methods used by Akiachak households to harvest subsistence salmon, 1998.

Table 16. Estimated percentages of salmon harvested by species and gear type, Akiachak, 1998

Resource	Percent Base	Percent of Harvest by Gear Type Used				Percent	
		Subsistence Set Net	Subsistence Drift Net	Subsistence Gill Nets	Rod and Reel	Removed From Commercial Catch	Harvested All Methods
Salmon	All Salmon	21.25	77.12	98.38	0.38	1.24	100.00
Chum Salmon	Gear Type	24.14	32.99	31.08	0.00	17.69	
	Chum	16.66	82.62	99.29	0.00	0.71	
	All Salmon	5.13	25.44	30.58	0.00	0.22	30.80
Coho Salmon	Gear Type	11.94	14.75	14.15	100.00	10.20	
	Coho	17.60	78.89	96.48	2.64	0.88	
	All Salmon	2.54	11.38	13.92	0.38	0.13	14.42
Chinook Salmon	Gear Type	46.74	31.94	35.14	0.00	52.72	
	Chinook	28.20	69.94	98.14	0.00	1.86	
	All Salmon	9.93	24.64	34.57	0.00	0.66	35.22
Pink Salmon	Gear Type	0.40	0.47	0.46	0.00	7.14	
	Pink	15.75	67.72	83.46	0.00	16.54	
	All Salmon	0.08	0.36	0.45	0.00	0.09	0.54
Sockeye Salmon	Gear Type	16.78	19.84	19.18	0.00	12.24	
	Sockeye	18.75	80.45	99.20	0.00	0.80	
	All Salmon	3.57	15.30	18.87	0.00	0.15	19.02

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 17. Estimated quantity of salmon harvested by gear type, Akiachak, 1998

Resource	Harvest Units	Harvest Gear Type Used								Removed From Commercial Harvest		All Combined Harvest Methods	
		Subsistence Set Gill Net		Subsistence Drift Gill Net		All Subsistence Gill Nets		Rod and Reel		Total	Hhold Mean	Total	Hhold Mean
		Total	Hhold Mean	Total	Hhold Mean	Total	Hhold Mean	Total	Hhold Mean				
All Salmon	Numbers	7,319	62	26,560	225	33,879	287	131	1	428	4	34,439	292
	Pounds	81,449	690	252,301	2,138	333,750	2,828	787	7	4,959	42	339,495	2,877
Chum Salmon	Numbers	1,767	15	8,763	74	10,530	89	0	0	76	1	10,605	90
	Pounds	10,603	90	52,576	446	63,178	535	0	0	455	4	63,633	539
Coho Salmon	Numbers	874	7	3,919	33	4,793	41	131	1	44	0	4,968	42
	Pounds	5,244	44	23,513	199	28,757	244	787	7	262	2	29,806	253
Chinook Salmon	Numbers	3,421	29	8,484	72	11,905	101	0	0	226	2	12,131	103
	Pounds	58,149	493	144,234	1,222	202,383	1,715	0	0	3,839	33	206,222	1,748
Pink Salmon	Numbers	29	0	125	1	154	1	0	0	31	0	185	2
	Pounds	84	1	363	3	448	4	0	0	89	1	537	5
Sockeye Salmon	Numbers	1,228	10	5,269	45	6,497	55	0	0	52	0	6,550	56
	Pounds	7,368	62	31,615	268	38,984	330	0	0	315	3	39,298	333

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

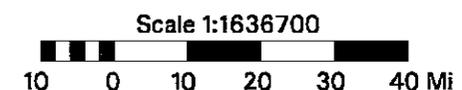
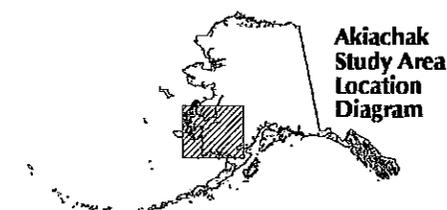
**FIGURE 13**  
**SUBSISTENCE SALMON**  
**FISHING AREAS USED**  
**BY AKIACHAK RESIDENTS,**  
**1988-1997**

**LEGEND**

-  Salmon Fishing Areas
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

This map depicts only those areas used by community residents while domiciled in Akiachak. Although an effort was made to get as many residents as possible to review the draft maps, not all Akiachak residents were available to review the map data. Therefore, this map may not include all of the areas used by the community. Subsistence use areas change through time. Consult with the community for more definitive information.



State of Alaska  
 Department of Fish and Game  
 Division of Subsistence  
 December, 1999





Table 18. Percentage of households subsistence fishing for salmon by location, Akiachak, 1998

Salmon Harvest Location	Percentage of Households
Kuskokwim River: between Akiak and Kwethluk	45.68
Kuskokwim River: between Kwethluk and Bethel	41.98
Kisaralik River	7.41
Kasigluk River	4.94
Fog River	1.23

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Salmon were processed in a variety of ways including drying and smoking, half-drying and freezing, freezing, salting, and canning or jarring. Salmon were also eaten fresh and were cooked by frying, baking, steaming and boiling. Methods used for processing salmon and description of processing techniques used by Akiachak residents were similar to those described for Kwethluk (Coffing 1991). June and early July were critical times for harvesting, drying, and smoking salmon. The proper processing of salmon is significantly dependent on dry weather with ample wind to dry the salmon after it is cut and hung on drying racks. Poor drying conditions can result in a household's harvest being ruined. Chinook, chum, and sockeye salmon were the primary salmon species that are dried and smoked. Seasonally wet weather in late July generally make drying of coho salmon impractical. However, some households do make an effort to dry coho salmon and are sometimes successful. Some families may try to harvest coho salmon that have entered the spawning streams because these fish have lost much of their body fat and dry quickly. Only a few families harvest salmon for use as dog food; typically chum, sockeye, pink, and coho salmon. Chinook salmon were reserved primarily for human use, however, very small male chinook salmon or salmon that are not fit for humans to eat were also fed to dogs. In order not to waste resources, the inedible leftovers from processing were fed to dogs.

#### Areas Used for Harvesting Salmon

Areas used for harvesting salmon from 1988 through 1997 are shown in Figure 13. Most of the subsistence salmon fishing by Akiachak households occurred in the Kuskokwim River from a point located 4 miles downstream of the community to a point located 6 miles upstream of Akiachak. Subsistence fishing for salmon also occurred in that portion of the Kuskokwim River between Napaskiak and the mouth of the Johnson

River. Salmon were also harvested in tributary streams such as the Kísaralik and Kasigluk rivers located within a few miles east of Akiachak. Salmon were also harvested in the Hoholitna River, Stony River, and the Kuskokwim River upstream of the Stony River during August and September when individuals were hunting for moose, caribou and other wildlife. Salmon that were harvested in fall while hunting were generally not dried and smoked but were eaten fresh.

During 1998, Akiachak households reported harvesting salmon in 5 locations (Table 18). That portion of the Kuskokwim River between Bethel and Akiak was the area used by most Akiachak households. An estimated 7 percent of households harvested salmon from the Kísaralik River drainage and 5 percent harvested salmon from the Kasigluk River drainage. One percent of the households reported harvesting salmon from the Fog River, a tributary of the Tuluksak River.

#### NON-SALMON FISH

Akiachak residents also used several species of fish other than salmon, including herring, rainbow smelt, halibut, lamprey, stickleback, Alaska blackfish, burbot, Dolly Varden, lake trout, Arctic grayling, pike, sheefish, suckers, rainbow trout, broad whitefish, humpback whitefish, round whitefish and cicso. Harvests of non-salmon fish, which amounted to an estimated 129,826 pounds usable weight, ranked second as a resource category after salmon in its contribution to Akiachak's total resource harvest (Fig. 9).

## Regulations

Subsistence fishing regulations provided for a variety of legal gear that included gillnets, beach seines, fish wheels, pot, long line, fyke net, dip net, jigging gear, spear or lead (Alaska Department of Fish and Game 1998a). There were no closed seasons or bag limits for fish harvested under subsistence regulations. In addition, subsistence fishing permits and harvest reporting were not required under both state and federal regulations. Gillnet size restrictions mentioned for salmon in the previous section also applied to non-salmon finfish. State of Alaska fishing regulations did not allow subsistence fishing with a line attached to a rod or pole (rod and reel) or a handline unless such fishing was through the ice. State regulations required that individuals using rod and reel gear during periods of open water first obtain a sport fishing license if they were 16 years of age or older, and abide by sport fishing bag and possession limits. Federal subsistence fishing regulations for each of these species were the same except when using rod and reel gear. Fish could be harvested using rod and reel gear under federal subsistence regulations, however, the federal bag and possession limits were the same as the State's sport fish limits. Harvest of halibut was regulated through the International Pacific Halibut Commission, which allowed a daily sport fishing harvest of 2 halibut (International Pacific Halibut Commission 1998).

## Harvest and Use

An estimated 98.8 percent of Akiachak households used non-salmon fish and 95 percent of households harvested at least one species of non-salmon fish (Table 11). Approximately 73 percent of households received fish other than salmon from other households and 70 percent shared fish with others. Most households used burbot (94

percent), smelt (84 percent), pike (83 percent), broad whitefish (76 percent), humpback whitefish (75 percent) and blackfish (74 percent). Akiachak residents did not harvest shellfish, such as marine clams and freshwater mussels during 1998, however, an estimated 3.7 percent of households reported using marine clams they had received from other communities.

As described earlier, an estimated 3,760 pounds of fish other than salmon were caught during commercial salmon fishing activities and retained for home use. These fish consisted of burbot, Dolly Varden, sheefish, broad whitefish and humpback whitefish (Table 13)

Blackfish, whitefish, burbot and pike represented the majority of pounds usable weight of fish harvested during 1998 (Fig. 14). Blackfish contributed 35,557 pounds usable weight to the non-salmon fish category, the single largest contribution of any fish species except salmon (Table 11). This was followed by burbot at 23,167 pounds, pike (19,798 pounds), broad whitefish (16,671 pounds), smelt (14,728 pounds), humpback whitefish (14,466 pounds), and sheefish at 1,335 pounds (Table 11). Harvest of the other species amounted to less than 1,000 pounds each.

Households used a variety of gear to harvest fish. Gillnets, dipnets, *taluyat* (traditional fish traps), fishing through the ice with hook and line, and rod and reel gear were the primary methods employed (Table 19). Methods used to harvest fish varied from species to species, however, gillnets continued to be the primary harvest tool used by most households. During 1998, gillnets were used to harvest every fish species taken with the exception of smelt, halibut, lamprey, stickleback, blackfish and lake trout. Dipnets were the only gear used for harvesting smelt. Home made fishtraps (*taluyat*) were the only gear used when harvesting blackfish and stickleback. Lamprey were harvested with a home made tool consisting of a wooden stick with nails driven part way in it which was then used to "rake" the lamprey out of the water.

An estimated 86 percent of households used a hook and line to fish through the ice for harvesting burbot and 68 percent harvested pike by ice fishing. Nearly 20 percent of households used rod and reel when fishing in open water for grayling, pike and rainbow trout (Table 19). Several households depended on a single gear type to harvest certain species (Table 20). Although most households used gillnets to harvest humpback whitefish, almost four percent of households depended on rod and reel gear alone to harvest humpback whitefish. Further, while 70 percent of households harvested humpback whitefish, 21 percent caught these whitefish with a net set under the ice during winter. Finally, 27 percent of households relied solely on set gillnets fished in open water to harvest broad whitefish.

The percent of non-salmon fish harvested by gear type is shown in Table 21. Subsistence gear including gillnets, *taluyat*, dipnets, and rakes were used to harvest 100 percent of the herring and herring roe, smelt, stickleback, blackfish, suckers and round whitefish. Eighty-one percent of the burbot and 70 percent of the pike caught during 1998 were harvested with hook and line through the ice. Rod and reel gear was used to harvest nearly all of the Dolly Varden, Arctic Grayling and rainbow trout, and more than half of the halibut. While sheefish are also harvested with subsistence gillnets, this harvest data was not collected due to an oversight on the survey form. All of the sheefish harvests appearing in this report were retained from commercial salmon harvest activities.

The estimated pounds of fish harvested by gear type are shown in Table 22. An estimated total of 88,446 pounds of non-salmon fish were harvested using gillnets, dipnets and fishtraps. Approximately 5,019 pounds were obtained using rod and reel gear and 32,588 pounds of fish were harvested while fishing through the ice with hook and line gear.

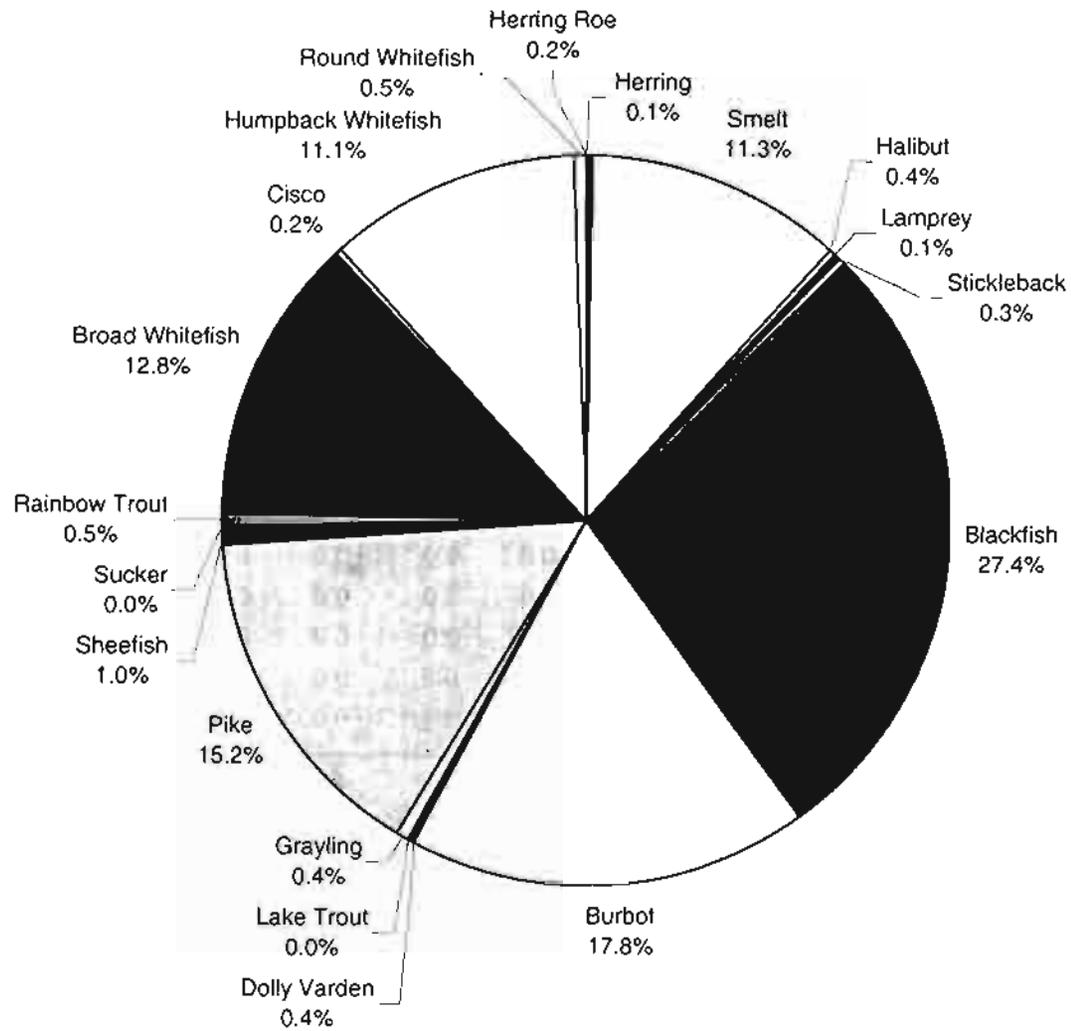


Fig. 14. Contribution of each non-salmon fish species to the total pounds of non-salmon fish harvested for subsistence, Akiachak, 1998.

Table 19. Percentage of households harvesting fish other than salmon by gear type, Akiachak, 1998

Resource	Percentage of Households Harvesting by Gear Type										
	Set Gill Net	Drift Gill Net	Net Under Ice	Dip Net	Hook and Line Ice Fishing	Taluyat	Rod and Reel	Longline	Handpick	Beach Seine	Other Methods
Herring	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Herring Roe	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	0.0
Rainbow Smelt	0.0	0.0	0.0	76.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Halibut	0.0	0.0	0.0	0.0	0.0	0.0	1.2	2.5	0.0	0.0	0.0
Lamprey	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Stickleback	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0	0.0	0.0
Blackfish	0.0	0.0	0.0	0.0	0.0	60.5	0.0	0.0	0.0	0.0	0.0
Burbot	4.9	4.9	14.8	0.0	86.4	0.0	0.0	0.0	0.0	0.0	0.0
Dolly Varden	1.2	1.2	0.0	0.0	0.0	0.0	14.8	0.0	0.0	0.0	0.0
Lake Trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grayling	2.5	0.0	0.0	0.0	0.0	0.0	19.8	0.0	0.0	0.0	0.0
Pike	4.9	0.0	9.9	0.0	67.9	0.0	19.8	0.0	0.0	0.0	0.0
Sucker	3.7	1.2	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rainbow Trout	2.5	0.0	0.0	0.0	0.0	0.0	19.8	0.0	0.0	0.0	0.0
Broad Whitefish	30.9	13.6	19.8	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.0
Cisco	3.7	1.2	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Humpback Whitefish	28.4	11.1	30.9	0.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0
Round Whitefish	1.2	0.0	1.2	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, 1999

Table 20. Percentage of households using only certain gear types to harvest fish other than salmon, Akiachak, 1998

Resource	Percentage of Households Harvesting						
	Drift Gill Net only	Set Gill Net only	Drift and Set Gill Net only	Rod and Reel only	Under Ice Gill Net only	Dip Net only	Hook and Line Ice Fishing
Herring	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Herring Roe	0.0	3.7	0.0	0.0	0.0	0.0	0.0
Rainbow Smelt	0.0	0.0	0.0	0.0	0.0	75.3	0.0
Halibut	0.0	0.0	0.0	1.2	0.0	0.0	0.0
Lamprey	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Stickleback	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Blackfish	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Burbot	0.0	1.2	0.0	0.0	1.2	0.0	66.7
Dolly Varden	0.0	1.2	0.0	13.6	0.0	0.0	0.0
Lake Trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Grayling	0.0	1.2	0.0	18.5	0.0	0.0	0.0
Pike	0.0	1.2	0.0	6.2	2.5	0.0	54.3
Sucker	1.2	3.7	0.0	0.0	1.2	0.0	0.0
Rainbow Trout	0.0	2.5	0.0	19.8	0.0	0.0	0.0
Broad Whitefish	11.1	27.2	1.2	1.2	16.0	0.0	0.0
Cisco	1.2	2.5	0.0	0.0	2.5	0.0	0.0
Humpback Whitefish	8.6	21.0	0.0	3.7	21.0	0.0	0.0
Round Whitefish	0.0	1.2	0.0	0.0	1.2	0.0	0.0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 21. Estimated percent of fish other than salmon harvested by gear type, Akiachak, 1998

Resource	Percent Pounds Harvested by Gear Type			
	Gillnet, dipnet and trap	Removed From Commercial Catch	Rod and Reel	Hook and line Ice Fishing
Non-Salmon Fish	68.13	2.90	3.87	25.10
Herring	100.00	0.00	0.00	0.00
Herring Roe	100.00	0.00	0.00	0.00
Rainbow Smelt	100.00	0.00	0.00	0.00
Halibut	47.37	0.00	52.63	0.00
Lamprey	100.00	0.00	0.00	0.00
Stickleback	100.00	0.00	0.00	0.00
Blackfish	100.00	0.00	0.00	0.00
Burbot	17.66	1.53	0.00	80.81
Dolly Varden	1.38	0.46	98.16	0.00
Lake Trout	0.00	0.00	0.00	0.00
Grayling	2.62	0.00	97.38	0.00
Pike	15.26	0.00	14.70	70.03
Sheefish	0.00	100.00	0.00	0.00
Sucker	100.00	0.00	0.00	0.00
Rainbow Trout	2.88	0.00	97.12	0.00
Broad Whitefish	89.79	9.86	0.35	0.00
Cisco	100.00	0.00	0.00	0.00
Humpback Whitefish	96.11	2.94	0.95	0.00
Round Whitefish	100.00	0.00	0.00	0.00

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Note: Sheefish harvest data using subsistence gear was not collected

Table 22. Estimated pounds of fish other than salmon harvested by gear type, Akiachak, 1998

Resource	Gillnets, dipnets and traps		Removed From Commercial Catch		Rod and Reel		Hook and line Ice Fishing		All Combined Harvest Methods	
	Total	HHold Mean	Total	HHold Mean	Total	HHold Mean	Total	Hhold Mean	Total	HHold Mean
Non-Salmon Fish	88,446.09	749.54	3,759.98	31.86	5,019.37	42.53	32,587.67	276.17	129,826.22	1,100.22
Herring	131.11	1.11	0.00	0.00	0.00	0.00	0.00	0.00	131.11	1.11
Herring Roe	236.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	236.00	2.00
Rainbow Smelt	14,728.15	124.81	0.00	0.00	0.00	0.00	0.00	0.00	14,728.15	124.81
Hallbut	262.22	2.22	0.00	0.00	291.36	2.47	0.00	0.00	553.58	4.69
Lamprey	174.81	1.48	0.00	0.00	0.00	0.00	0.00	0.00	174.81	1.48
Stickleback	437.04	3.70	0.00	0.00	0.00	0.00	0.00	0.00	437.04	3.70
Blackfish	35,557.33	301.33	0.00	0.00	0.00	0.00	0.00	0.00	35,557.33	301.33
Burbot	4,077.55	34.55	354.00	3.00	0.00	0.00	18,722.67	158.67	23,167.33	196.33
Dolly Varden	6.56	0.06	2.19	0.02	465.44	3.94	0.00	0.00	474.19	4.02
Lake Trout	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Grayling	15.30	0.13	0.00	0.00	568.15	4.81	0.00	0.00	583.44	4.94
Pike	3,022.11	25.61	0.00	0.00	2,910.67	24.67	13,865.00	117.50	19,797.78	167.78
Sheefish	0.00	0.00	1,335.15	11.31	0.00	0.00	0.00	0.00	1,335.15	11.31
Sucker	8.74	0.07	0.00	0.00	0.00	0.00	0.00	0.00	8.74	0.07
Rainbow Trout	17.48	0.15	0.00	0.00	588.54	4.99	0.00	0.00	606.02	5.14
Broad Whitefish	14,969.98	126.86	1,643.26	13.93	58.27	0.49	0.00	0.00	16,671.51	141.28
Cisco	264.41	2.24	0.00	0.00	0.00	0.00	0.00	0.00	264.41	2.24
Humpback Whitefish	13,903.60	117.83	425.38	3.60	136.94	1.16	0.00	0.00	14,465.93	122.59
Round Whitefish	633.70	5.37	0.00	0.00	0.00	0.00	0.00	0.00	633.70	5.37

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 23. Percentage of households harvesting fish other than salmon by month, Akiachak, 1998

Resource	Percentage of Households Harvesting												
	January	February	March	April	May	June	July	August	September	October	November	December	Any Month
Non-Salmon Fish	34.6	44.4	65.4	51.9	42.0	67.9	49.4	51.9	37.0	80.3	88.9	60.5	95.1
Herring	0	0	0	0	1.2	0	0	0	0	0	0	0	1.2
Herring Roe	0	0	0	0	4.9	2.5	0	0	0	0	0	0	4.9
Rainbow Smelt	0	0	0	0	32.1	60.5	0	0	0	0	0	0	76.5
Halibut	0	0	0	0	2.5	1.2	0	0	0	0	0	0	3.7
Lamprey	0	0	0	0	0	0	0	0	0	0	1.2	0	1.2
Stickleback	0	0	0	1.2	0	0	0	0	0	0	1.2	1.2	2.5
Blackfish	6.2	6.2	2.5	0	0	0	0	0	6.2	46.9	46.9	35.8	60.5
Burbot	8.6	11.1	11.1	7.4	1.2	0	1.2	3.7	7.4	67.9	86.4	37.0	91.4
Dolly Varden	0	0	0	0	0	0	11.1	6.2	2.5	0	0	0	16.1
Grayling	0	0	0	0	0	1.2	8.6	11.1	6.2	0	0	0	21.0
Pike	9.9	23.5	56.8	45.7	1.2	6.2	14.8	2.5	1.2	6.2	6.2	8.6	80.2
Sucker	0	0	0	0	0	0	1.2	3.7	0	1.23	0	0	6.2
Rainbow Trout	0	0	0	0	0	2.5	12.4	9.9	1.2	0	0	0	22.2
Broad Whitefish	13.6	13.6	12.4	12.4	3.7	16.1	29.6	32.1	14.8	16.1	17.3	14.8	71.6
Cisco	3.7	3.7	3.7	3.7	1.23	3.7	3.7	3.7	3.7	3.7	3.7	3.7	7.4
Humpback Whitefish	23.5	23.5	23.5	21.0	8.6	17.3	24.7	34.6	21.0	23.5	24.7	23.5	71.6
Round Whitefish	0	0	0	0	0	0	1.2	0	0	1.2	1.2	1.2	2.5

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

The percent of households harvesting fish varied by month and by species (Table 23). In any given month, at least 34 percent of Akiachak households were involved in harvesting fish other than salmon. Participation was highest during October and November when over 80 percent of Akiachak households were harvesting non-salmon fish. Participation was also quite high during March (65 percent), April (52 percent), June (68 percent), August (52 percent) and December (60 percent). Broad whitefish, cisco, humpback whitefish and pike were harvested during each month of the year and burbot was harvested every month except June. Harvest effort for burbot and Alaska blackfish was highest during October, November and December. Household harvest activities for pike was greatest in March (57 percent) and April (46 percent).

#### Areas Used for Harvesting Non-Salmon Fish

Most of the fish harvest efforts during 1998 occurred in areas relatively close to Akiachak. Blackfish were harvested in the tundra streams located between Akiak and Kwethluk, in the Gweek River drainage and in the Kisaralik and Kasigluk river drainages. Broad and humpback whitefish were harvested the Kuskokwim River from near Akiak to the mouth of the Johnson River, in the Gweek River, and also the Kialik River north of Tuntutuliak. Cisco were harvested in the Kuskokwim River between Akiak and Bethel. Burbot were harvested in the Kuskokwim River from near Akiak, downstream to the mouth of the Johnson River as well as in the Kisaralik and Gweek rivers. Pike were caught in the Kuskokwim River from Akiak to the mouth of the Johnson River and from the Kasigluk, Kisaralik and Fog river drainages. Pike were also harvested in the Yukon River drainage between Marshall and Russian Mission. Smelt were harvested in the Kuskokwim River between Akiak and Kwethluk. Suckers were caught in the Gweek River and the Kuskokwim River between Akiak and Bethel. Dolly Varden and Arctic

grayling were harvested in the Kasigluk, Kisaralik, and Fog rivers. These fish were also caught incidentally in gillnets in the Kuskokwim River between Akiak and Bethel. Grayling were also harvested from the Gweek River during 1998. Rainbow trout were harvested in the Kasigluk and Kisaralik rivers as well as in the Kuskokwim River between Kwethluk and Bethel. Lamprey were harvested from the Yukon River between Marshall and Russian Mission.

Areas used by Akiachak residents from 1988 through 1997 to harvest fish other than salmon are shown in Figure 15 and Figure 16. Figure 15 shows areas used for harvesting "trout", a collective name used here to define Arctic grayling, Dolly Varden, lake trout and rainbow trout. Areas shown on the map have been used to harvest at least one of the species listed here. Dolly Varden and grayling are harvested in nearly all of the shaded areas in Figure 15. Lake trout are harvested primarily in Kisaralik Lake. Rainbow trout are harvested in the Kwethluk, Kasigluk and Kisaralik rivers. Dolly Varden and grayling are also harvested in the Tuluksak and Fog river drainages, but they are not shown on the figure.

Figure 16 identifies areas used by Akiachak residents to harvest whitefish, cisco, smelt, blackfish, pike, burbot, sheefish, sucker, lamprey and stickleback. Fishing areas include the Kuskokwim River from about 10 miles below Tuluksak downstream to near Tuntutuliak, including the lower mouth of the Johnson River. The lower Kasigluk and Kisaralik rivers east of Akiachak and the tundra area north of the community are used as is the Hoholitna River, the upper Holitna/Kogruklu River and areas adjacent to the Yukon River south of the community of Marshall and also near Russian Mission. Areas adjacent to Whitefish Lake located southeast of Upper Kalskag as well as lakes north and northeast of Upper Kalskag were identified. Additional fishing areas were located about 20 miles northwest of the community of Kasigluk and also in the Kialik river drainage north of Tuntutuliak.

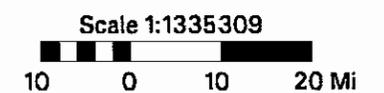
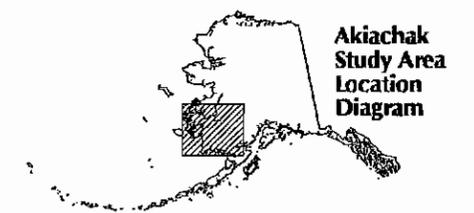
**FIGURE 15**  
**SUBSISTENCE "TROUT" FISHING AREAS USED BY AKIACHAK RESIDENTS, 1988-1997**

**LEGEND**

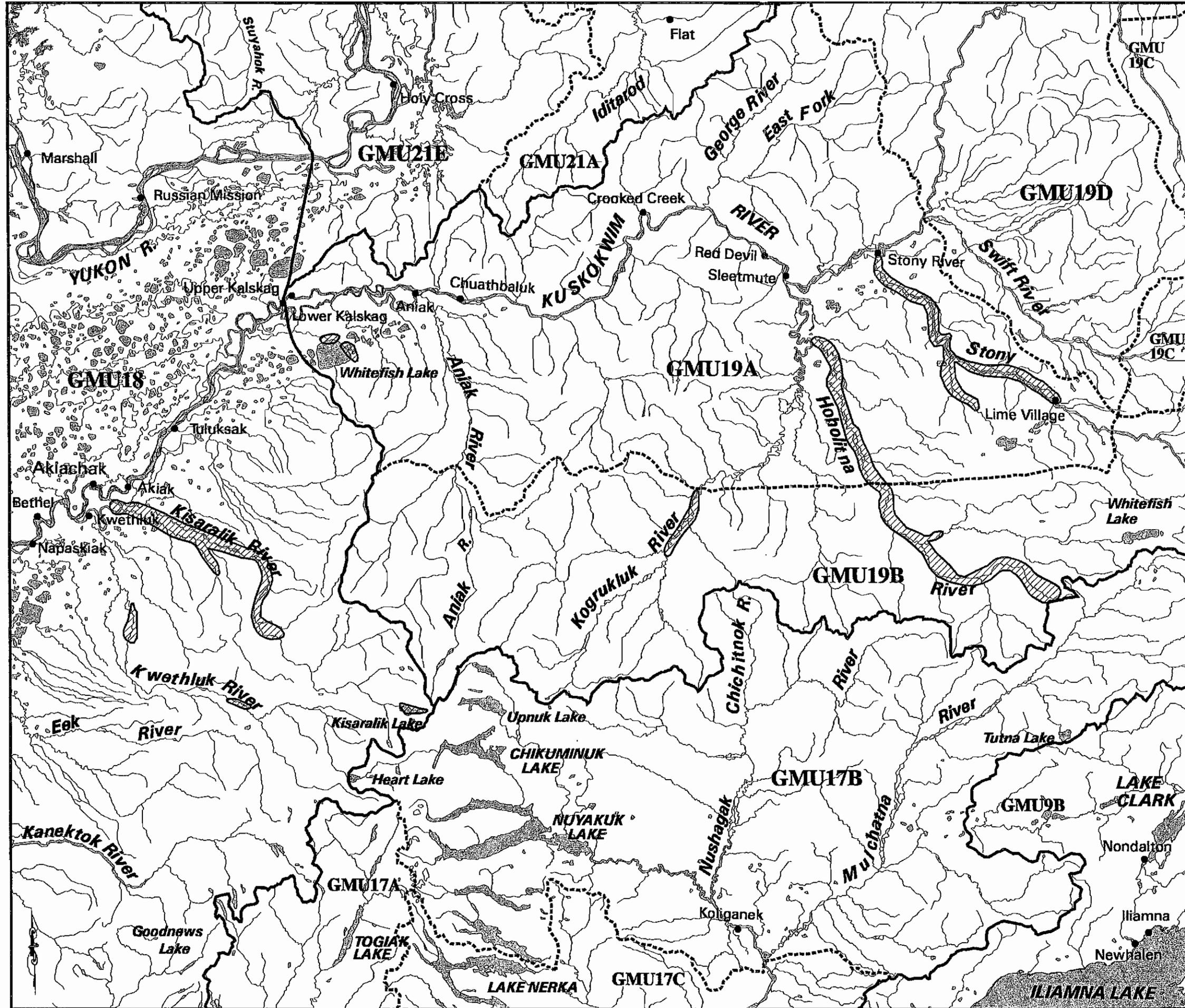
-  Trout Fishing Areas (Arctic Grayling, Dolly Varden, Lake Trout, Rainbow Trout)
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

This map depicts only those areas used by community residents while domiciled in Akiachak. Although an effort was made to get as many residents as possible to review the draft maps, not all Akiachak residents were available to review the map data. Therefore, this map may not include all of the areas used by the community. Subsistence use areas change through time. Consult with the community for more definitive information.



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 December, 1999



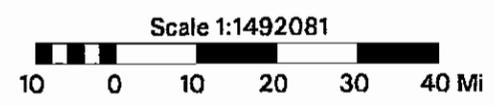
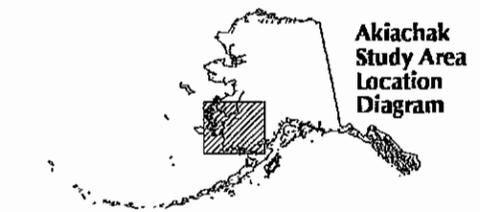


**FIGURE 16**  
**SUBSISTENCE "OTHER FISH"**  
**FISHING AREAS USED**  
**BY AKIACHAK RESIDENTS,**  
**1988-1997**  
**LEGEND**

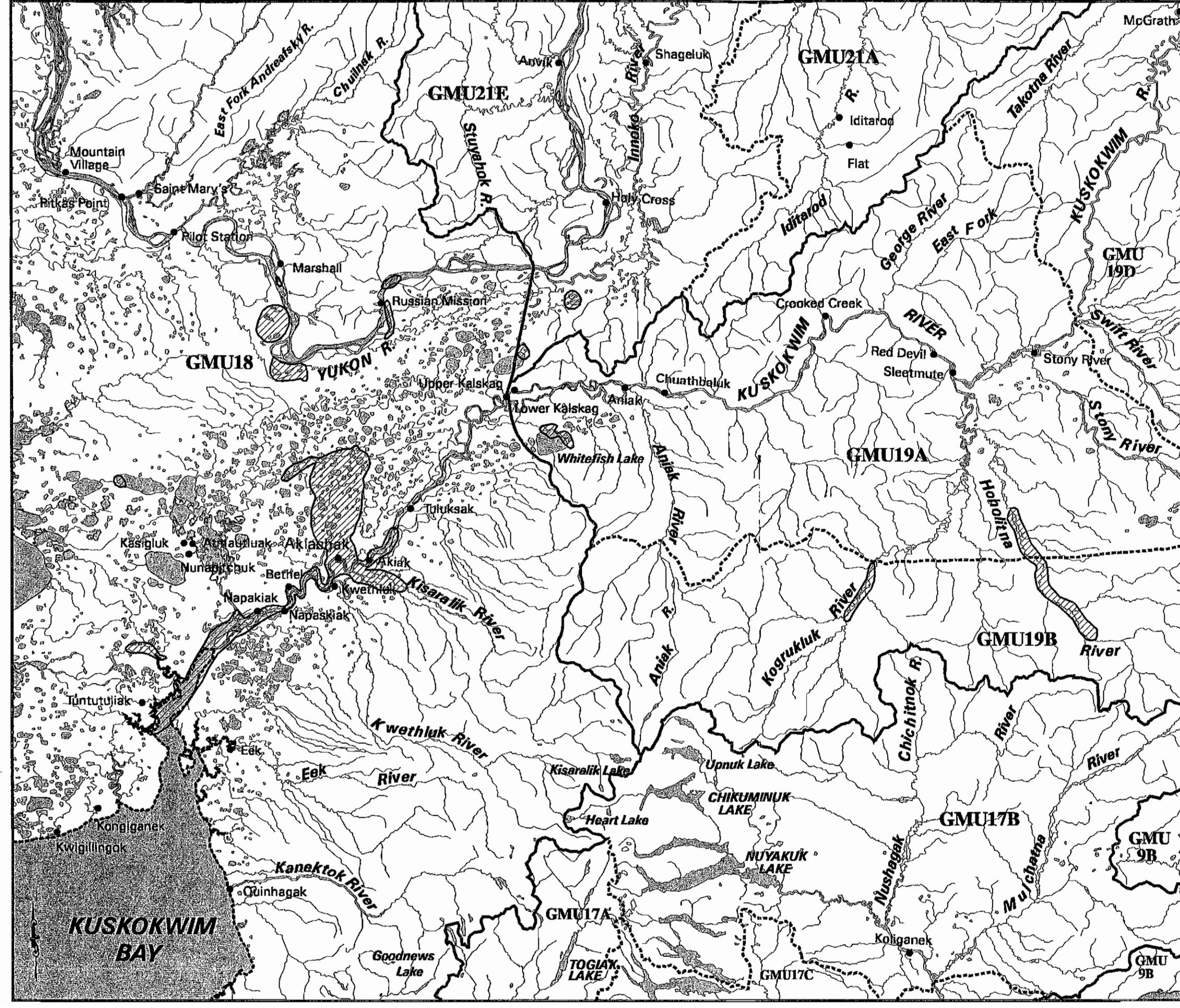
-  "Other Fish" Fishing Areas  
 (Whitefish, Cisco, Smelt,  
 Blackfish, Pike, Burbot, Sheefish,  
 Sucker, Lamprey, Stickleback)
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

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 Division of Subsistence  
 December, 1999





Fish were used in a variety of ways. Freshly caught fish were shared widely in the community and many were eaten soon after they were harvested. Blackfish, rainbow trout, grayling and Dolly Varden are usually eaten soon after they are caught. Other fish such as pike that are harvested during winter and early spring are cut and hung on horizontal poles where they are dried in the cold winter air. Dried pike are normally eaten as is or by dipping in seal or bear oil. Fish harvested in winter were easily frozen if not used immediately although, if harvest exceeded the household's needs, they were easily distributed to other households. In addition to baking, frying and boiling, some fish such as whitefish were dried and smoked along with salmon at summer fishcamp. Nearly all of the fish, including the head, the stomach, heart, liver and eggs of some fishes such as burbot are consumed. Organs or parts of fish that were not eaten were fed to dogs. Some fish were also harvested for use as dog food. Suckers, stickleback blackfish and burbot were sometimes used to feed dogs. Herring roe was dried and eaten without further preparation. Fish such as grayling, Dolly Varden and whitefish were sometimes eaten frozen and uncooked with seal oil.

Men, women, and children of various ages, were involved in fishing. Children accompanied their parents or relatives when putting a set gillnet in the water, when checking a net set under the ice, or when ice fishing. Children frequently fished for whitefish near the summer fishcamp using a rod and reel or a hook and line with salmon eggs for bait. Fishing activities typically accompany nearly every other subsistence activity in which a household is involved, such as berry picking, moose hunting and wood gathering to name a few. Non-salmon fish were an important resource that was locally available to many households on a year round basis.

## LARGE LAND MAMMALS

### Overview of Large Land Mammal Harvest and Use

During 1998, Akiachak residents harvested an estimated 127,884 pounds of large game, consisting of black bear, brown bear, moose and caribou. This combined harvest averaged over 1,000 pounds per household and 244 pounds per capita (Table 11). Large land mammals represented 18.4 percent of the total community harvest (pounds edible weight) of fish and wildlife. Slightly more than 95 percent of Akiachak households used large land mammals during 1998. Approximately 88 percent of the households had at least one individual who tried to harvest large game while nearly 72 percent of households gave and received large game during the study year (Table 11).

In addition to black bear, brown bear, caribou and moose, muskoxen are also found in southwestern Unit 18, however, during 1998, no Akiachak households reported using or attempting to harvest muskoxen. Both moose and caribou were used by 95 percent of Akiachak households. Most households (84 percent) had at least one person who attempted to harvest moose and a similar proportion of households (83 percent) tried to harvest caribou. Both caribou and moose were shared widely with other households (Table 11). Less than half (41 percent) of Akiachak households used black bear and fewer (11 percent) used brown bear. Forty six percent of households tried to harvest black bear. Few households (8.6 percent) attempted to harvest brown bear during 1998.

## Caribou: Regulations, Harvest and Use

Caribou harvested in Unit 18 were primarily from either the Mulchatna herd or the smaller Quailnguut (Kilbuck) caribou herd. During 1998, Akiachak residents also hunted for caribou in Unit 19A, 19B, and 19D located upstream from Akiachak. The caribou hunting season in Unit 18 has become more liberal since the influx of Mulchatna caribou in the mid 1990s. Caribou seasons in Unit 18 (south of the Yukon River) are opened by Emergency Order after ADF&G and USFWS have determined that "sufficient" numbers of Mulchatna caribou have entered the unit. For the past few years, caribou from the Mulchatna herd have moved into Unit 18 from areas to the east (Unit 19 and Unit 17).

During 1998, the State and Federal caribou seasons in Unit 18 (south of the Yukon River) opened on September 5 and closed on April 1 with a bag limit of 5 caribou. Seasons in Units 19A and 19B opened August 1 and closed April 16. The season in Unit 19D opened August 10 and closed September 30 with a 1 caribou bag limit (Alaska Department of Fish and Game 1997, 1998c; United States Fish and Wildlife Service 1997, 1998).

During 1998, 83 percent of Akiachak households harvested an estimated total of 374 caribou. This represented 72 percent of the large game harvested (Fig. 17) and 35 percent of the pounds edible weight of large game harvested (Fig. 18). Households harvested an average of just over 3 caribou each while per capita harvests averaged about 82 pounds (Table 11). Harvest timing varies year to year and is largely dependent on caribou distribution and abundance, weather factors such as water levels in tributary streams used to access harvest areas, and snow conditions throughout the winter months. During September, families often combined caribou hunting with other subsistence activities such as moose and bear hunting, berry picking and wood gathering. During winter, hunters combined caribou hunting with furbearer trapping and

hunting, moose hunting, small game hunting, checking blackfish traps and other subsistence activities. Hunters also went out specifically to look for caribou, particularly during the winter season. Thirty-five percent of the caribou harvested by Akiachak hunters in 1998 were taken during September and 55 percent were taken during the months of November through March during the winter season (Table 24). Key respondents reported that Akiachak residents generally harvest caribou throughout the year except when the caribou are calving.

Most of the Akiachak households (73 percent) harvested caribou in Unit 18 (Table 25). Eleven percent of households harvested caribou in Unit 19A and about four percent harvested in Unit 19B. During 1998, no households reported harvesting caribou in Units 19D, 21E or Unit 17. While households harvested caribou in a variety of places during 1998, nearly 83 percent of Akiachak households reported catching caribou in either the Kisaralik or Kasigluk river drainages of Unit 18 (Table 26). Five percent of households reported harvesting caribou in the Kwethluk River drainage and also in the Tuluksak River drainage. Nearly 9 percent harvested caribou in Unit 19A between Napaimiut and the Stony River while a few also harvested animals in the Unit 19B portions of the Holitna and Hoholitna river drainages.

Nearly 80 percent (298 caribou) of the total estimated caribou harvest (374) by Akiachak households during 1998 were taken in the Kisaralik and Kasigluk river drainages (Table 27). Twenty-nine animals were harvested in the Tuluksak River drainage, 19 were taken in the Kwethluk River drainage, 17 were harvested along the main Kuskokwim River between Napaimiut and the Stony River, four were harvested along the Kuskokwim River between Lower Kalskag and Napaimiut, and one was taken in the Stony River drainage of Unit 19A. Six caribou were harvested in Unit 19B in the Holitna and Hoholitna river drainages. No Akiachak hunters reported harvesting caribou

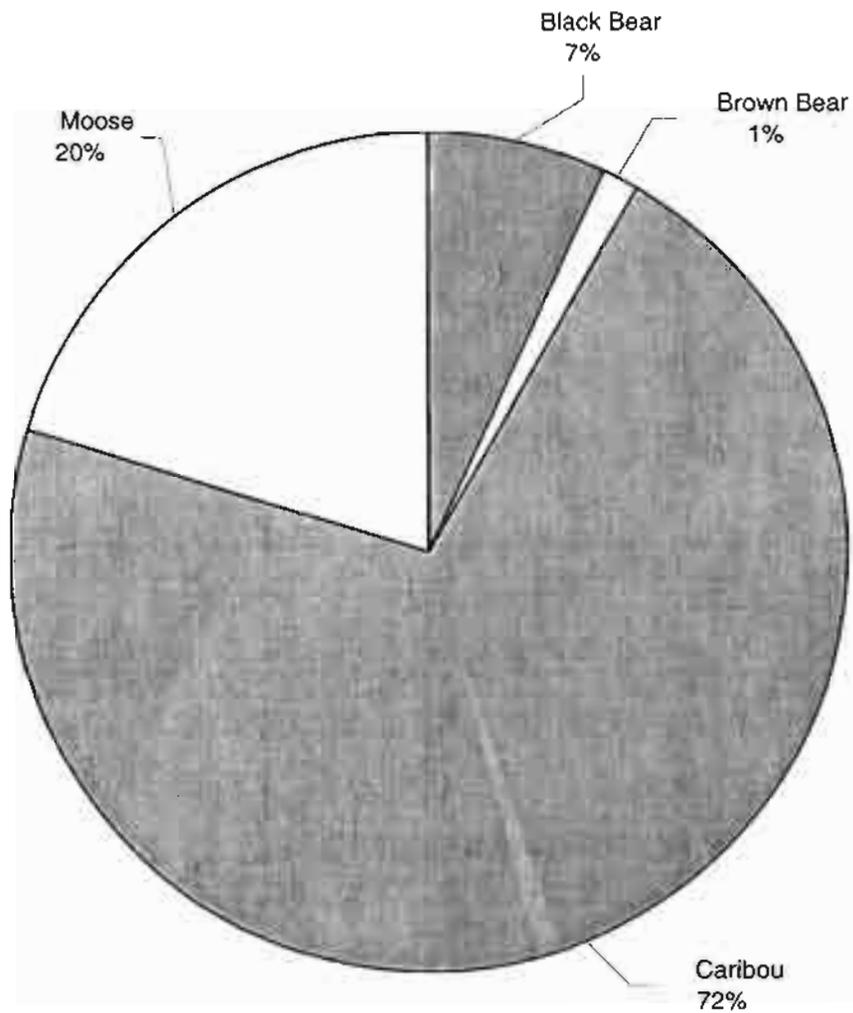


Fig. 17. Contribution of each large land mammal species to the overall number of large land mammals harvested, Akiachak, 1998.

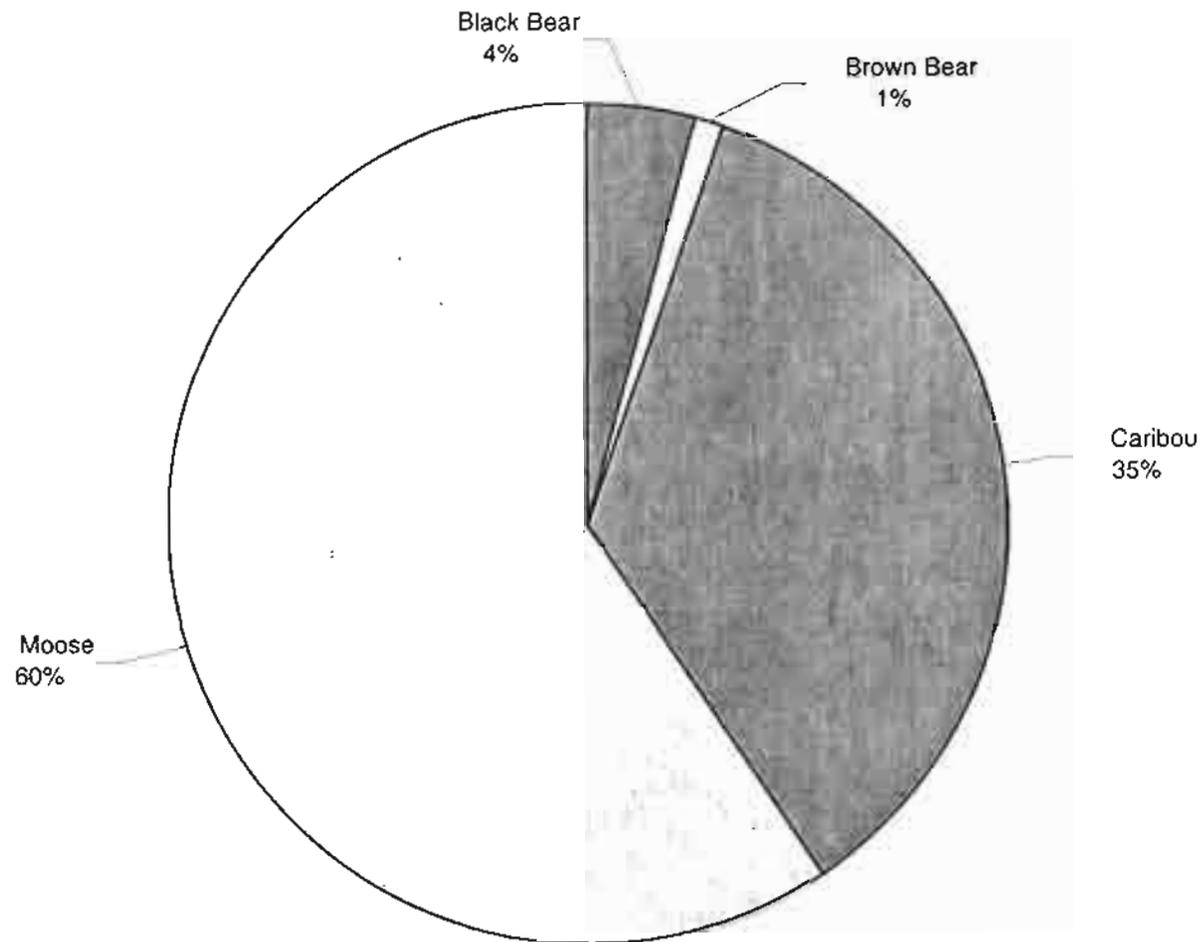


Fig. 18. Contribution of each large land mammal species to the overall pounds of large land mammals harvested, Akiachak, 1998.

Table 24. Estimated percentage of resources harvested each month, Akiachak, 1998

Resource	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Unknown
Black Bear	0	0	0	0	0	0	0	30	70	0	0	0	0
Brown Bear	0	0	0	0	0	0	20	0	80	0	0	0	0
Caribou	11	16	13	0	0	0	0	4	35	6	8	6	0
Moose	3	2	0	0	0	0	0	11	81	1	0	1	0
Beaver	10	11	14	5	10	1	0	0	12	9	9	13	6
Coyote	50	50	0	0	0	0	0	0	0	0	0	0	0
Red Fox	33	29	28	0	0	0	0	0	0	0	4	6	0
Snowshoe Hare	13	19	24	2	0	0	0	1	7	7	12	10	6
Land Otter	11	14	12	8	4	0	0	0	4	12	25	11	0
Lynx	21	13	0	13	0	0	0	0	13	0	21	21	0
Marten	32	32	23	0	0	0	0	0	0	0	0	6	6
Mink	0	0	0	0	0	0	0	0	0	17	39	26	19
Muskrat	4	4	4	15	38	4	0	0	13	0	1	1	16
Porcupine	8	6	5	0	0	0	0	8	40	20	4	5	2
Parka Squirrel	0	0	0	0	0	0	0	14	86	0	0	0	0
Weasel	33	0	0	0	0	0	0	0	0	0	33	33	0
Wolf	33	33	33	0	0	0	0	0	0	0	0	0	0
Wolverine	0	0	100	0	0	0	0	0	0	0	0	0	0
Bearded Seal	0	0	20	60	0	0	0	10	10	0	0	0	0
Ribbon Seal	0	0	0	0	0	0	0	100	0	0	0	0	0
Ringed Seal	0	0	0	68	26	0	0	5	0	0	0	0	0
Spotted Seal	0	0	8	42	25	3	6	17	0	0	0	0	0
Walrus	0	0	33	67	0	0	0	0	0	0	0	0	0
Belukha Whale	0	0	0	0	0	0	0	0	100	0	0	0	0
Blueberries	0	0	0	0	0	0	24	72	4	0	0	0	0
Boysenberries	0	0	0	0	0	3	59	31	8	0	0	0	0
Cranberries	0	0	0	0	0	0	0	23	77	0	0	0	0
Raspberries	0	0	0	0	0	0	0	0	100	0	0	0	0
Salmonberries	0	0	0	0	0	1	48	49	2	0	0	0	0
Blackberries	0	0	0	0	0	0	1	28	72	0	0	0	0
Wild Rhubarb	0	0	0	0	15	63	20	2	0	0	0	0	0
Hudson Bay Tea	6	6	8	9	11	7	8	12	12	7	6	6	0
Sourdock	0	0	0	0	22	46	18	14	0	0	0	0	0
Wild Celery	0	0	0	0	46	39	15	0	0	0	0	0	0
Rose Hips	0	0	0	0	0	0	4	40	36	20	0	0	0
Stinkweed	3	3	3	3	5	11	14	15	23	13	3	3	0
Fungus	7	12	10	8	6	7	6	6	10	9	8	9	0
Unknown Greens	0	0	0	0	0	33	0	0	0	0	0	0	67
Mousefoods	0	0	0	0	0	0	0	1	89	10	0	0	0
Wood	8	8	9	8	8	8	8	8	8	8	8	8	0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 25. Estimated number and percentage of Akiachak households harvesting large land mammals by Game Management Unit, 1998

Resource	Number and Percentage of Households Harvesting by Game Management Unit													
	Unit 18 Kuskokwim Area		Unit 19A		Unit 19B		Unit 19D		Unit 18 Yukon Area		Unit 21E		Unit 17	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Black Bear	19	23.5	2	2.5	0	0	0	0	0	0	0	0	0	0
Brown Bear	4	4.9		0	1	1.2	0	0	0	0	0	0	0	0
Caribou	59	72.8	9	11.1	3	3.7	0	0	0	0	0	0	0	0
Moose	32	39.5	18	22.2	2	2.5	2	2.5	2	2.5	0	0	0	0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 26. Percentage of households harvesting large land mammals by location, Akiachak, 1998

Harvest Location	Percentage of Households Harvesting			
	Moose	Caribou	Black Bear	Brown Bear
Gweek River Drainage (Unit 18)	8.65	0	6.17	0
Kwethluk River Drainage (Unit 18)	0	4.94	0	0
Kasigluk River Drainage (Unit 18)	7.41	38.27	3.7	1.23
Kisaralik River Drainage (Unit 18)	16.1	44.44	11.11	3.7
Kuskokwim River: Bethel to Akiak (Unit 18)	1.23	0	1.23	0
Tuluksak River Drainage (Unit 18)	3.7	4.94	1.23	0
Kuskokwim River: Akiak to Lower Kalskag (Unit 18)	3.7	0	0	0
Yukon River: Downstream of Russian Mission (Unit 18)	1.23	0	0	0
Yukon River Drainage: Russian Mission to Paimiut (Unit 18)	1.23	0	0	0
Yukon River Drainage: Upstream of Paimiut (21E)	0	0	0	0
Kuskokwim River Drainage: Lower Kalskag to Napaimiut (Unit 19A)	7.41	1.23	0	0
Kuskokwim River Drainage: Napaimiut to Stony River (Unit 19A)	11.1	8.64	2.47	0
Lower Holitna River Drainage (Unit 19A)	1.23	0	0	0
Lower Hoholitna River Drainage (Unit 19A)	1.23	0	0	0
Upper Holitna River Drainage (Unit 19B)	0	1.23	0	0
Upper Hoholitna River Drainage (Unit 19B)	2.47	2.47	0	1.23
Stony River Drainage (Unit 19A)	1.23	1.23	0	0
Kuskokwim River Drainage: From Stony River to McGrath (Unit 19D)	2.47	0	0	0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 27. Estimated number of large land mammals harvested by location, Akiachak 1998

Harvest Location	Number of Large Land Mammals Harvested			
	Moose	Caribou	Black Bear	Brown Bear
Gweek River Drainage (18)	11.65	0	8.74	0
Kwethluk River Drainage (18)	0	19.42	0	0
Kasigluk River Drainage (18)	8.74	134.27	4.37	1.46
Kisaralik River Drainage (18)	26.22	163.40	17.48	4.37
Kuskokwim River Drainage: Bethel to Akiak (18)	1.46	0	1.46	0
Tuluksak River Drainage (18)	4.37	29.38	1.46	0
Kuskokwim River: Akiak to Lower Kalskag (18)	5.83	0	0	0
Yukon River Drainage: Downstream of Russian Mission (18)	1.46	0	0	0
Yukon River Drainage: Russian Mission to Paimiut (18)	1.46	0	0	0
Yukon River Drainage: Upstream of Paimiut (21E)	0	0	0	0
Kuskokwim River Drainage: Lower Kalskag to Napaimiut (19A)	17.48	3.64	0	0
Kuskokwim River Drainage: Napaimiut to Stony River (19A)	14.57	17.00	2.91	0
Lower Holitna River (19A)	1.46	0	0	0
Lower Hoholitna River Drainage (19A)	1.46	0	0	0
Upper Holitna River Drainage (19B)	0	1.46	0	0
Upper Hoholitna River Drainage (19B)	2.91	4.37	0	1.46
Stony River Drainage (19A)	1.46	1.46	0	0
Kuskokwim River Drainage: From Stony River to McGrath (19D)	5.83	0	0	0

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

near Kisaralik Lake, Heart Lake, or Aniak Lake during 1998. There was also no reported caribou harvest by Akiachak residents in Units 17 and 19D during the study period.

Areas used by Akiachak residents to hunt for caribou from 1988 through 1997 are shown in Figure 19. These areas include Game Management Units 18, 19A, 19B, 19D and a portion of Unit 17B. Hunting areas within Units 19A, 19B, 19D and 17B are used primarily during the late summer and fall time when hunters access the areas by boat. Fall hunting areas also include the Kisaralik, Kasigluk, Tuluksak, Kwethluk and Akulikutak river drainages. Extreme low water during the fall season can make access to portions of some of these rivers and associated tributaries difficult. Akiachak hunters are especially adept at finding their way around or over shallow areas. High water does not necessarily make travel up these rivers any easier, as the rivers are swift, divided into several channels, and are strewn with sweepers and hidden obstacles.

Caribou hunting with snowmachine during the winter months occurs primarily in Unit 18 in the Kwethluk, Kasigluk and Kisaralik river drainages and the surrounding tundra. Hunters travel to places where they expect, by experience, to find caribou, or to places where they know other hunters have been successful. Since 1995, hunters have been able to find caribou in the areas east of the community because the Mulchatna caribou herd ventured westward from Unit 19B and 17B into Unit 18. Some hunting of caribou in Unit 18 occurred prior to the expansion of the Mulchatna herd, however, hunters that traveled up into Units 19A and 19B, particularly into the Holitna and Hoholitna river drainages, were probably more successful harvesting caribou than those hunting caribou in Unit 18 during the fall. As the range and availability of the Mulchatna caribou herd changes over time, caribou harvest areas will also likely shift. For example, during the winter of 1999, caribou were harvested near the Gweek River located west of Akiachak.

Hunters accessed Unit 17B by walking overland after boating up the Holitna River and Kogruklu River. Hunters sometimes hike several miles looking for caribou, moose and other game. Caribou hunting efforts in Unit 19A, 19B and 19D were usually combined with efforts to harvest moose and black bear. However, hunters traveled to Unit 19B particularly because but they knew there is a very good chance of harvesting caribou there.

Areas used prior to 1988 for harvesting caribou included the Kuskokwim Mountain area between the Aniak River and Taylor Mountain in Unit 19A and 19B. The region around the Tikchik Lakes and northeast to the Shotgun Hills area and Nushagak Hills in Unit 17B was also used when harvesting furbearers and trapping. Caribou were harvested whenever they could be taken when food was needed. Residents still living but now retired from hunting and trapping used to frequent this area using dogteams to trap beaver and harvest other game.

Caribou harvested during the fall were sometimes brought home to Akiachak the same day if the harvest location was not too far from home and if the hunter or group of hunters did not wish to camp several days longer. It is common for caribou harvested in the fall to be butchered in the field into large pieces (legs, ribs, back, neck etc) and hung by wooden poles until the surface of the meat is dry. Once the surface is dry, the meat can be packed in the boat and taken home. Caribou harvested in the winter were also butchered in the field into large pieces. Sometimes the animals are gutted, skinned and cut up. Other times, caribou are gutted and cut up leaving the skin on the much of the animal. Final skinning of the larger pieces is done after the animal is taken home. Small caribou may be gutted and loaded into a sled and taken home without any additional butchering in the field.

Nearly every part of an animal was utilized by Akiachak households. Hides were dried and used for sleeping pads when camping. The organs, such as the liver, kidneys

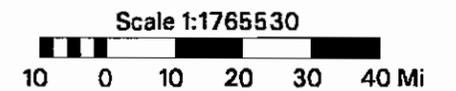
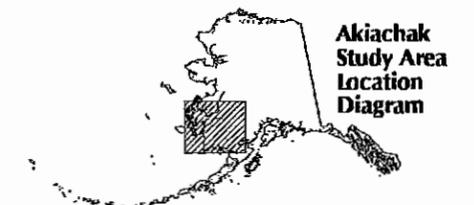
**FIGURE 19**  
**SUBSISTENCE CARIBOU**  
**HUNTING AREAS USED**  
**BY AKIACHAK RESIDENTS,**  
**1988-1997**

**LEGEND**

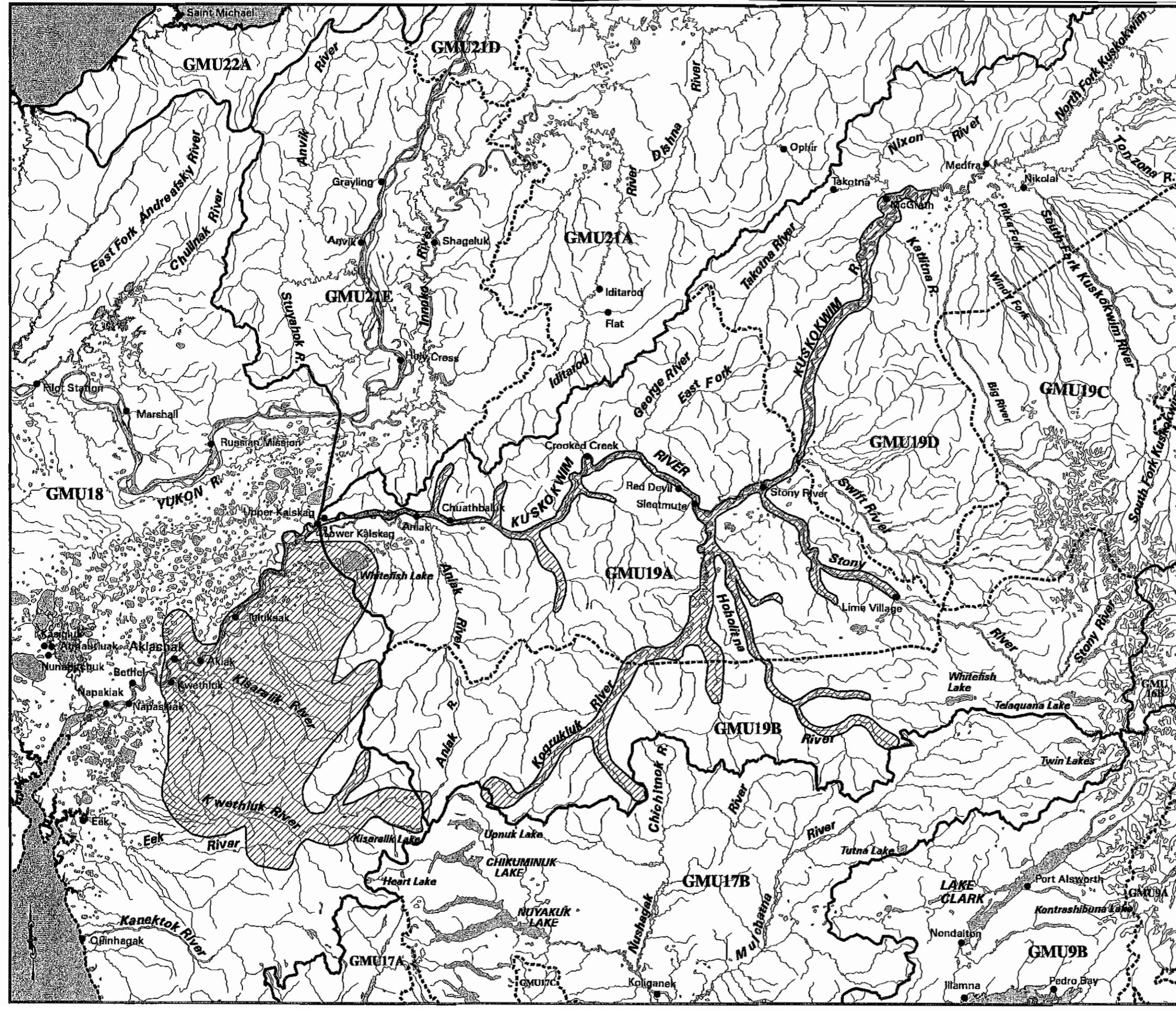
-  Caribou Hunting Areas
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

This map depicts only those areas used by community residents while domiciled in Akiachak. Although an effort was made to get as many residents as possible to review the draft maps, not all Akiachak residents were available to review the map data. Therefore, this map may not include all of the areas used by the community. Subsistence use areas change through time. Consult with the community for more definitive information.



State of Alaska  
 Department of Fish and Game  
 Division of Subsistence  
 December, 1999





and heart are consumed. Leg bones are cooked and cracked so that the marrow could be extracted and eaten. Caribou feet are also boiled and eaten, as is often the tongue. As with other large game, the intestinal fat is saved and used. Caribou antler and hooves are used to make tools and crafts.

#### Moose: Regulations, Harvest and Use

Akiachak residents hunted moose in Unit 18, 19A, 19B, and 19D during 1998. Moose seasons in the areas hunted by Akiachak were provided for under both state and federal regulations. The fall moose season in the Kuskokwim drainage of Unit 18 opened August 25 and closed September 30: the state season was open September 1 through September 30 and the federal season was open August 25 through September 25 (Alaska Department of Fish and Game 1997, 1998c; United States Fish and Wildlife Service 1997, 1998). The moose season in the Yukon River drainage of Unit 18 upstream of the Andrafsky River also opened September 1 through September 30 in both the state and federal regulations. A winter moose season Unit 18 was provided for under both state and federal regulations. Both agencies coordinate on opening and closing dates and provide for a season during the same 10-day period. During both the 1997 and 1998 regulatory years, the winter season was opened from December 27 through January 5. During the study period, the winter season was opened for a total of 10 days. Moose hunting on federal lands of Unit 18 was closed to everyone except rural residents identified in federal regulation as having customary and traditional use of Unit 18 moose. During 1998 this included residents of Unit 18, Upper Kalskag, Lower Kalskag, Aniak and Chuathbaluk. The individual bag limit in Unit 18 for all seasons combined was 1 bull.

Moose hunting seasons in Unit 19A (excluding the Lime Village Management Area) were also divided into multiple state and federal seasons resulting in four distinct hunting periods: September 1 – 20, November 20 – 30, January 1 – 10, and February 1 – 10. All except the January season were both state and federal seasons. The January hunting season was a federal season on federal lands only. The bag limit for these federal seasons was one moose; however, antlerless moose could only be taken during the February season in a portion of Unit 19A upstream of the Kolmakof and Holokuk river drainages. The season in Unit 19B and Unit 19D opened September 1 under both the state and federal regulations. The state season in both Units 19B and 19D closed September 25 while the federal season closed September 30. The bag limit in both Units 19B and 19D was one bull.

Sixty eight percent of Akiachak households harvested moose in 1998. The estimated number of moose harvested totaled 106 animals. Moose represented 20 percent of the large game animals harvested (Fig. 17) and 60 percent of the pounds edible weight of large game harvested (Fig. 18). Household moose harvests averaged about one moose per household while per capita harvests averaged about 145 pounds (Table 11). Eighty one percent of the moose harvest reported by Akiachak hunters in 1998 occurred during September (Table 24). Approximately 11 percent of the harvest occurred in August. Harvest was also reported during the months of October, December, January and February. Key respondents reported that moose are taken any time of the year when meat is needed.

Thirty-nine percent of the Akiachak households harvested moose in the Kuskokwim River drainage of Unit 18, 22 percent harvested moose in Unit 19A, and 2.5 percent harvested moose in each Units 19B, 19D and the Yukon drainage of Unit 18 (Table 25). During 1998, no Akiachak households reported harvesting moose in Units 21E or 17. Households harvested moose in a variety of places in these Units (Table 26).

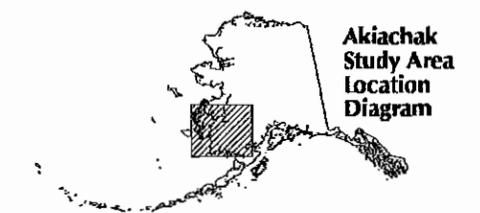
**FIGURE 20**  
**SUBSISTENCE MOOSE**  
**HUNTING AREAS USED**  
**BY AKIACHAK RESIDENTS,**  
**1988-1997**

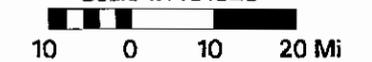
**LEGEND**

-  Moose Hunting Areas
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

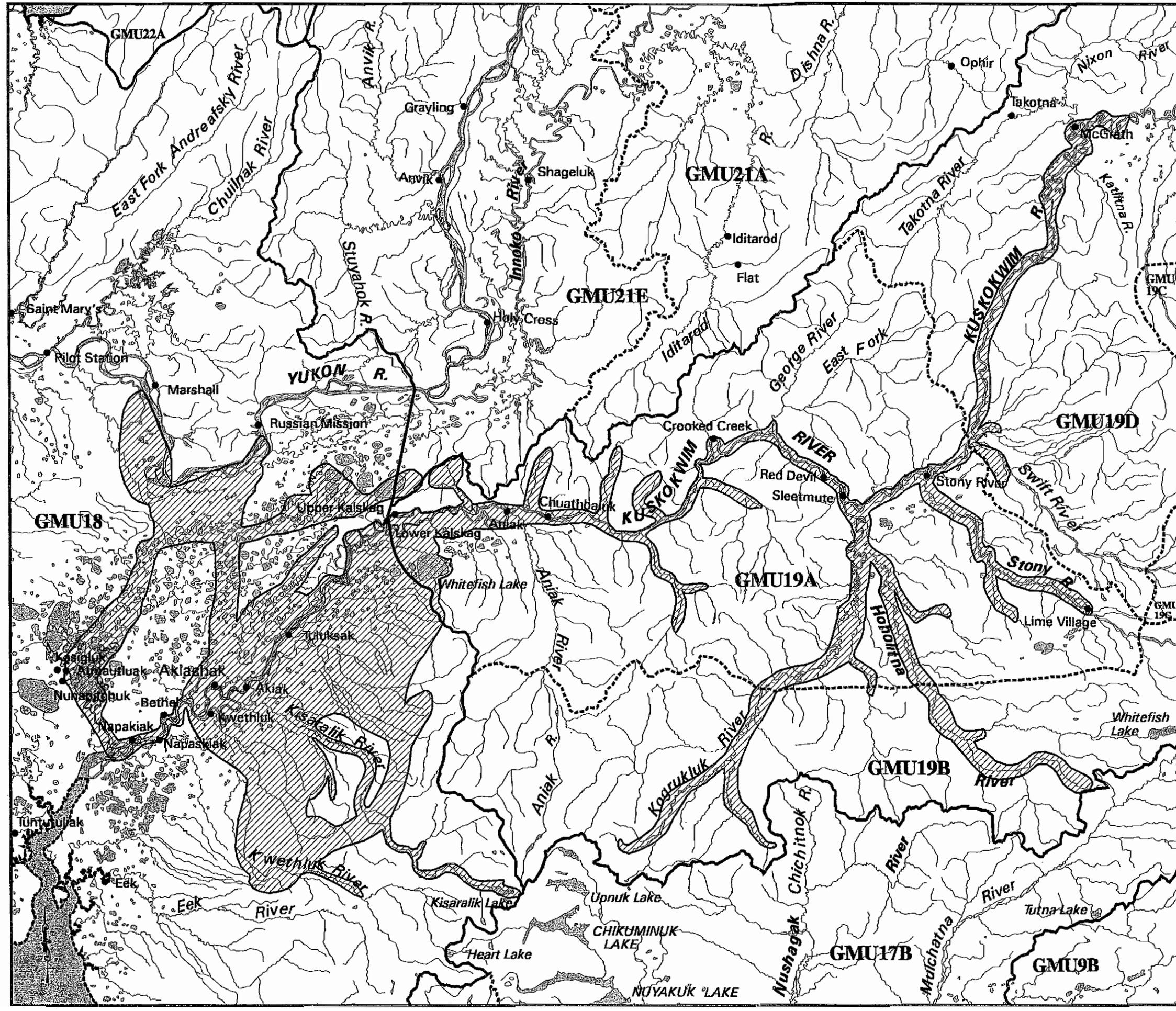
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 December, 1999





Forty one percent of the households reported harvesting moose in the Kuskokwim River drainage downstream of Lower Kalskag. The Gweek, Kasigluk, Kisaralik and Tuluksak rivers and the Kuskokwim River drainage from Akiak upstream to the Stony River were the primary areas where hunters searched. Individuals also harvested moose in the Holitna, Hoholitna and Stony river drainages as well as in Unit 19D.

Approximately 44 percent of the moose harvested during 1998 were taken in the Gweek, Kisaralik, or Kasigluk river drainages (Table 27). The Kisaralik River drainage accounted for 26 moose (25 percent) of the 106 moose harvested. Thirty-two moose (30 percent) were harvested in the area upstream of Lower Kalskag to the Stony River. An estimated 6 moose were harvested in Unit 19D between the Stony River and McGrath. Three moose were harvested in the Yukon River drainage of Unit 18 during the winter season.

Areas used by Akiachak residents to hunt for moose from 1988 through 1997 are shown in Figure 20. These areas include Game Management Units 18, 19A, 19B, 19D and a portion of Unit 17B. Hunting areas within Units 19A, 19B, 19D and 17B are used primarily during the late summer and fall time when hunters access the areas by boat. Fall hunting areas in Unit 18 include the Johnson, Gweek, Kisaralik, Kasigluk, Tuluksak, Kwethluk and Akulikutak river drainages as well as the many sloughs and tributaries of the Kuskokwim River. Hunters travel great distances searching for moose, extending up the Kuskokwim River above McGrath and to the headwaters of the Holitna and Hoholitna rivers. Tributary streams all along the Kuskokwim River such as the Kolmakof, Holokuk, Oskawalik, Stony, Swift, and Tatlawiksuk rivers are also hunted. Hunters also travel up the Johnson River drainage by boat to areas northwest of Upper Kalskag. Water levels can be quite variable during the fall season and can either hinder or help hunters accessing harvest areas. Hunters did not identify areas in Unit 17 for hunting moose;

however, hunters did identify areas in Unit 17B where they hunted caribou on foot after boating up the Holitna and Kogrukluk rivers. It is possible that hunters searching for caribou in Unit 17B may also harvest moose on occasion. Moose hunting is often combined with efforts to harvest other resources such as caribou, black and brown bear, beaver, waterfowl, fish, berries and wood.

During the winter months, moose hunting occurs in Unit 18 east of Akiachak in the Kwethluk, Kasigluk, Kisaralik and Tuluksak drainages. Individuals also hunt the Kuskokwim River corridor, the Gweek and upper Johnson river drainages, and the Yukon River area between Russian Mission and Marshall. Hunters travel to Unit 19A during the winter seasons and hunt in the area around Whitefish Lake and in the vicinity of Aniak. Snowmachines are the primary method used to access hunting areas during winter.

Depending on the area hunted and the distance from Akiachak, hunters may make a camp, often consisting of a canvas wall tent with a wood stove, from which hunting activities are based. Some Akiachak residents have cabins located in areas where they frequently hunt and trap; these shelters are used during their winter hunts. Individuals typically hunt with at least one other person.

Areas used prior to 1988 included the Aniak Lake and Aniak River drainage, the Tikchik Lakes area of Unit 17B (Upknuk, Nishlik, Chikuminuk, Chauekuktuli and Nuyakuk lakes) as far east as the Tikchik Mountain extending to the Shotgun Hills, Finn Mountain, Nushagak Hills, and Taylor Mountain in Unit 19B. This area was accessed by dogsled for purposes of furbearer hunting and trapping as well as hunting caribou and moose when needed. Akiachak elders no longer hunting moose or trapping furbearers have vivid memories of subsistence activities in this area.

Moose are butchered at the kill site and cut into pieces that can be carried by one person. When hunting by boat, the butchered animal is often taken back to the hunting

camp where the pieces are hung to form a dry surface. Meat is kept cool and dry and then transported home. Moose caught close to Akiachak may be taken back to the community the same day immediately after the animal is butchered. During winter months, moose are butchered in a similar fashion. Sometimes the hide is left on the front and hind legs until the meat can be brought home at which time the hide is removed. During winter, the meat cools much quicker and hanging the meat in order to dry the surface is not necessary.

Hunters often cooperate in harvesting moose and generally share the meat equally after the hunt is complete. Once the meat is home, it may be hung in a cache or smokehouse until it can be processed, frozen and distributed. During winter, meat can remain in a cache outside until needed. However, moose meat is widely distributed and does not remain in storage for long. While men are the primary hunters, women related to the hunters (i.e. a spouse, mother, sister or sister-in-law) women are the primary processors and do the final processing. Children are encouraged to hunt with their families and participate in the butchering and processing activities. It is customary for the first moose harvested by a young hunter to be completely distributed to other households. A portion may be kept for a feast to celebrate the young hunter's success.

Use of moose is comparable to that discussed for caribou. One exception, however, is that if the animal is skinned at the kill site, the hides are often left in the field. Hides of moose are not typically brought back to the community to be used for sleeping pads. During the initial butchering of the moose at the kill site, some hunters leave the hide on the legs to help keep the meat clean until it is taken home for final processing. Organs, such as the liver, kidneys and heart are consumed. Leg bones are cooked and cracked so that the marrow can be extracted and eaten. Moose feet are also boiled and eaten as are the tongue, the nose and meat from the head. Fat from the animal is saved and used. The stomach is cleaned and cooked. Hunters frequently bring the antlers of

moose home, if it is not inconvenient. Antler and hooves are used to make tools and crafts. Meat is cooked in a variety of ways including boiling, roasting, baking and frying. Meat is also cut into strips and dried into jerky, requiring no cooking before being eaten.

Households regularly combine their individual resources to enable hunters to go moose hunting. Sharing expenses of gasoline, food and equipment necessary for the hunt such as a boat, motor, camping gear, hunting equipment, ammunition etc., allows more households to participate in moose hunting activities and helps ensure a successful and safe hunt. Young hunters learn how and where to hunt moose by accompanying older, more experienced hunters, such as brother, father, uncle or grandfather. As individuals gain the experience they need to hunt more independently, they may seek out new areas to hunt.

#### Black Bear: Regulations, Harvest and Use

State and federal black bear hunting seasons and bag limits in the areas hunted by Akiachak residents were quite liberal during 1998. There were no closed seasons in Units 18, 19A, 19B, and 19D and each Unit had a three bear bag limit (Alaska Department of Fish and Game 1997, 1998c; United States Fish and Wildlife Service 1997, 1998).

Akiachak residents harvested an estimated 36 black bears during 1998. Black bear represented seven percent of the large game animals harvested (Fig. 17) and four percent of the pounds edible weight of large game harvested (Fig. 18). Per capita harvest of black bear averaged 10.4 pounds (Table 11). All of the black bear harvested in 1998 were taken during August (30 percent) and September (70 percent, Table 24). Black bear are typically harvested in association with fall moose and caribou hunting

activities and wood gathering. Key respondents report that black bear are also harvested year round, including hunting bears in dens during the winter months.

Approximately 26 percent of Akiachak households harvested black bear (Table 13). Most of the successful households (19 of 21) harvested bear in Unit 18 while two households harvested bear in Unit 19A (Table 25). Akiachak households did not report harvesting black bear in Units 19B, 19D or 17 during the study period. In Unit 18, the Gweek, Kasigluk and Kisaralik river drainages were the primary harvest areas (Table 27). Black bear were also harvested in the Tuluksak River drainage and along the Kuskokwim River between Bethel and Akiak. Three black bears were harvested in the Kuskokwim River drainage of Unit 19A between Napaimiut and the Stony River.

Areas used for hunting black bear by Akiachak residents from 1988 through 1997 are shown in Figure 21. These areas include Game Management Units 18, 19A, 19B and 19D. During August and September, hunters look for black bear while hunting both moose and caribou, thus much of the black bear hunting areas are concentrated along riparian corridors of rivers and streams accessible by boat. In Unit 19 this area includes the main Kuskokwim River as well as several tributaries such as the Kolmakof, Holokuk, Oskawalik, George, Holitna, Kogrukluk, Hoholitna, Stony and Tatlawiksuk rivers. The Kwethluk River as far upstream as Elbow Mountain, the Kisaralik River including Quicksilver Creek and the Johnson River drainage are also hunted. Black bears are also harvested in tundra areas east and west of Akiachak when they are found during spring and fall. Harvest areas near the Yukon River south of Russian Mission were used in spring.

Hunters did not identify Unit 17B as a black bear harvest area, however, Akiachak residents do hunt caribou in a portion of Unit 17B and it is likely that black bear may be hunted in this same area. Elders now retired from hunting and trapping, hunted black bear in Unit 17B in the Tikchik Lakes area (Upknuk, Nishlik, Chikuminuk,

Chauekuktuli and Nuyakuk lakes) as far east as the Tikchik Mountain extending to the Shotgun Hills, Finn Mountain, Nushagak Hills, and Taylor Mountain in Unit 19B during the 1930s through the early 1960s. This area was accessed by dogsled for furbearer hunting and trapping as well as hunting caribou, moose, black bear and brown bear.

Black bear are easily butchered by one person. Bears may be gutted in the field and then loaded in a boat and brought home. When harvested in an area far from home, black bear are skinned, butchered and hung much like moose and caribou. Unlike moose and caribou, meat from black bear is not dried and made into jerky. Also, the heart and tongue are eaten but the liver is not. Bones containing marrow are cooked and cracked to get the marrow out. The meat is cooked in a variety of ways including boiling, baking, roasting and frying. The fat is used and rendered into oil that may be eaten with dried meat or fish. Black bear skins are dried and used for making mukluks and trim on other articles of clothing. It is customary that the head of a bear be buried facing east in the field.

#### Brown Bear: Regulations, Harvest and Use

Akiachak residents harvested brown bear in Units 18 and 19B during 1998 (Table 25). Seasons for hunting brown bear for subsistence use during 1998 were open from September 1 through May 31 in the Western Alaska Brown Bear Management Area (WABBMA). The WABBMA included all of Unit 18, all of Unit 17, that portion of Units 19A and 19B downstream of and including the Aniak River drainage and Unit 9B (Alaska Department of Fish and Game 1997, 1998c; United States Fish and Wildlife Service 1997, 1998). The bag limit was one brown bear per regulatory year. Brown bears harvested under this regulation did not have to be sealed unless the hide was taken outside of the WABBMA. The meat also had to be salvaged for human consumption.

**FIGURE 21**  
**SUBSISTENCE BLACK BEAR HUNTING AREAS USED BY AKIACHAK RESIDENTS, 1988-1997**

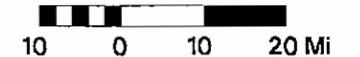
- LEGEND**
-  Black Bear Hunting Areas
  -  GMU Boundaries
  -  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

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 December, 1999

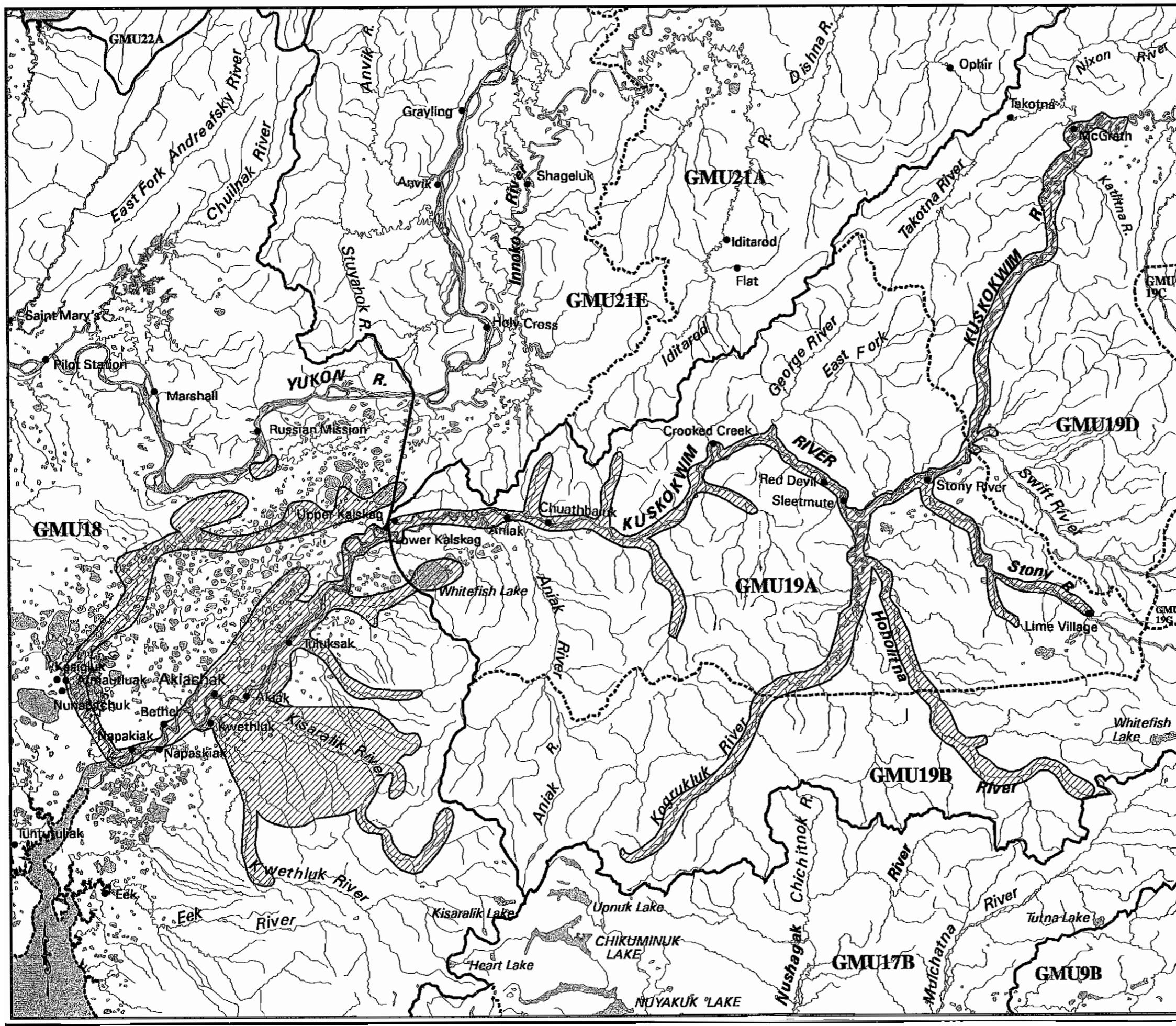




FIGURE 22

**SUBSISTENCE BROWN BEAR HUNTING AREAS USED BY AKIACHAK RESIDENTS, 1988-1997**

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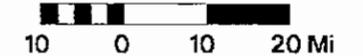
-  Brown Bear Hunting Areas
-  GMU Boundaries
-  Subunit Boundaries

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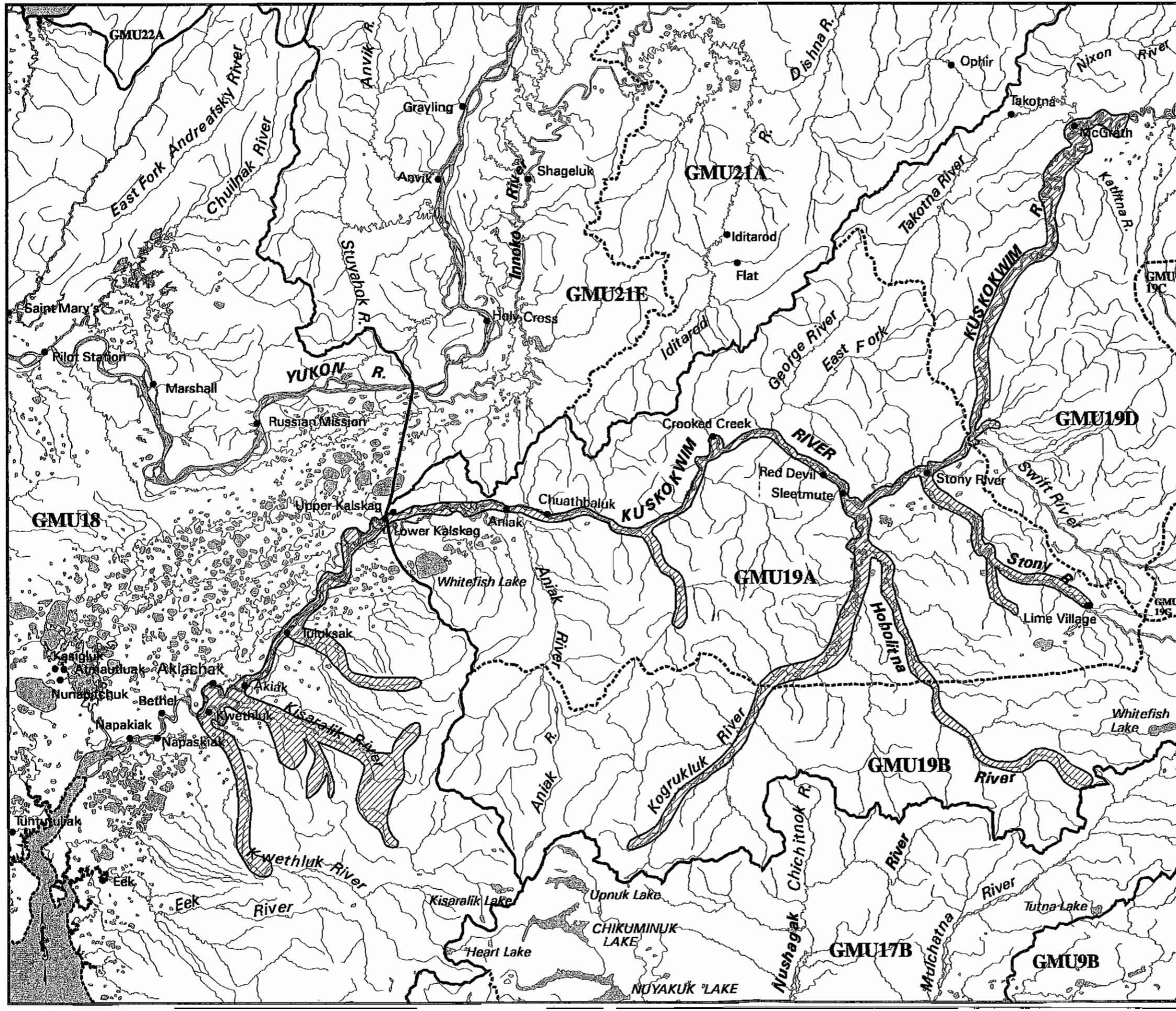
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December, 1999





State and federal brown bear hunting regulations in the remainder of Unit 19A and Unit 19B and in Unit 19D allowed hunters to harvest a bear once every four years, required hunters to purchase a \$25 tag and have the hide and skull sealed. State brown bear seasons in the remainder of Units 19A and all of 19D were open from September 1 through May 31. The state season in the remainder of Unit 19B was open from September 10 through May 25. Federal seasons in the remainders of Units 19A and 19B and all of Unit 19D were open from September 10 through May 25.

Approximately six percent of Akiachak households harvested brown bear in 1998 resulting in an estimated total harvest of seven bears. Brown bear comprised only one percent of the large game animals harvested (Fig. 17) and one percent of the pounds edible weight of large game harvested (Fig. 18). The per capita harvest was three pounds (Table 11). During 1998, 80 percent of the brown bear were harvested during September and 20 percent were harvested in July (Table 24). Key respondents reported that brown bear might be harvested any time the bears are not in their dens. Unlike black bear, hunters do not try and harvest brown bear that are still in their dens; however, hunters occasionally find bears out of their den during the winter months. For example, hunters from the neighboring community of Kwethluk have observed brown bear tracks in December 1999 and have harvested brown bear as early as mid-March (Andrew 1999).

Four brown bear were harvested in the Kisaralik River drainage of Unit 18. Brown bear were also harvested in the Kasigluk River drainage of Unit 18 and in the Hoholitna River drainage of Unit 19B (Table 27). During the study period, Akiachak residents reported no brown bear harvested in Units 19A, 18D or 17.

Areas used by Akiachak residents to hunt for brown bear from 1988 through 1997 are shown in Figure 22. These areas include Game Management Units 18, 19A, 19B and 19D. In Unit 18, brown bear were hunted in the Kwethluk, Kasigluk, Kisaralik

and Tuluksak River drainages. Bear were also hunted along the main Kuskokwim River from Akiachak to McGrath, in the Holitna, Kogruluk and Hoholitna river drainages, and in the Stony River drainage. Spring harvest areas were primarily in the Kisaralik, Kasigluk and Kwethluk river areas and along the Kuskokwim River between Kwethluk and Tufuksak. Areas further up the Kuskokwim River in Units 19A, 19B and 19D were hunted primarily during August and September in association with moose, caribou and black bear hunting activities. During the mapping component of this study, Akiachak residents did not identify brown bear hunting areas in Unit 17. However, because residents hunt caribou in a portion of Unit 17, they may also harvest brown bear there.

Hunters most commonly hunt brown bear during fall (mid-August through early October) and spring (April through early June). Some harvest occurs during mid June through early August; these harvests are often in association with salmon fishcamp or berry picking activities. Bears that become bothersome near fish camps are harvested when necessary. Some people prefer not to harvest bears in some areas during late summer if the hunter believes that the bear may have recently been feeding on salmon. People from Akiachak have a deep respect for the strength and power of brown bear and because of this some individuals will try to avoid encounters with brown bear whenever possible. Those individuals that have the knowledge and experience to hunt brown bear typically hunt in areas where bears have recently been seen or where, based on past experiences, the hunter can expect to find bears.

Key respondent elders reported that they have also used the Aniak Lake and Aniak River drainage, the Tikchik Lakes area (Upknuk, Nishlik, Chikuminuk, Chauekuktuli and Nuyakuk lakes) as far east as the Tikchik Mountain extending to the Shotgun Hills, Finn Mountain, Nushagak Hills, and Taylor Mountain in Unit 19B for hunting moose and harvesting furbearers during the 1930s through 1960s, by dogteam.

Although most brown bear were in their den during much of the winter, bear were occasionally harvested in these areas during late winter and early spring.

Upon harvest, brown bear are skinned and the fresh meat is hung similar to moose, caribou and black bear. If harvested close to the community, the meat may be brought home or hung in a smokehouse at fishcamp. As with black bear, the head of the brown bear is buried facing east and is not brought back to the community.

Some people do not like the taste of brown bear. Brown bear meat it is not used by as many households that use moose, caribou or even black bear. Some people do not like the taste of brown bear. Hunters cooperating in the hunt usually share the meat, however, the individual who killed the bear typically keeps the hide. Choice parts of the bear, including the hide, may be given to an elder or someone who specifically requests the part and bear meat is typically shared with people who like to eat brown bear. Parts of the bear eaten include the tongue, heart, kidneys and sometimes the intestines. The meat is cooked in a variety of ways; however, it is not dried into jerky like moose or caribou. Bear fat is made into oil and sometimes used as a substitute for seal oil, eaten with dried meat and dried fish. Bear hides are used for camp mattresses similar to caribou hides. Bear claws are sometimes made into necklaces. Some bartering of bear hides for other subsistence products may also occur as it did in the past when people would trade bear hides for marine mammal products (Andrew 1999).

Hunters learn how and where to hunt brown bear by accompanying older more experienced hunters (often a father, uncle or grandfather). Customs and traditions surrounding the harvest and use of brown bear are learned by watching and participating in activities with elders and individuals that have more experience. As with processing other game animals, women are the primary processors.

## SMALL LAND MAMMAL HUNTING AND TRAPPING

Akiachak residents harvested a variety of small land mammals during 1998. Some of these such as wolf, fox, coyote, wolverine, marten and weasel were harvested solely for their fur. Others such as beaver, muskrat, otter, mink, lynx and parka squirrel were harvested for both fur and food. While porcupine and snowshoe hare were harvested primarily for food, porcupine quills and rabbit skins were also utilized. Tree squirrels were harvested incidentally as they were caught in traps set for other animals such as marten.

### Regulations

Harvest seasons and bag limits varied by species. Generally speaking, trapping seasons in Unit 18 occurred from early November through late March for all but a few furbearer species. Seasons for mink and weasel closed on January 31. Beaver and muskrat trapping seasons continued until June 10 and there was no closed season on squirrels and marmots. There were no trapping bag limits on any furbearer species in Unit 18 during 1998 (Alaska Department of Fish and Game 1997b, 1998d).

In addition to trapping regulations, hunting seasons exist for some small land mammals such as wolf, wolverine, coyote fox, and lynx. The hunting season for wolf opened August 10 and closed April 30. The hunting season for wolverine opened September 1 and closed March 31. Hunting seasons for coyote and arctic fox were from September 1 through April 30, while the red fox season was from September 1 through February 15. The state lynx season opened November 10 and closed March 31. Hunting bag limits in Unit 18 were five wolf, one wolverine, two coyotes and 10 red fox

(Alaska Department of Fish and Game 1997a, 1998c). The hides of beaver, wolf, wolverine and otter were required to be sealed. There was no limit and no closed season for porcupine and snowshoe hare.

### Harvest and Use

Eighty-eight percent of Akiachak households used small land mammals and 78 percent harvested at least one species in this resource category (Table 11). Much of the interest in harvesting small land mammals was in their food value. A majority of Akiachak households attempted to harvest snowshoe hare (70 percent), beaver (59 percent) and porcupine (58 percent), however, the percent of households trying to harvest land otter (27 percent) and muskrat (21 percent) was much lower. Less than 10 percent of households harvested lynx, fox, mink, marten, parka squirrel, weasel, wolf, coyote and wolverine. The majority of households (59 percent) shared their harvest with other households and 43 percent reported receiving small land mammals from others.

The estimated number of small land mammals harvested by Akiachak residents during 1998 is shown in Figure 23. Snowshoe hare comprised the majority of small land mammals harvested, consisting of 2,338 hares and a per capita harvest of 20 pounds (Table 11). An estimated 433 beaver were harvested as were 256 porcupine, 207 muskrats, 87 red fox, 82 land otters, 42 parka squirrels, 23 marten, 23 mink, 22 wolves, 17 tree squirrels, 13 weasels, 13 lynx, four coyote, and one wolverine.

Although not all small land mammals that were harvested were used for food, those that were amounted to a total of 13,782 pounds edible weight. The consumption of small land mammals was 26.3 pounds per capita (Table 11). Beaver contributed nearly 6,500 pounds, snowshoe hare contributed almost 6,000 pounds and porcupine contributed over 1,000 pounds (Figure 24). Most of the muskrat and some of the land

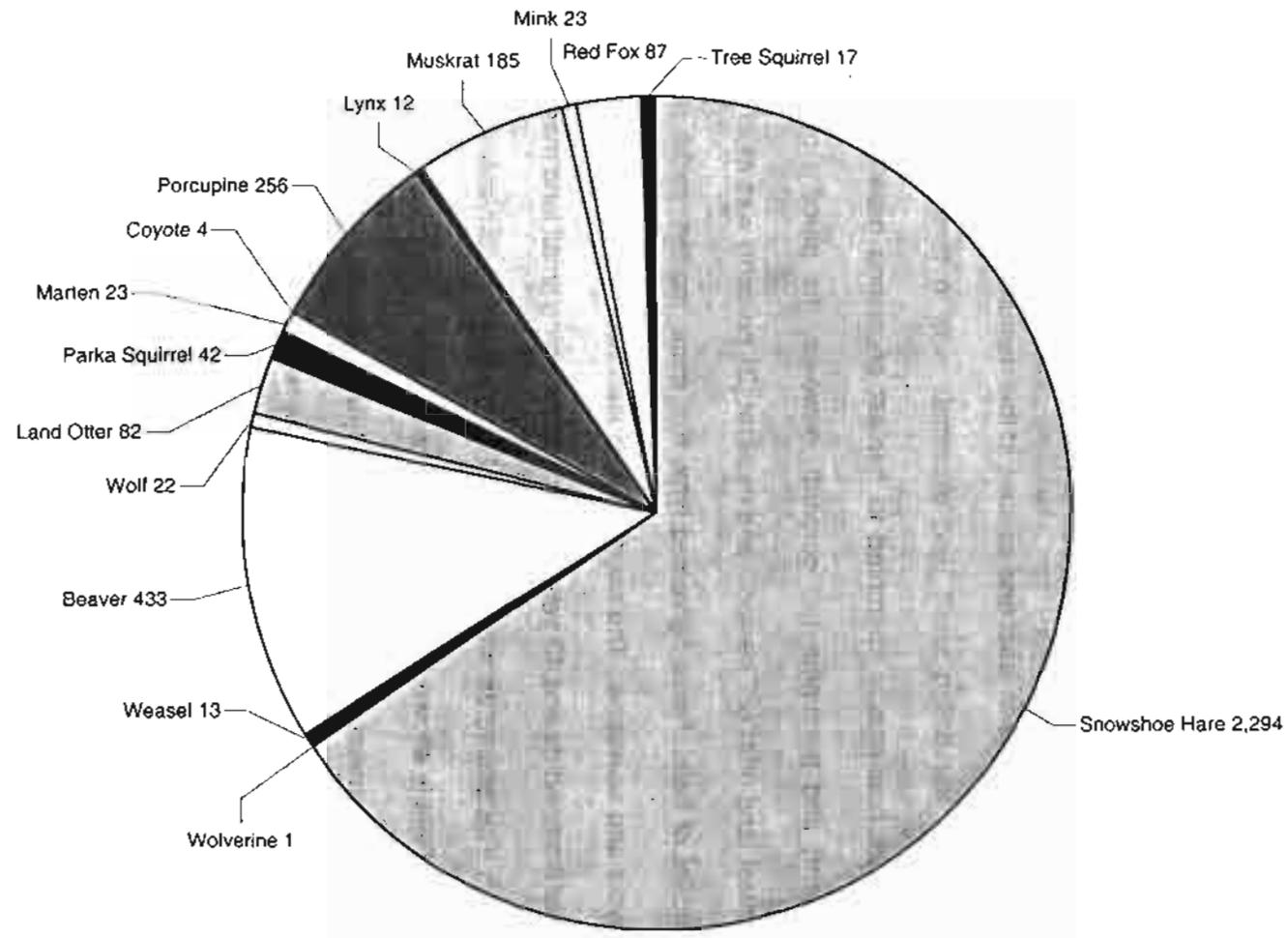


Fig. 23. Estimated number of small land mammals harvested, Akiachak, 1998.

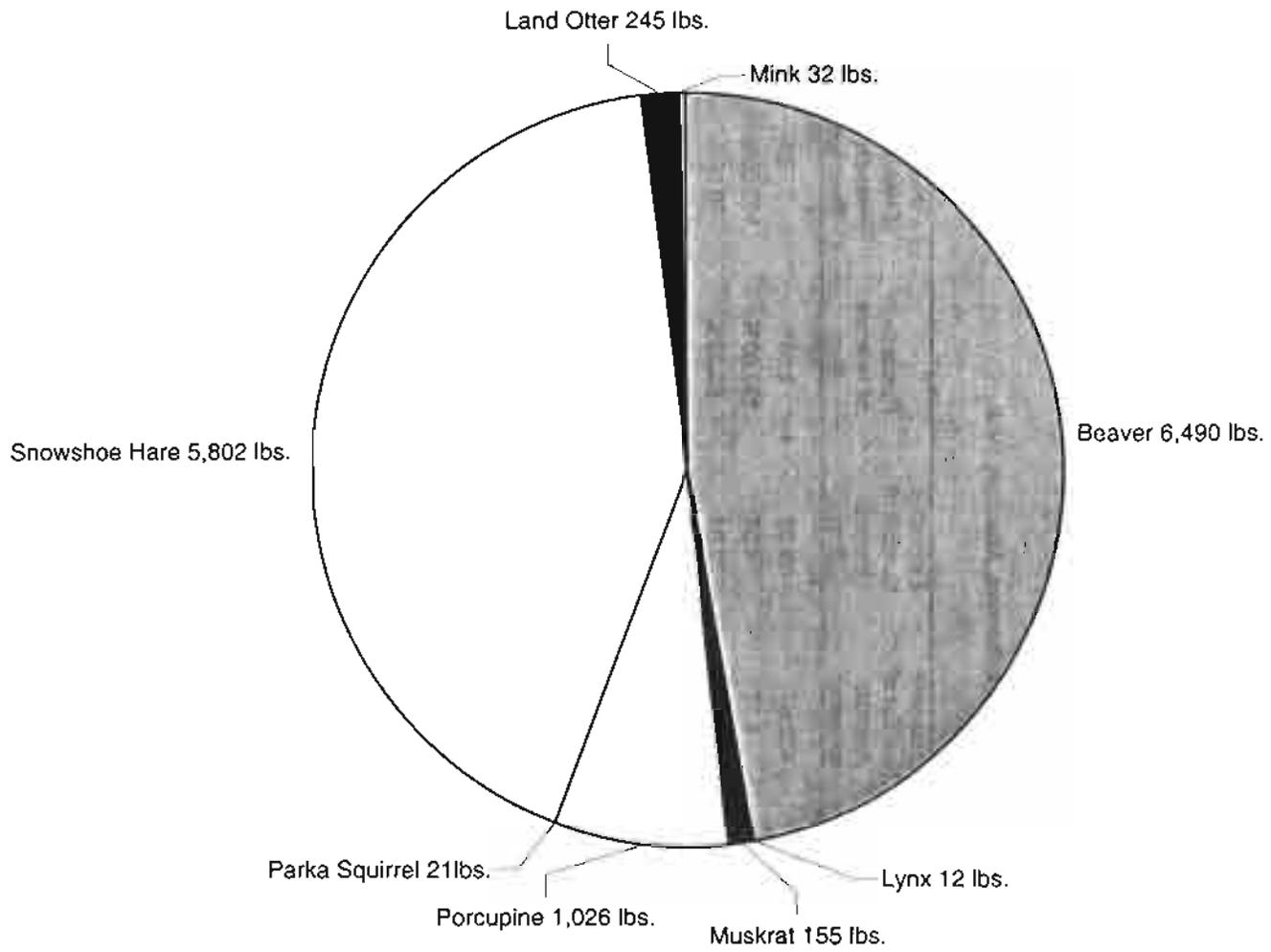


Fig. 24. Contribution of small land mammals harvested for food, Akiachak, 1998.

Table 28. Harvest and sale of furbearers, Akiachak, 1998

Resource	Estimated Number of Animals Harvested	Estimated Number of Animals Sold	Percentage of Animals Sold	Percentage of Harvesting Households That Sold	Average Price Each Animal
Beaver	432.67	39.33	9.09%	2.08%	\$14.00
Coyote	4.37	4.37	100.00%	100.00%	\$20.00
Red Fox	87.41	72.84	83.33%	20.00%	\$19.00
Land Otter	81.58	23.31	28.57%	10.00%	\$42.50
Lynx	13.11	7.28	55.56%	20.00%	\$45.00
Marten	23.31	4.37	18.75%	25.00%	\$24.00
Mink	23.31	7.28	31.25%	20.00%	\$17.00
Muskrat	206.86	11.65	5.63%	5.88%	\$0.75
Weasel	13.11	5.83	44.44%	33.33%	\$1.00
Wolf	21.85	18.94	86.67%	100.00%	\$180.00
Wolverine	1.46	1.46	100.00%	100.00%	\$300.00

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

otter, mink, parka squirrel and lynx were each used for food by some Akiachak households. Coyote, wolf, wolverine, fox and marten were harvested solely for their fur. Tree squirrels harvested incidentally in traps set for other species such as marten were later used for trapping bait.

Of the 81 households surveyed, only two households (about one percent of Akiachak households) reported selling any furs during 1998. The percent of fur animals sold varied across species. The majority of the fox, lynx, and wolf harvested were sold, as were all of the wolverine and coyote (Table 28). Relatively few of the beaver (9 percent), muskrat (6 percent), marten (19 percent), land otter (29 percent), and mink (31 percent) were sold. Households harvesting fur animals either home-tanned the fur to use in making garments such as hats, coats and mittens or gave the animal to another household for their use. The average price paid per animal sold is shown in Table 28. Sales of furbearers generated an estimated \$7,357 dollars to the overall community income (Table 7).

Beaver were harvested during every month except July, with the majority of the harvest occurring from September through March and May. Approximately 5 percent of the harvest occurred during April (Table 24). Porcupines were taken every month with the majority of the harvest taking place during September and October. Snowshoe hare and land otter were harvested primarily from September through April with a few otter being harvested in May. Red fox, wolf, weasel, and coyote were harvested during the winter months, as were lynx. Some lynx were also harvested during September, October, April and May. Parka squirrels were harvested during August and September, mink were harvested from October through December and wolverine was harvested in March.

Because they are harvested primarily for food, beaver, muskrat and porcupine are harvested anywhere and at any time of the year. It is common for beaver to be harvested when hunters are searching for moose and caribou during August and September. Harvest areas located on the Holitna and Hoholitna river drainages include this sort of hunting effort. Unlike winter-harvested beaver, hides of beaver caught during August and September for food are not often kept. Traps and snares are the usual tools used for harvesting beaver during winter, however, beaver are also harvested with firearms. Muskrat are trapped typically in winter, however, during April and May most are harvested with firearms. Like beaver, porcupine are harvested whenever possible and when food is needed. Hunters are always on the lookout for porcupine when involved in any subsistence activities. Some individuals use the quills of porcupine for making crafts, such as earrings, to sell or barter.

Mink, land otter, marten, lynx, fox, wolf, wolverine and parka squirrel harvests are often the result of a directed harvest effort. However, these animals may also be harvested if encountered while hunting for other species. Furbearers are most commonly harvested with guns, traps and snares. Mink, land otter and muskrat are also harvested using traditional *taluyet*, (funnel traps) which are set underwater as a drowning set. Snowshoe and tundra hare are harvested with firearms and also by snaring. Hides of snowshoe hare were sometimes home tanned and used to make parkas and mittens for children.

People of all ages participate in harvesting furbearers and small game. Men, women and children all participate in snaring snowshoe hare. Parka squirrels are harvested both by men and women. Children often accompany adult relatives to harvest porcupine, beaver and muskrats. Wolf, wolverine, lynx, marten, fox, mink and land otter are harvested primarily by men, however, children may go along so that they may be

FIGURE 25

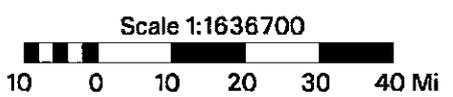
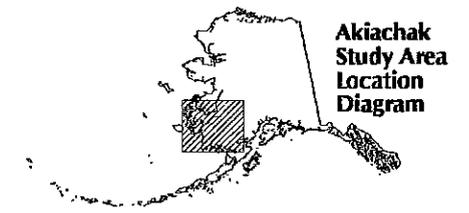
**SUBSISTENCE FURBEARER HUNTING AND TRAPPING AREAS USED BY AKIACHAK RESIDENTS, 1988-1997**

**LEGEND**

-  Furbearer Hunting and Trapping Areas
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

This map depicts only those areas used by community residents while domiciled in Akiachak. Although an effort was made to get as many residents as possible to review the draft maps, not all Akiachak residents were available to review the map data. Therefore, this map may not include all of the areas used by the community. Subsistence use areas change through time. Consult with the community for more definitive information.



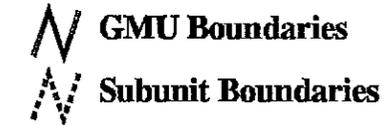
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December, 1999





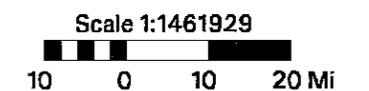
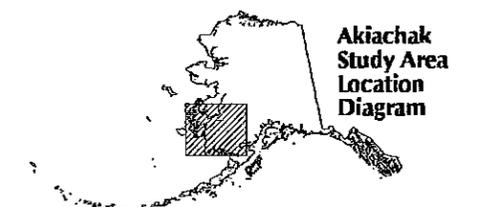
**FIGURE 26**  
**SUBSISTENCE SMALL GAME**  
**HUNTING AREAS USED**  
**BY AKIACHAK RESIDENTS,**  
**1988-1997**

**LEGEND**

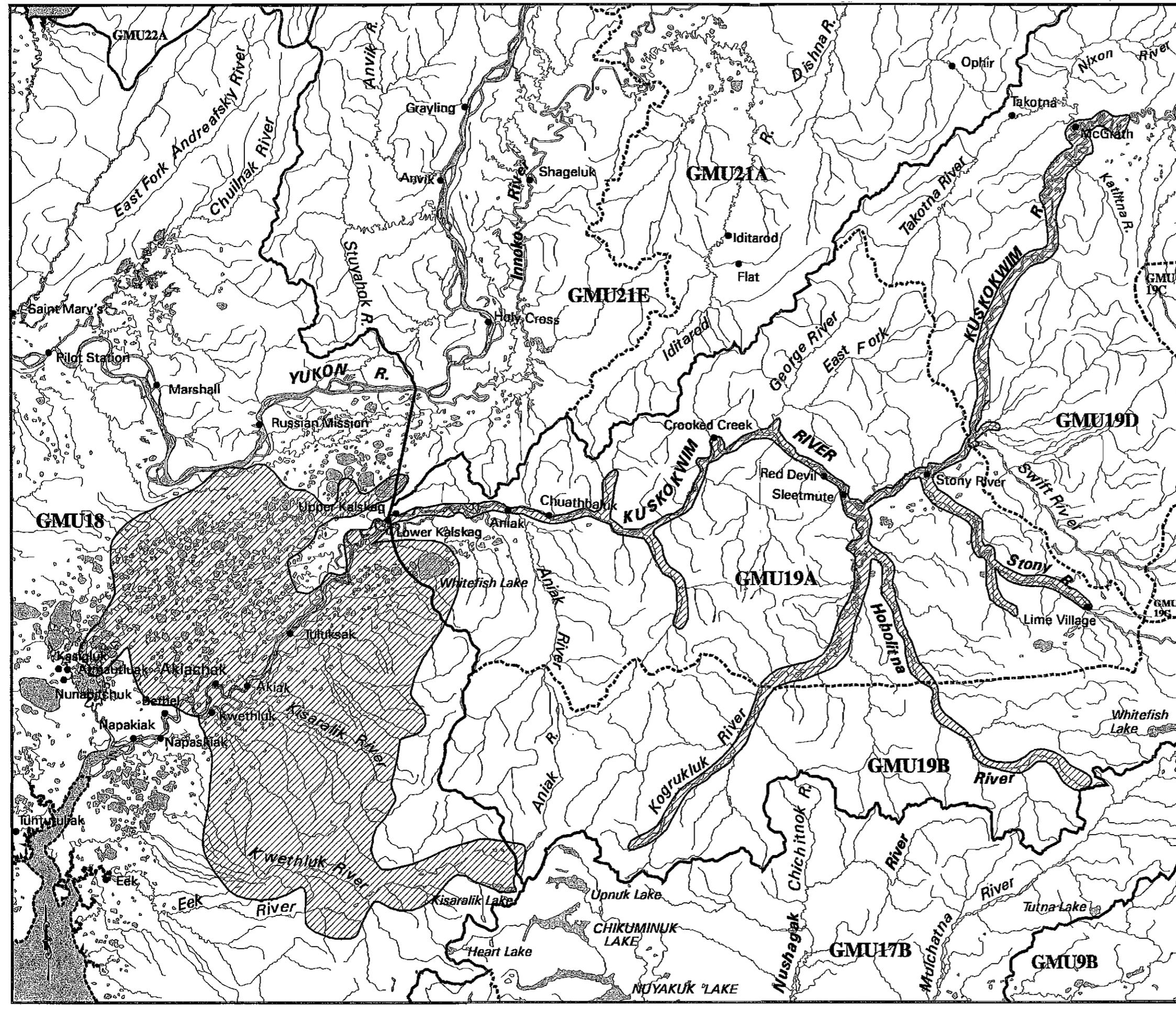


Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

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State of Alaska  
 Department of Fish and Game  
 Division of Subsistence  
 December, 1999





taught how and where to set traps and snares and become proficient hunters and trappers. Women who may not be involved in harvesting furbearers or small game are typically involved in processing the catch. During 1998, 31 percent of the population in Akiachak was involved in harvesting furbearers and 37 percent was involved in processing furbearers (Table 12).

#### Areas Used for Harvesting Small Land Mammals

Areas used when hunting and trapping furbearers, and small game animals such as hares and porcupine, are shown in Figure 25 and Figure 26. Except for beaver, which were harvested over a very large geographic area, hunting for most fur animals took place primarily in Unit 18 within a 75 mile radius of Akiachak. Some individuals had cabins or established tent camps from which their furbearer hunting and trapping activities were based. Other individuals used areas close to Akiachak and return home each day after hunting. Others had trapping camps in the vicinity of the Yukon River downstream of Russian Mission and have used that camp to harvest furbearers and small game. Some Akiachak residents also concentrated furbearer harvest activities in an area not depicted on Figure 25, located in the Tuluksak and Fog river drainages.

Areas used for hunting and trapping small game and furbearers prior to 1988 included the Aniak Lake and Aniak River drainage, the Tikchik Lakes area of Unit 17B (Upknuk, Nishlik, Chikuminuk Chauekuktuli and Nuyakuk lakes) as far east as the Tikchik Mountain extending to the Shotgun Hills, Finn Mountain, Nushagak Hills, and Taylor Mountain in Unit 19B. This area was accessed by dogsled for purposes of furbearer hunting and trapping as well as hunting other game. These activities were once a part of the regular seasonal round for Akiachak residents.

## MARINE MAMMALS

### Regulations

Since 1974, marine mammals have been managed by the federal government, under the provisions of the Marine Mammal Protection Act (MMPA). The U.S. Department of Interior manages sea otter, walrus and polar bear. The U.S. Department of Commerce manages all other marine mammals. Under the terms of the MMPA, coastal Alaska Natives may harvest marine mammals as long as the harvest is not done in a "wasteful" manner. There were no restrictions on the seasons, harvest levels, harvest areas, or methods for taking these marine mammals. Marine mammal species harvested by Akiachak included seals, belukha whale and walrus.

### Harvest and Use

The majority (58 percent) of Akiachak households used marine mammals or marine mammal products, such as seal oil, during 1998 (Table 11). Marine mammals were hunted by 17 percent of households and harvested by 14 percent of households. More than half (53 percent) of the households received some marine mammal part or product from other households. Spotted seal and walrus were the marine mammals most often used by Akiachak households. More than a quarter (27 percent) of households used seal oil, 27 percent used spotted seal and 22 percent used walrus. Bearded seal was used by 17 percent of households, ringed seal used by 15 percent of households and one percent of households used ribbon seal. Ten percent of households were unsure of the species of seal they had used. A few households used belukha whale, bowhead whale and sea lion.

Most (83 percent) Akiachak households did not attempt to hunt marine mammals. Of the 17 percent that did attempt to harvest marine mammals, a few were successful in harvesting seal, walrus, and belukha whale. No households attempted to harvest sea lion or bowhead whale. An estimated 70 seals were harvested for a per capita harvest of 18.7 pounds. Most of the seals harvested (77 percent) were either spotted seal (37.5 percent) or ringed seal (39.5 percent). Fifteen of the seals harvested (21 percent) were bearded seal. One belukha whale and an estimated 4 walrus were also harvested (Fig. 27).

Marine mammal hunting takes place primarily during the months of March, April, May, August and September. Harvest timing varies from year to year depending on ice conditions and other weather related variables such as wind and temperatures. During 1998 the majority of the seal harvested by Akiachak hunters were taken in April (Table 24). Because some of the best seal hunting occurs along the Kuskokwim Bay coast from late March through April, and the Kuskokwim River normally breaks up during May, boating from Akiachak to good seal hunting areas in April is usually not possible. As a result, Akiachak seal hunters sometimes fly to a community on the coast and hunt with friends or family living there who have all the necessary boats and equipment. Marine mammal hunting is sometimes combined with hunting sea duck and other waterfowl during spring.

Individuals that commercial fish for herring at Goodnews Bay often hunt for seals on their way back home to Akiachak. Some Akiachak men are originally from communities located on the Bering Sea coast and have married into Akiachak. These men grew up hunting marine mammals and return to their natal community to continue these hunting efforts. Other Akiachak men have married women from Bering Sea coast communities and go to their wife's natal community to hunt with relatives there.

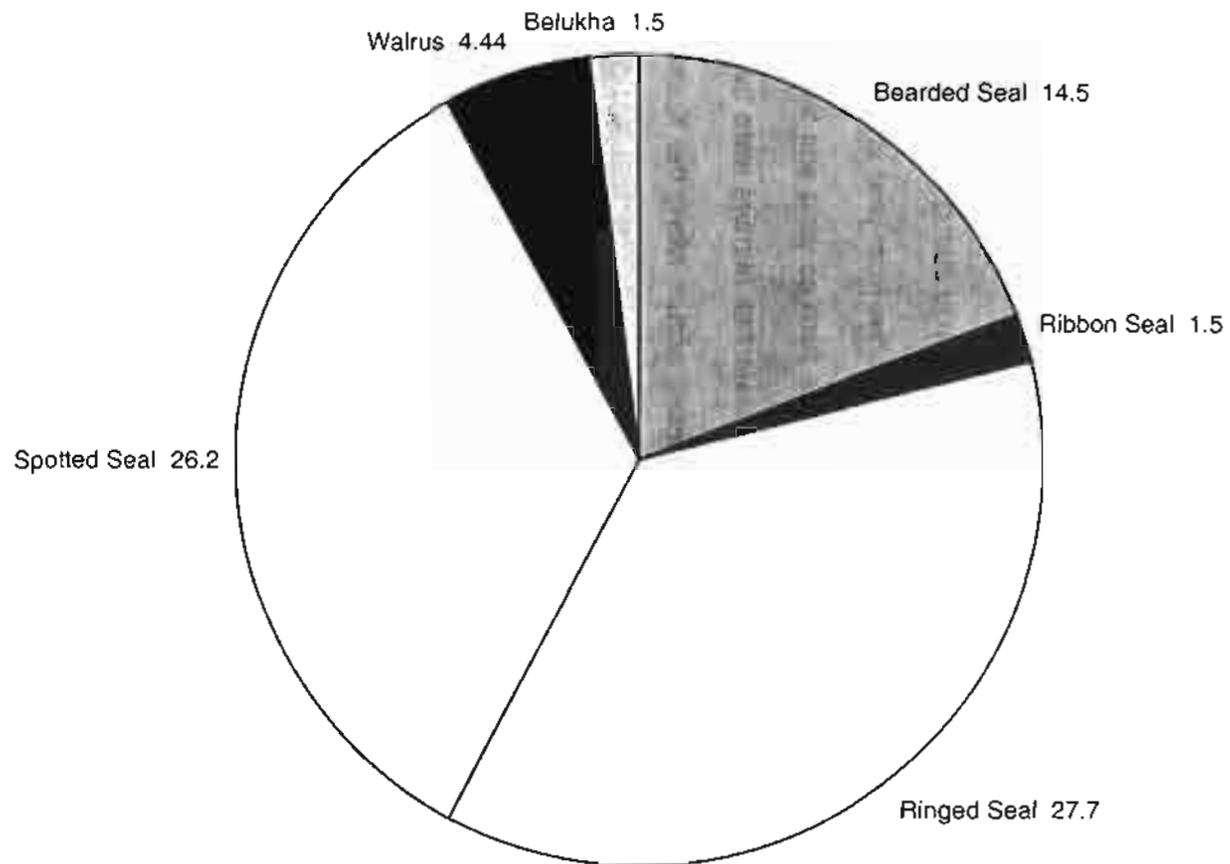


Fig. 27. Estimated number of marine mammals harvested, Akiachak, 1998.

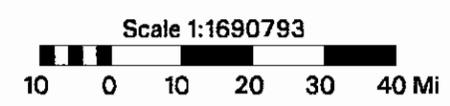
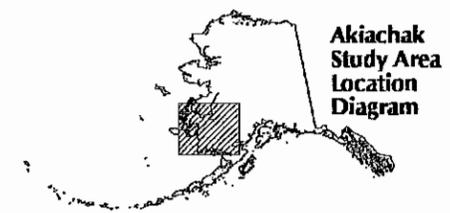
**FIGURE 28**  
**SUBSISTENCE MARINE MAMMAL**  
**HUNTING AREAS USED**  
**BY AKIACHAK RESIDENTS,**  
**1988-1997**

**LEGEND**

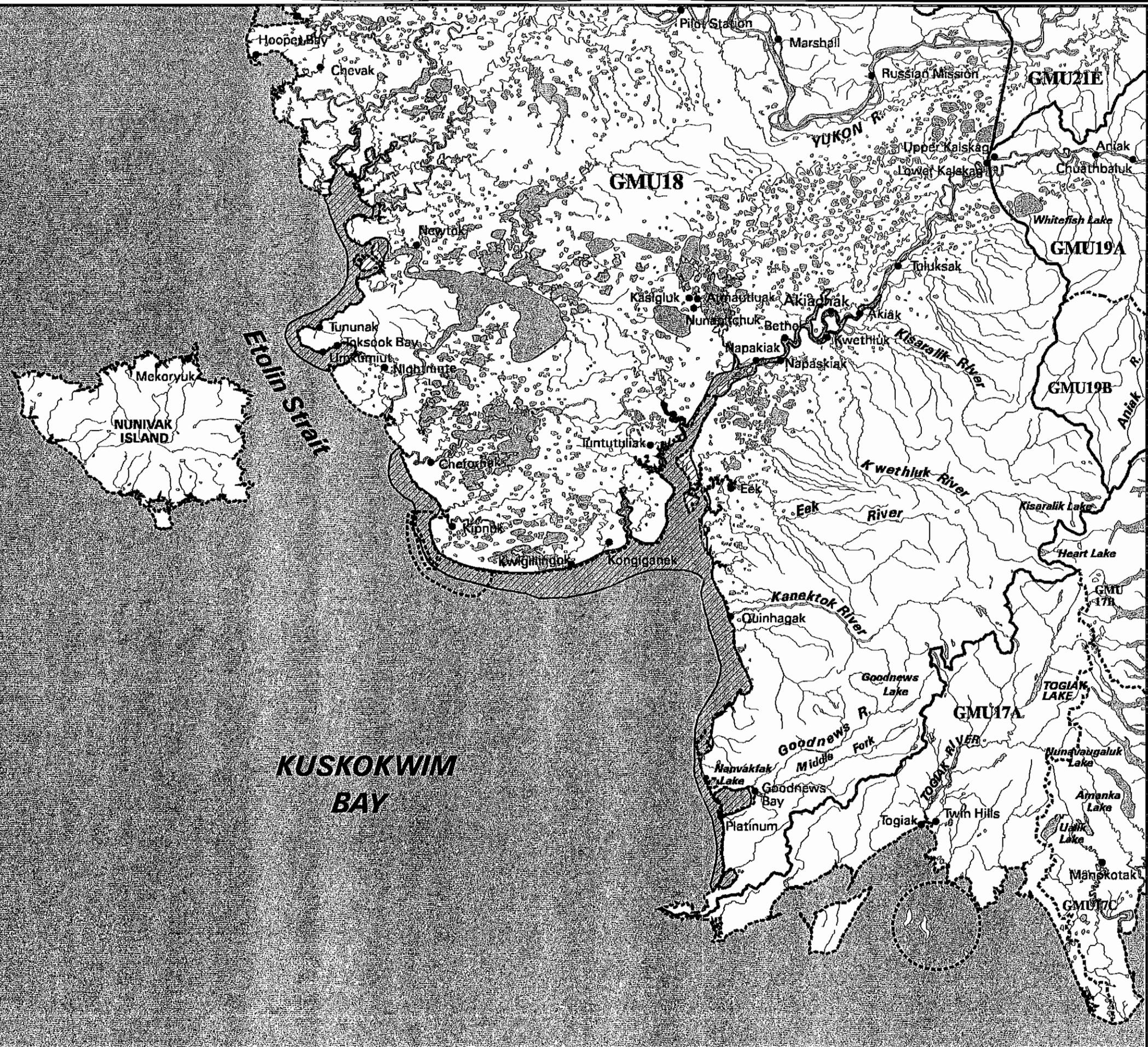
-  Marine Mammal Hunting Areas
-  GMU Boundaries
-  Subunit Boundaries

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State of Alaska  
 Department of Fish and Game  
 Division of Subsistence  
 December, 1999





Depending on the area that individual hunters may be traveling to, hunters may go by snowmachine, boat or commercial airline. If they are traveling to a community by snowmachine or commercial airline, they typically go hunting with a friend or relative who has a boat and the other gear needed to hunt marine mammals.

Successful seal hunters returning to Akiachak by boat can haul whole ringed and small spotted seals with them. Hunters returning to Akiachak by aircraft may bring small seals back home without processing them, but seals such as large spotted or bearded seal are cut up before being packed for the trip home. Once home, the women continue processing the animals; this includes making seal oil from the fat and preparing seal meat to distribute to other households. Seal oil is used by many households for food when eating dried meat, dried fish, frozen fish, and when making *aqutaq*, a traditional dessert often comprised of berries, whipped shortening or animal fats/oils, and sometimes whitefish or green plant leaves. Seal meat is prepared in a variety of ways including cooking and drying. Seal hides are often dried by nailing them up on the outside of a building. Once dried, the hides can be made into clothing such as boot soles and slippers. Some hides are sent to tanneries for commercially tanning; they are then used to make hats, mittens and coats.

#### Areas Used for Harvesting Marine Mammals

Areas used to hunt marine mammals by Akiachak hunters are shown in Figure 28. The area consists of the Kuskokwim River starting from above Akiak to Kuskokwim Bay, including parts of the Gweek River, the lower Johnson River and the sloughs and mouths of the many tributaries located along the main Kuskokwim River. Coastal areas from near Cape Newenham northwest to the area west of Newtok and south of Chevak are also hunted. The primary marine mammal hunting areas were near the mouth of the

Kuskokwim River and along the coast of Kuskokwim Bay. Seals are harvested in the Kuskokwim River as well as the Johnson and Gweek rivers on occasion. Young bearded seal travel several miles up into rivers and tributaries where they are often harvested. It is not uncommon for Akiachak hunters traveling to berry picking areas by boat during August and September to harvest young bearded seal. Seals are also harvested during boat trips to commercial herring fishing areas, such as Goodnews Bay.

During 1998, Akiachak hunters harvested seals in Kuskokwim Bay, in Hazen Bay and near Toksook Bay. Walrus were harvested near Toksook Bay in March. The belukha whale was harvested during September although the harvest location was not reported. The sea lion used by Akiachak households was received from Toksook Bay.

## BIRDS AND EGGS

### Regulations

Legal hunting seasons for most migratory waterfowl opened September 1 and ended December 16 (Table 29). The season for Tundra swan was open from September 1 through October 31. Seasons for grouse and ptarmigan were open from August 10 through April 30. Bag and possession limits varied for the different species of birds. Hunting of swan was allowed in Unit 18 by registration permit only with a bag limit of one. Emperor geese, spectacled and Steller's eider had no legal open season (Alaska Department of Fish and Game 1997c, 1998e). No state or federal regulations allowed for the harvest of bird eggs, however, regulatory changes were being developed which could provide for legal egg harvests in the future.

Table 29. Hunting seasons and bag limits for birds, Game Management Unit 18, 1998-1999

Resource	Season	Bag Limit
Ducks (except sea ducks scoter, long-tailed, harlequin and mergansers)	September 1 - December 16	10 per day, 30 in possession
Sea Ducks Common and King eider, scoter, long-tailed, harlequin and mergansers	September 1 - December 16	15 per day, 30 in possession
Spectacled and Steller's eider	No open season	
Pacific Black Brant	September 1 - December 16	2 per day, 4 in possession
Cackling Canada Geese	September 1 - December 16	4 per day, 8 in possession
Lesser Canada Geese	September 1 - December 16	4 per day, 8 in possession
Emperor Geese	No open season	
Snow Geese	September 1 - December 16	3 per day, 6 in possession
White-fronted Geese	September 1 - December 16	4 per day, 8 in possession
Tundra Swan	September 1 - December 16	1 by permit only
Sandhill Crane	September 1 - December 16	3 per day, 6 in possession
Grouse	August 10 - April 30	15 per day, 30 in possession
Ptarmigan	August 10 - April 30	20 per day, 40 in possession

Source: Alaska Department of Fish and Game 1997c, 1998e

Note: Daily bag limits could not contain more than a combination of four Canada or white-fronted geese and possession limits could not contain more than eight Canada or white-fronted geese.

## Harvest and Use

Akiachak residents used a minimum of 32 kinds of birds and eggs in 1998. During 1998, Akiachak residents harvested an estimated 35,824 pounds usable weight of birds and eggs (Table 11). This harvest came to an average of 304 pounds per household and 68 pounds per capita. Nearly all households (97 percent) used birds or eggs, 91 percent harvested birds or eggs and 73 percent of households received birds or eggs from other households (Fig. 6). Ducks, geese, and swans each represented between 22 and 26 percent of the pounds usable weight of birds harvested (Fig. 29). Ptarmigan and crane contributed a combined total of 26 percent pounds usable weight while grouse and loons combined contributing about 3 percent of the total pounds usable weight of birds.

The resource category of upland game birds consisted of grouse and ptarmigan. Spruce and ruffed grouse were the primary types of grouse available to Akiachak hunters. Grouse and ptarmigan, resident species available to hunters during spring, fall and winter, were also harvested in association with many other hunting activities. An estimated 84 percent of households hunted ptarmigan and 30 percent hunted grouse. All households that tried to harvest grouse or ptarmigan were successful. An estimated 5,450 ptarmigan and 146 grouse were harvested. Ptarmigan were harvested during winter and spring with the majority of the harvest (81 percent) occurring during spring (Table 30). Grouse were harvested during fall, winter and spring with the majority of the harvest (58 percent) occurring during fall.

Migratory waterfowl such as ducks, geese, swans and cranes are typically present in the area only from early to mid-April through September. An estimated 97 percent of Akiachak households used ducks, 89 percent harvested ducks and more than half of the households either gave or received ducks from other households. An

estimated 10,850 ducks were harvested during 1998, amounting to an estimated 9,210 pounds usable weight. The overall per capita harvest of ducks during 1998 was 11.6 pounds per person. Black scoter, surf scoter, scaup, pintail, mallard, widgeon and goldeneye contributed the greatest proportion (83 percent) of the total numbers of ducks harvested during 1998. Scoters alone accounted for nearly a third of the total ducks harvested. Approximately 89 percent of the total duck harvest occurred during spring. A few ducks, such as goldeneye and mallard, were harvested sometime after May and before September (Table 30). Mergansers and bufflehead ducks were harvested primarily during fall.

In 1998, 95 percent of Akiachak households used geese, 88 percent of households attempted to harvest geese and 86 percent of households were successful at harvesting geese. Geese were shared by more than half (52 percent) of all households while 44 percent of households received geese. Geese harvested during 1998 totaled an estimated 4,016 birds (Table 11). The average household harvest amounted to 67 pounds and the per capita harvest was 15 pounds usable weight. An estimated 1,285 white-fronted geese, 1,527 lesser Canada geese and 959 cackling Canada geese accounted for 94 percent of the geese harvested, while emperors represented 3.5 percent, brant almost 2 percent and snow geese about 1 percent of the geese harvested. Ninety-three percent of the geese harvested were taken during spring with the remaining seven percent were taken during fall, probably September, before the birds left the area. Lesser Canada geese and cackling Canada geese were the only species of geese reported taken during the fall.

Seventy-six percent of Akiachak households used and tried to harvest Sandhill crane during 1998. Seventy percent of the households were successful harvesting crane and 32 percent shared crane with others. An estimated 434 cranes were harvested during the study year for an average household harvest of 31 pounds and a

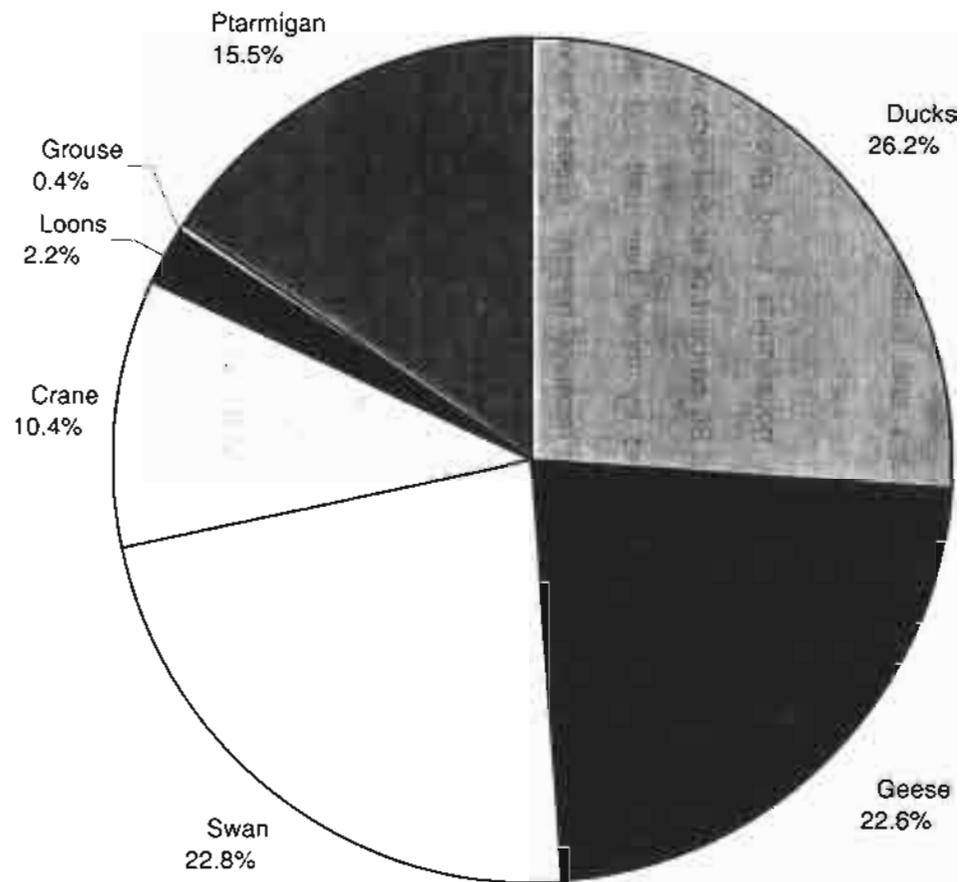


Fig. 29. Contribution of each bird category to the overall pounds of birds harvested, Akiachak, 1998.

Table 30. Estimated number and percentage of birds and eggs harvested by season, Akiachak, 1998

Resource	Harvest by Season *								Total Number
	Spring		Summer		Fall		Winter		
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	
Bufflehead	53.90	48	0	0	58.27	52	0	0	112.17
Black Scoter	2,233.26	99	0	0	21.85	1	0	0	2,255.11
Surf Scoter	1,434.94	99	0	0	8.74	1	0	0	1,443.68
White-winged Scoter	10.20	78	0	0	2.91	22	0	0	13.11
Goldeneye	499.68	87	14.57	3	62.64	11	0	0	576.89
Harlequin	55.36	61	0	0	34.96	39	0	0	90.32
Mallard	900.30	78	17.48	2	243.28	21	0	0	1,161.06
Common Merganser	1.46	17	0	0	7.28	83	0	0	8.74
Red-Breasted Merganser	0	0	0	0	14.57	100	0	0	14.57
Northern Pintail	1,040.15	82	0	0	224.35	18	0	0	1,264.49
Scaup	1,538.37	95	0	0	78.67	5	0	0	1,617.04
Northern Shoveler	275.33	93	0	0	21.85	7	0	0	297.19
Green-winged Teal	256.40	65	0	0	136.94	35	0	0	393.33
Wigeon	686.15	75	0	0	224.35	25	0	0	910.49
Arctic (Pacific) Loons	151.51	97	0	0	4.37	3	0	0	155.88
Common Loon	36.42	96	0	0	1.46	4	0	0	37.88
Red-Throated Loon	16.02	100	0	0	0	0	0	0	16.02
Yellow-billed Loon	5.83	100	0	0	0	0	0	0	5.83
Long-tailed duck	451.60	99	0	0	2.91	1	0	0	454.52
Common Eider	23.31	100	0	0	0	0	0	0	23.31
King Eider	199.58	100	0	0	0	0	0	0	199.58
Spectacled Eider	14.57	100	0	0	0	0	0	0	14.57
Pacific Black Brant	62.64	100	0	0	0	0	0	0	62.64
Cackling Canada Geese	879.90	92	0	0	78.67	8	0	0	958.57
Lesser Canada Geese	1,424.74	93	0	0	101.98	7	0	0	1,526.72
Emperor Geese	139.85	100	0	0	0	0	0	0	139.85
Snow Geese	43.70	100	0	0	0	0	0	0	43.70
White-fronted Geese	1,185.83	92	0	0	99.06	8	0	0	1,284.89
Swan	722.57	90	0	0	80.12	10	0	0	802.69
Crane	390.42	90	2.91	1	40.79	9	0	0	434.12
Grouse	33.51	23	0	0	84.49	58	27.68	19	145.68
Ptarmigan	4,441.75	82	0	0	0	0	1,008.10	18	5,449.85
Duck Eggs	671.58	100	0	0	0	0	0	0	671.58
Geese Eggs	745.88	100	0	0	0	0	0	0	745.88
Swan Eggs	340.89	100	0	0	0	0	0	0	340.89
Gull Eggs	976.05	100	0	0	0	0	0	0	976.05

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

\* Spring = March, April, May; Summer = June, July, August; Fall = September, October, November; Winter = December, January, February

per capita harvest of 7 pounds (Table 11). Most of the cranes that were harvested (90 percent) were taken during spring with remaining 10 percent taken during summer and fall. An estimated 803 swans were harvested by Akiachak hunters during 1998. This harvested amounted to an average household harvest of 68 pounds and a per capita harvest of 15 pounds. Ninety-six percent of the households used swan, 86 percent attempted to harvest swan and 84 percent of all households harvested this species (Table 11). Ninety percent of the swans harvested were taken during spring with the remaining 10 percent harvested during fall. Overall, cranes amounted to an estimated 3,647 pounds usable weight and swans 8,027 pounds usable weight of resource.

Nearly 40 percent of Akiachak households used eggs and 37 percent harvested eggs during 1998. Approximately 25 percent shared bird eggs with other households. Gull eggs comprised 36 percent of all eggs harvested. Duck and geese eggs each accounted for about 25 percent while swan eggs represented 12 percent of all bird eggs collected.

Waterfowl are eaten fresh and are cooked in a variety of ways. Some of the waterfowl harvest is also frozen for use later throughout the year. The wings of waterfowl are often used as brooms to sweep the floor at home or at fishcamp. Feathers are sometimes used to make crafts such as dance fans, which are used in Yup'ik dancing. Eggs collected in the spring are also cooked fresh. Grouse and ptarmigan are eaten fresh, however, a common method of preserving ptarmigan during spring is by drying. The birds are skinned and the breasts and wings are removed and hung up outside on horizontal poles there the meat dries. Once dried, the meat is eaten without further preparation.

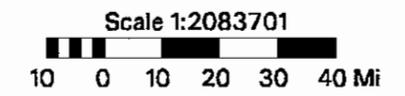
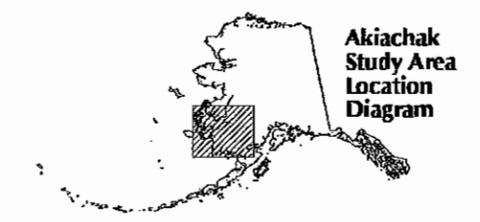
**FIGURE 30**  
**SUBSISTENCE WATERFOWL**  
**HUNTING AREAS USED**  
**BY AKIACHAK RESIDENTS,**  
**1988-1997**

**LEGEND**

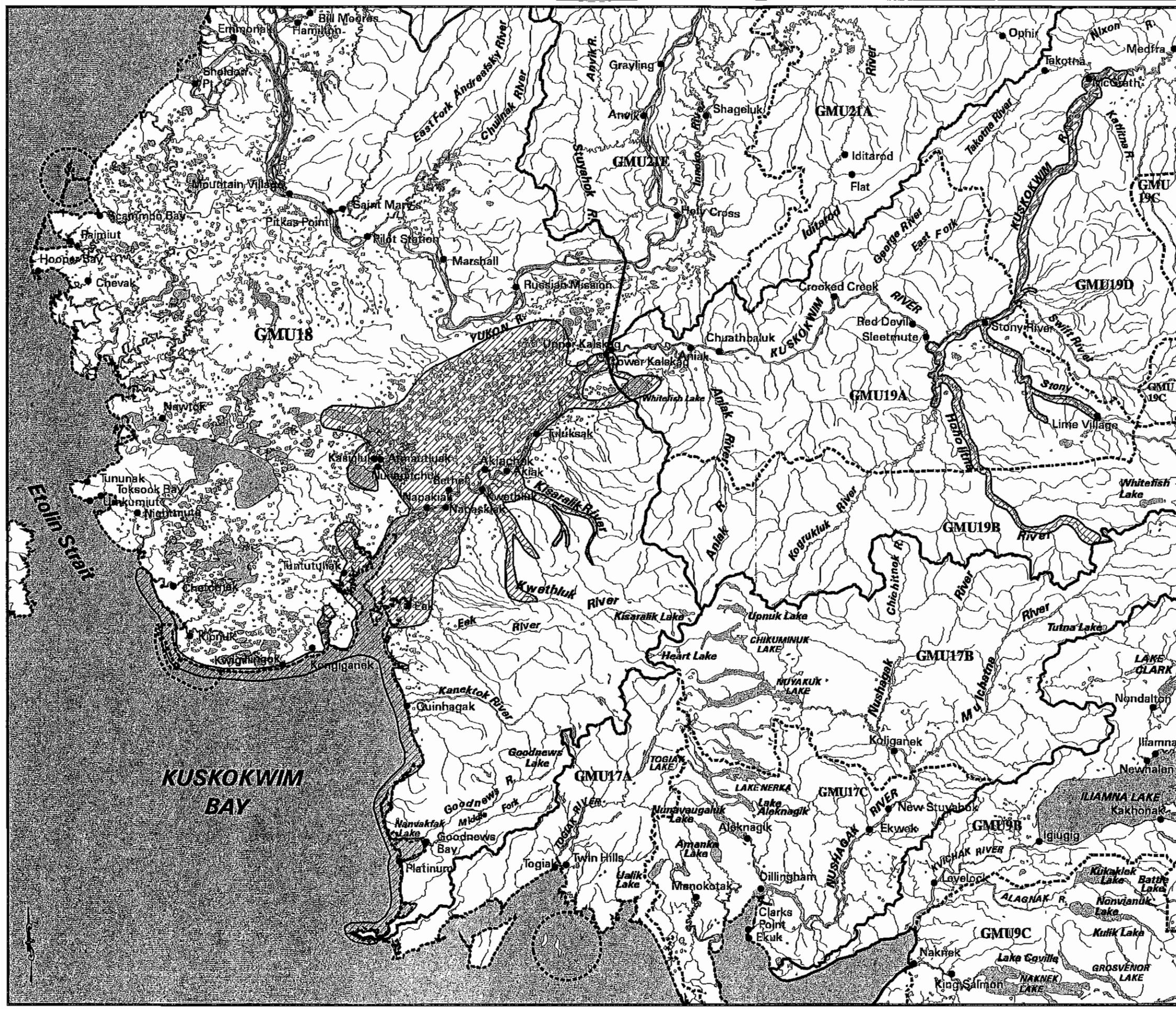
-  Waterfowl Hunting Areas
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

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 December, 1999





### Areas Used for Harvesting Birds and Eggs

Akiachak residents hunt migratory waterfowl and harvest eggs primarily in Game Management Unit 18 (Fig/ 30). Areas used for hunting grouse and ptarmigan are included with small game hunting areas depicted in Figure 26. The majority of the migratory waterfowl harvest (including cranes) occurs during spring. The birds arrive in the Akiachak area when the tundra snow is melting and the rivers have not yet opened up from their cover of ice. Thus, snowmachine travel is often difficult, if possible, and boating on the main Kuskokwim River and adjacent tributaries is usually not possible until the birds have been around for a few weeks. Much of the waterfowl harvested during spring occurs within a few miles of the community. During mid April, some hunters drag small skiffs overland by snowmachine or ATV to tundra lakes or small tributaries that are free of ice. Hunters also travel to coastal areas to participate in spring waterfowl and marine mammal hunting with friends or relatives living in coastal communities. The harvest of sea ducks such as eiders occurs at this time. Some harvest of birds occurs in Game Management Unit 19A and 19B during late summer and early fall while individuals are also hunting for big game.

## WILD PLANTS, BERRIES AND WOOD

### Harvest and Use

Akiachak residents harvested a variety of plants, consisting of several types of berries, green plants, plant roots, and wood. Some form of wild plant was used by 99 percent of Akiachak households (Fig. 6). Seventy eight percent of individuals harvested

some type of vegetation during 1998, more than any other single category (Table 12). An estimated 31,807 pounds usable weight of edible wild plants, berries and roots was harvested during 1998, averaging 270 pounds per household and 61 pounds per person. Ninety-five percent of households used some type of berries and 91 percent were involved in harvesting berries (Table 11). Salmonberries and blueberries were harvested and used by more households than was any other type of wild plant. However, approximately 78 percent of households used lowbush cranberries and more than half used blackberries (crowberries) during the study year. Boysenberries were used by 39 percent of households and a few households (1 percent) used raspberries. In terms of amounts harvested, 1,763 gallons of salmonberries representing 42 percent of the overall berry harvest, were harvested. This averaged 15 gallons per household and 24 pounds per capita. One-thousand gallons of blueberries were also gathered, for a mean household harvest of 8.5 gallons. This followed by low bush cranberries at 7 gallons per household and blackberries (crowberries) at 4 gallons per household. A total of 54 gallons of boysenberries were harvested. The raspberry harvest amounted to about 15 gallons for the entire community (Table 11). Berries are among the first wild resources harvested by children, providing them with an important opportunity to participate in subsistence activities and contribute to the family's economy.

Harvests of plants averaged 59 pounds per household and 13 pounds per capita. Most households used Hudson's Bay tea (67 percent), stinkweed (59 percent), wild rhubarb (57 percent) and sourdock (52 percent). Except for sourdock, the majority of households also harvested these plants. Amounts of plants harvested amounted to an estimated 744 gallons of wild rhubarb, 265 gallons of Hudson's Bay tea, 274 gallons of "mousefoods" (roots of sedges and grasses cached by mice, voles and lemmings), 246 gallons of sourdock, 230 gallons of stinkweed, 137 gallons of wild celery, and 130 gallons of rose hips. Wood was harvested by nearly all households and was used for

heating homes, steambaths, cabins or tents at summer fish camps, trapping camps and hunting camps. Cottonwood was used for smoking fish during summer. An estimated 729 cords of wood were harvested. Fungus collected from birch and cottonwood trees was collected so that it could be burnt into ash, which was then added to chewing tobacco.

#### Areas Used for Harvesting Wild Plants, Berries and Wood

Areas used to harvest different types of berries and plants are shown in Figure 31. Berry harvest areas are quite extensive, extending up the Johnson River to areas west of Upper Kalskag, down the Kuskokwim River to near Eek and Tuntutuliak, and to Nelson Island near Tununak. Parts of the middle Kisaralik River area were identified as harvest areas as were areas near Chuathbaluk and just downstream of Crooked Creek on both sides of the Kuskokwim River. Areas not identified on Figure 31 include areas frequented by moose and caribou hunters during the fall where individuals sometimes harvest blackberries (crowberries) and cranberries for camp use or to take home.

Areas used for harvesting wood appear in Figure 32. The core harvest area consist of the area around Akiachak, including the Gweek River drainage, the lower Kisaralik and Kasigluk river drainages, Bogus Creek, located about half way between Tuluksak and Whitefish Lake southeast of Lower Kalskag and the Kuskokwim River corridor from about Akiachak to Lower Kalskag. An area between Whitefish Lake and Aniak was also identified. Not shown on Figure 32 are areas where individuals gather wood for camp use while hunting and trapping during the fall and winter. Periods of high water during spring break and when logs float down the Kuskokwim River are examples of when individuals will try and collect logs using boats. During winter when snowmachines or ATVs and sleds can be used, wood is generally cut into sled length

pieces and hauled back to the community where it is used. Individuals traveling up the Kuskokwim River during the fall hunting sometimes cut or gather spruce logs, tie them into a raft, and slowly float their way back downriver using their boat to maneuver the logs downstream to Akiachak. This is particularly true if the hunters have been unsuccessful catching a moose, caribou or other big game and are in no hurry to return home empty-handed.





FIGURE 32

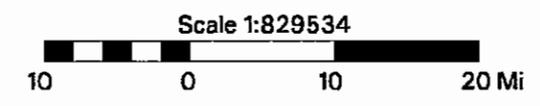
### SUBSISTENCE WOOD GATHERING AREAS USED BY AKIACHAK RESIDENTS, 1988-1997

#### LEGEND

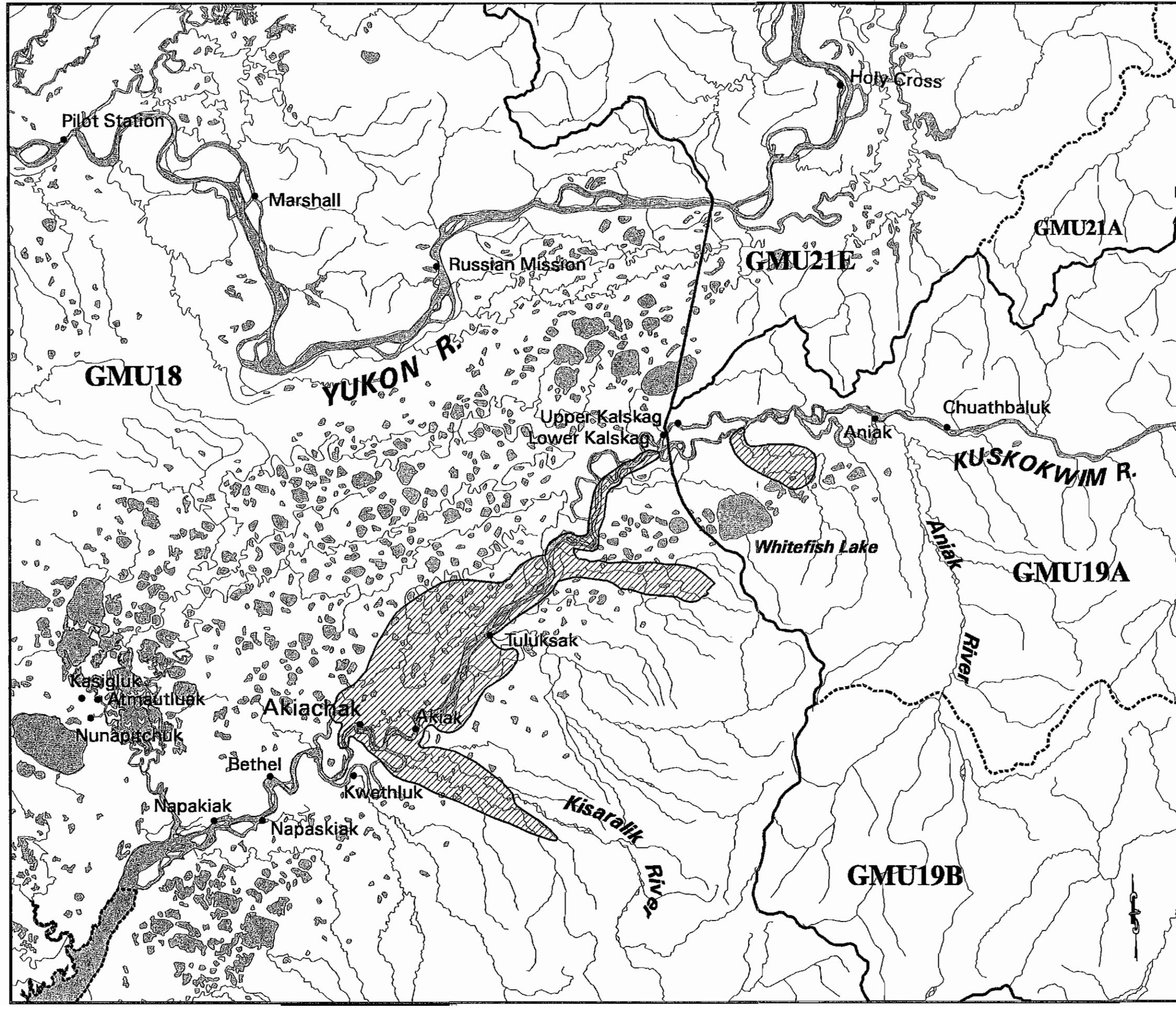
-  Wood Gathering Areas
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

This map depicts only those areas used by community residents while domiciled in Akiachak. Although an effort was made to get as many residents as possible to review the draft maps, not all Akiachak residents were available to review the map data. Therefore, this map may not include all of the areas used by the community. Subsistence use areas change through time. Consult with the community for more definitive information.



State of Alaska  
Department of Fish and Game  
Division of Subsistence  
December, 1999





## CHAPTER 4

### SUMMARY

This report describes the role of wild resource harvest and use in the community of Akiachak, Alaska during 1998. It is the result of the first baseline subsistence study of the community. Data obtained through household surveys indicate that the harvest of wild resources provided an important element to the community's economic foundation. Many households continued to rely on subsistence harvests of wild resources for the majority of their food. Similarly, commercial salmon fishing provided many households with an opportunity to earn cash that could be used to help meet basic living expenses, pay for hunting and fishing equipment, gasoline and other supplies needed for subsistence hunting and fishing.

Many of the fish and small game resources harvested by Akiachak residents are available year-round. Other resources such as salmon and waterfowl are available only seasonally. Black and brown bear are typically in hibernation during winter. In addition to some resources being available only seasonally, there are also annual variations in the abundance and distribution of various resources. Changes in caribou migration patterns since the late 1980's, for example, have resulted in caribou from the Mulchatna caribou herd being more available recently to hunters in the eastern portion of Game Management Unit 18. However, even when caribou are available, poor snow conditions during winter and low water conditions during late summer and early fall typically limit hunter access and harvest opportunity. A decline in the number of chum salmon returning to the Kuskokwim River since the late 1980s has resulted in reduced subsistence harvests of that species as well as an overall reduction in commercial salmon fishing opportunity. Although there are similarities year to year with respect to the annual seasonal round of resource harvesting activities, each year is different.

Baseline subsistence research such as this provides a “snapshot” of subsistence harvest and use in the community. Measures of variation in subsistence harvest and use over time can be determined through periodic surveys over several years.

## PARTICIPATION IN HARVEST AND USE OF RESOURCES

Virtually all households (99 percent) used and (98 percent) harvested wild resources during 1998 (Fig. 6). Participation in harvest activities was relatively high across categories during 1998 except for marine mammals and marine invertebrates. Overall, 84 percent of the community residents were involved in harvesting resources and 60 percent of residents were involved in processing resources (Table 12). Households that attempted to harvest salmon and other fish were nearly always successful in their attempts as were households that attempted to harvest caribou, small land mammals, ducks, geese, berries and plants. Relative to the percent of hunters that successfully harvested caribou, individuals that tried to harvest moose and black bear were not as successful.

A pattern of sharing and distribution of fish and wildlife resources was evident by the percentage of households that used resources. For example, only 14 percent of Akiachak households harvested marine mammals, however, more than half (58 percent) of households used marine mammals. Similarly, 95 percent of Akiachak households used moose although only 68 percent of Akiachak households harvested moose.

Subsistence harvest activities occurred year round (Fig. 7). Many fish species are locally available year round and were harvested and used by most households. In contrast, harvest activities associated with salmon, which represent nearly one-half of the total subsistence harvest, dominate the summer seasonal round of most families.

Household participation levels in resource harvest activities were highest for vegetation (berries) and non-salmon fish (Fig. 6). Both of these resource categories are typically found locally, do not require a large investment in harvesting or processing equipment and can be harvested by people of all ages.

## HARVEST AMOUNTS

During 1998, the total harvest (edible weight) of wild resources by all Akiachak households was approximately 695,000 pounds (Table 11). Salmon and other fish comprised nearly 68 percent of the total harvest while large land mammals represented 18 percent, and vegetation about 5 percent (Fig. 9). Salmon alone contributed to almost 50 percent of the community's total wild food harvest. The estimated harvest of wild resources during 1998 averaged 5,887 pounds per household and ranged to more than 21,000 pounds for one household.

The estimated number of large land mammals harvested during 1998 included 106 moose, 374 caribou, 36 black bears, and seven brown bears were taken. Thirty-four thousand salmon, mostly chinook, chum and sockeye were harvested. Non-salmon fish harvested during 1998 included 5,000 burbot, 4,000 pike, 12,000 whitefish, and over 35,000 pounds of blackfish (Table 11). More than 2,000 snowshoe hares, 400 beavers, 200 muskrats and 250 porcupines were harvested as were more than 60 seals. Approximately 11,000 ducks, 4,000 geese, 800 swans and 400 cranes were also harvested. The berry harvest during 1998 amounted to more than 4,000 gallons for the community.

## EMPLOYMENT AND INCOME

Although 62 percent of the adults in Akiachak were employed sometime during 1998, only one third were employed year-round (Table 5). Thirty-four percent of the jobs in the community were from commercial fishing while thirty percent of jobs were from local government (Table 6). During 1998 only two households (about one percent) reported income from the sale of furs.

The estimated earned income per household in Akiachak during 1998 was \$19,537. Income to the community from other sources averaged \$12,896 per household. Finally, the average household income during 1998 from all sources averaged \$32,433 (Table 7). On average, nearly 20 percent of the total household income came from the Alaska Permanent Fund Dividend program.

Compared with other communities in the region, the 1990 census data indicates that the per capita income for Akiachak in 1989 was greater than for many other communities (Fig. 33). Data gathered through this study indicate that the per capita income for Akiachak in 1998 (\$7,317, Table 7) was not much different than it was in 1989 (\$7,349, Fig. 33). This may be partially due to declining value of the Kuskokwim commercial salmon fishery. In 1989, commercial salmon fishers in the Kuskokwim Area earned an average of \$6,277. By 1998 however, the average income for all Kuskokwim Area commercial salmon fishers had dropped to \$2,312 (Alaska Department of Fish and Game 1999a). In Akiachak, the average household income from commercial fishing during 1998 was \$1,949.60 (Table 7).

Most households reported harvesting, rather than buying, the majority of the meat and fish they used. Households spent an average of \$6,692 annually to purchase store bought food during 1998 (Table 31). Approximately 51 percent of households estimated that they obtained between 76 percent and 99 percent of their meat, fish, and

birds from wild resources. Thirty-two percent of households reported that all (100 percent) of the meat, fish and birds they used came from wild resources.

#### COMMERCIAL FISHING, INCOME AND WILD RESOURCE HARVEST

Households with commercial salmon fishing permits had earned incomes and total incomes that were, on average, significantly greater than non-permitted households (Table 32). Households with fishing permits also harvested an average of 60 percent more (7,084.3 vs. 4,423.5) pounds of wild resources than non-permitted households. In general, harvests by households with commercial salmon fishing permits were greater for most resource categories, however, the difference was significant only for salmon, moose and birds. The harvest of moose by households that held commercial fishing permits was more than twice the mean harvest by non-permitted households (Table 32).

The amount (pounds) of wild resources harvested and the distribution of commercial fishing permits for each of the 81 households surveyed is shown in Figure 34. Of the 81 households surveyed, 44 had a commercial salmon fishing permit. Twenty-three of the 44 households that had commercial fishing permits each had subsistence harvests that were less than the community average while 21 households had harvests that were greater than average. Most of the households that ranked in the top 25 percent, in terms of harvest amounts, held commercial salmon fishing permits. In fact, each of the seven households that ranked highest in terms of harvest amounts held a commercial salmon fishing permit.

Akiachak households that harvested resources in Game Management Unit 19 had significantly greater incomes than other Akiachak households and also harvested significantly more moose (953.3 pounds) than other households (514.3 pounds, Table 33). Households that had commercial salmon fishing permits and hunted in Unit 19

harvested an average of more than five times the number of moose than did households that hunted in Unit 19 but did not have commercial fishing permits (Table 34). The reasons for these differences is not clearly understood, however, a hunter's ability to access Unit 19 may be linked to the amount of cash available for purchasing gasoline and other supplies necessary for travel upriver to Unit 19. Since households with commercial salmon fishing permits had earned incomes and total incomes that were significantly greater than non-permitted households, they were better situated to afford the gasoline and other expenses necessary for hunting more distant areas and for hunting for longer periods of time. Commercial fishermen, as a group, also have typically larger boats than other hunters and have the capacity to carry more hunters and more harvested moose home from the hunt. Finally, the greater density of moose in Unit 19, compared to Unit 18, helped to ensure a greater chance of harvest success for all hunters that had the means to get there. Continued declines in the opportunity to earn income through commercial fishing coupled with the increasing costs of gasoline, equipment and equipment maintenance may result in less difference in the amounts of resources harvested by commercial fishers and non-commercial fishers in the future.

#### AREAS USED TO HARVEST WILD RESOURCES

Residents of Akiachak use a large area for harvesting wild resources (Fig. 35). The inland area stretches east to west from Kisaralik Lake, located in the Kilbuck Mountains, to Marshall, on the Yukon River and north to south from Upper Kalskag to the mouth of the Kuskokwim River. Nearly the entire Bering Sea coast from Cape Newenham to Chevak is used. Other areas used include the Kuskokwim River drainage from Kuskokwim Bay upstream to above McGrath, as well as the Kogrukluuk, Holitna, Hoholitna and Stony River drainages. Areas identified for harvesting wild resources

during this study were similar to areas identified in 1985 when the Yukon Delta National Wildlife Refuge was preparing the Comprehensive Conservation Plan for the refuge. (United States Fish and Wildlife Service 1988). Areas identified during this study include additional use areas outside of the refuge boundary.

Waterways throughout the region serve as primary access routes to harvest areas during periods of open water (mid-May through mid-October). Some headwater streams and tributaries are accessible by boat only during periods of high water during fall, however, many other areas are accessible only during winter by snowmachine. Unlike summer, winter travel routes are not restricted to waterways and individuals can follow familiar trails to traditionally used hunting areas. Akiachak residents often travel great distances to harvest large game, especially during the fall and early spring, and rely on hunting areas closer to the community during the winter to provide needed resources.

Areas located in the upper Nushagak River and Tikchik Lakes region, which were used several years ago by Akiachak trappers with dogteams, were not identified as having been used recently (1988 – 1997). It should be noted, however, that not all hunters in the community were available to review the draft land use maps while the maps were posted in the community for review. Changes in wildlife populations, increases in fur prices or a surge in trapping activities could result in Akiachak residents returning to these traditional harvest areas.

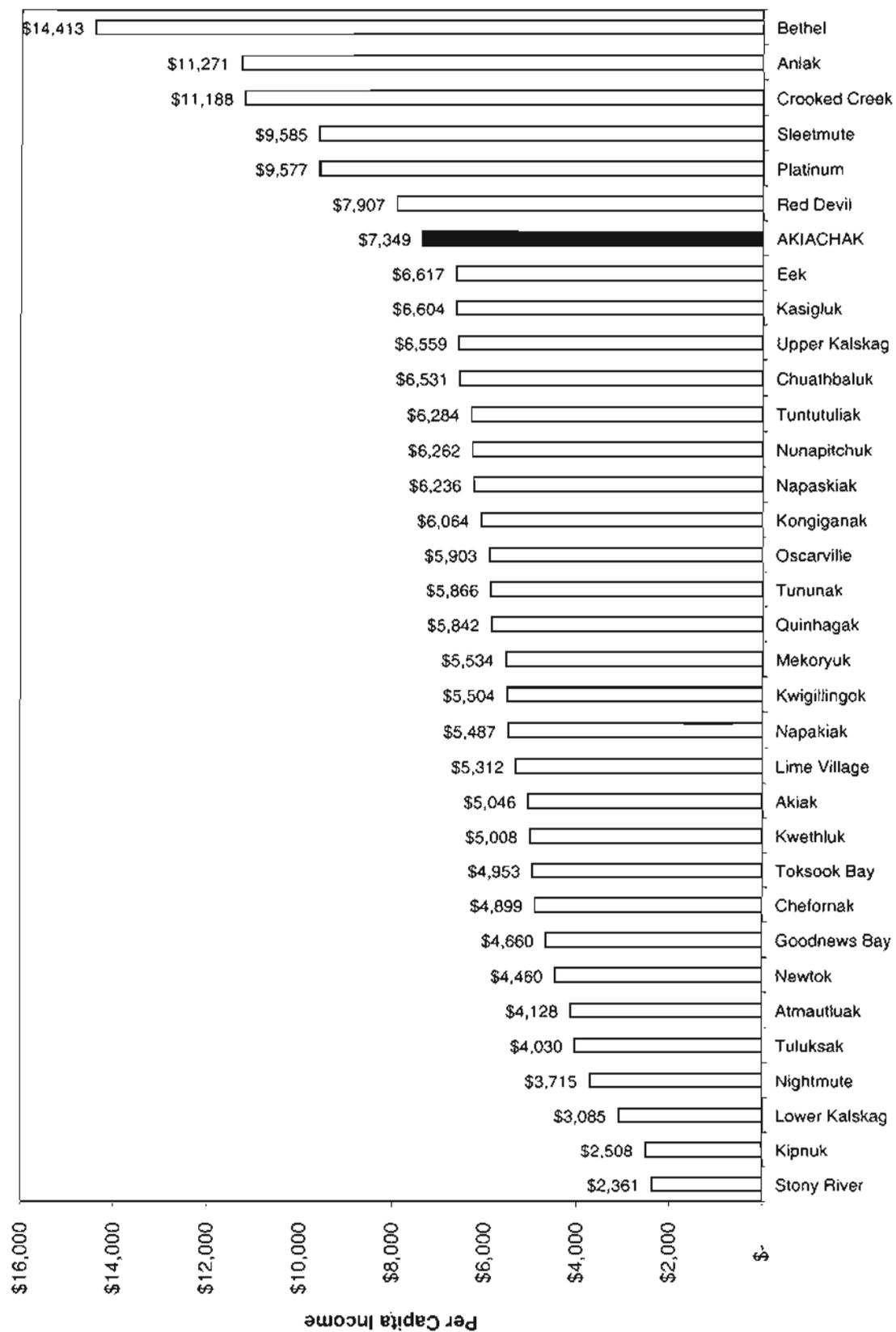


Fig. 33. Per capita income for selected Alaska communities, 1989 (Alaska Department of Labor, 1991).

Table 31. Estimated annual food purchase expenses and contribution of meat, fish and birds from wild resources, Akiachak, 1998

Characteristics	
Annual Food Purchase Expenses	
Community Total	\$789,697.80
Household Mean	\$6,692.35
Household Minimum	\$1,020.00
Household Maximum	\$19,200.00
Contribution of Wild Resources	
Percent of Households	Proportion of Meat, Fish and Birds Eaten That Was Obtained From Wild Resources
1.2	None
0.0	1-25%
4.9	26-50%
9.9	51-75%
50.6	76-99%
32.1	100%

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Table 32. Comparison of mean harvests and mean incomes for households having commercial fishing permits and households not having commercial fishing permits, Akiachak, 1998

Resource	Mean Pounds Harvested		T-test Sig.
	Permit Holders (n = 44)	Non-permit holders (n = 37)	
Salmon	3,540.39	2,088.28	0.017 *
Fish Other than Salmon	1,241.00	924.22	0.196
Land Mammals	1,498.35	826.98	0.001 **
Large Land Mammals	1,367.39	746.49	0.002 **
Black Bear	57.95	32.43	0.182
Brown Bear	9.09	16.22	0.513
Caribou	439.09	311.35	0.095
Moose	861.25	386.49	0.001 **
Small Land Mammals	130.96	80.50	0.137
Marine Mammals	138.86	132.76	0.958
Beluga	0.00	27.03	0.324
Birds	360.47	235.95	0.038 *
Plants	305.22	215.30	0.094
Total	7,084.29	4,423.49	0.002 **
Type of Income	Mean Household Income		T-test Sig.
	Permit Holders (n = 44)	Non-permit holders (n = 37)	
Earned	\$25,739.02	\$12,161.40	0.000 **
Nonearned	\$12,362.91	\$13,531.38	0.528
Total Income	\$38,101.93	\$25,692.78	0.001 **

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Note: T-test for equality of means using Levene's test for equality of variances.

\* = Significant at 0.05 level, \*\* = Significant at 0.01 level

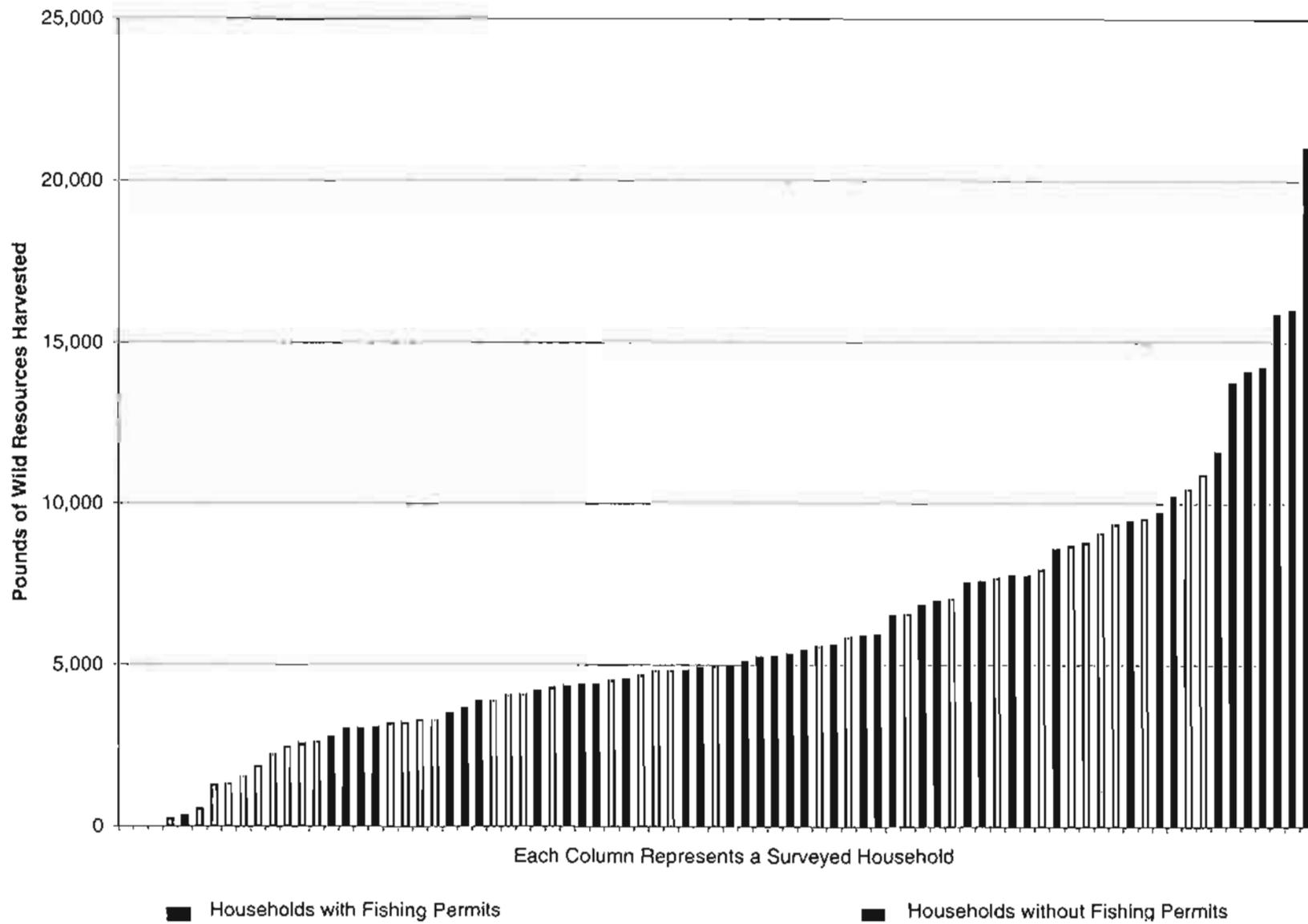


Fig. 34. Pounds of resources harvested by households and presence of commercial salmon fishing permits, Akiachak, 1998.

Table 33. Comparison of mean harvests and mean incomes of households based on harvest of resources in Game Management Unit 19, Akiachak, 1998

Resource	Mean Household Harvest (pounds)		T-test Significance
	Did Not Harvest in GMU 19 ( n = 57 )	Harvested in GMU 19 ( n = 24 )	
Salmon	2,770.71	3,129.71	0.596
Fish Other than Salmon	978.43	1,376.22	0.136
Marine Invertebrates	-	-	
Land Mammals	1,038.97	1,554.35	0.024 *
Large Land Mammals	923.42	1,464.58	0.013 *
Black Bear	42.11	56.25	0.510
Brown Bear	7.02	25.00	0.229
Caribou	360.00	430.00	0.404
Moose	514.30	953.33	0.004 **
Small Land Mammals	115.55	89.76	0.488
Marine Mammals	108.95	200.50	0.468
Birds	274.36	373.03	0.134
Plants	268.93	252.79	0.785
Wood	-	-	
Total	5,440.34	6,886.60	0.137

Income Type	Mean Household Income		T-test Significance
	Did Not Harvest in GMU 19	Harvested in GMU 19	
Earned	\$16,159.58	\$27,558.04	0.019 *
Nonearned	\$13,200.26	\$12,175.58	0.612
Total Income	\$29,359.84	\$39,733.62	0.015 *

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Survey, 1999

Note: T-test for equality of means using Levene's test for equality of variance

\* = Significant at 0.05 level, \*\* = Significant at 0.01 level

Table 34. Comparison of harvests of large land mammals from Game Management Unit 19 for households having commercial fishing permits and households not having commercial fishing permits, Akiachak, 1998

Resource	Mean Number of Animals Harvested in Game Management Unit 19		T-test Sig.
	Fishing Permit Households ( n = 44 )	Non-permit households ( n = 37 )	
Black Bear	.05	.00	0.160
Brown Bear	.00	.03	0.324
Caribou	.34	.11	0.076
Moose	.61	.11	0.002 **

Source: Alaska Department of Fish and Game, Division of Subsistence Household Survey, 1999

Note: T-test for equality of means using Levene's test for equality of variances

\* = Significant at 0.05 level, \*\* = Significant at 0.01 level



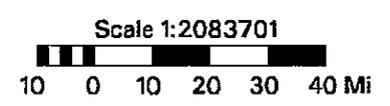
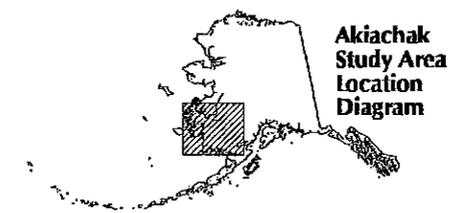
**FIGURE 35**  
**AREAS USED BY AKIACHAK**  
**RESIDENTS FOR SUBSISTENCE**  
**HUNTING, FISHING, AND**  
**GATHERING, 1988-1997**

**LEGEND**

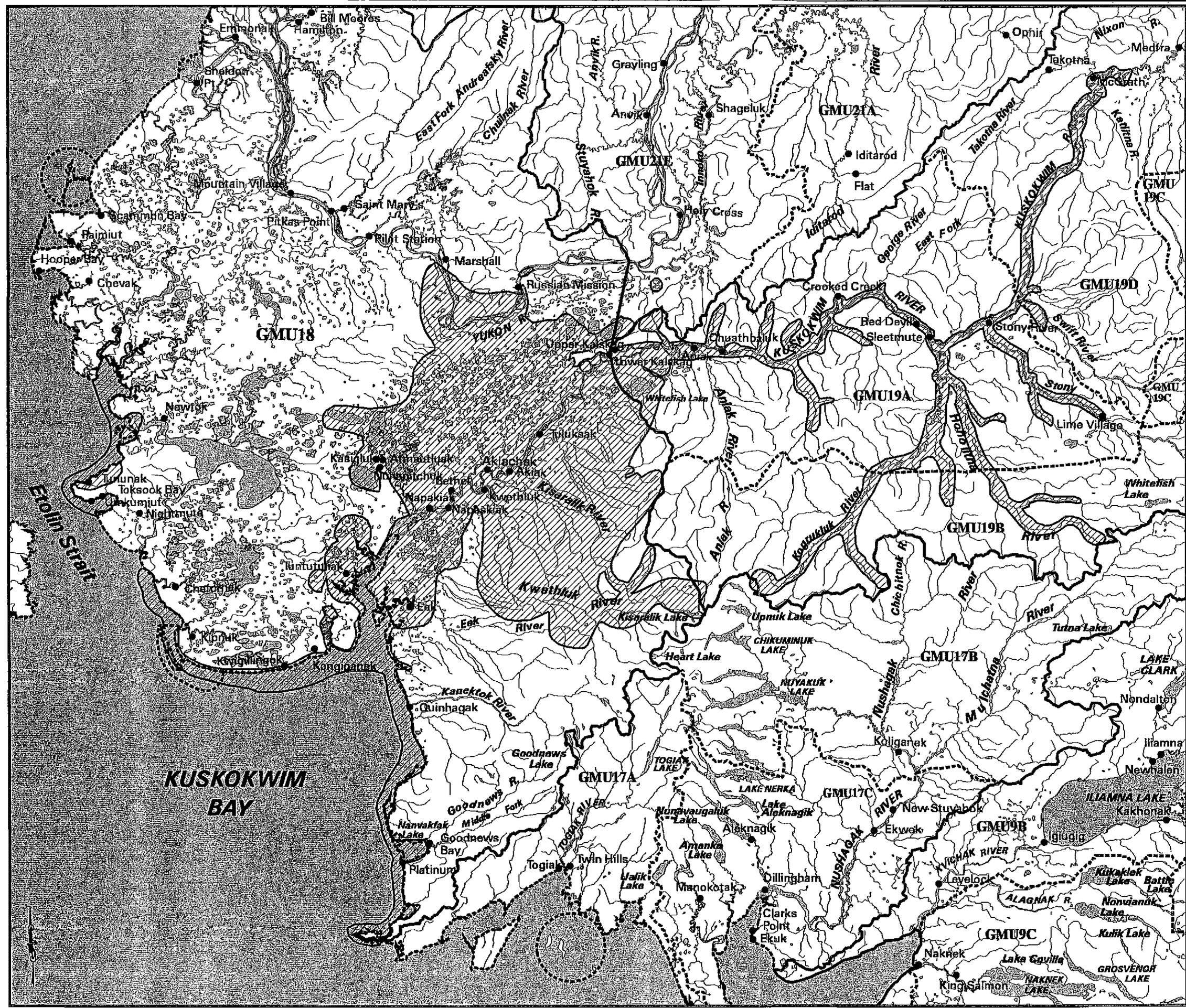
-  Subsistence Hunting, Fishing and Gathering Areas
-  GMU Boundaries
-  Subunit Boundaries

Sources: Data were collected by Michael Coffing (Division of Subsistence) Department of Fish and Game in April 1999 during interviews with 7 Akiachak residents. Additional information was added during a community review in September 1999. The map depicts areas used by Akiachak residents for subsistence activities from January 1, 1988 through December 31, 1997 (10 years) while living in Akiachak. See Division of Subsistence Technical Paper Number 258 for more information.

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APPENDIX A. AKIACHAK RESOLUTION FOR SUBSISTENCE RESEARCH

AKIACHAK NATIVE COMMUNITY  
Akiachak Indian Reorganization Act Council  
Post Office Box 70  
Akiachak, Alaska 99551  
(907)825-4626  
Facsimile No. (907)825-4029

Resolution of the Tribal Membership Endorsing Customary & Traditional Use  
Of Moose, Caribou and Bears

**WHEREAS,** The Akiachak Native Community is a federally recognized Tribe organized pursuant to the provisions of the Indian Reorganization Act of June 18, 1934, as amended; and

**WHEREAS,** The Akiachak IRA Council is the governing body for the Akiachak Native Community that represents the Tribes' interest on local, statewide, national, and international levels of policy development that have direct impact on the tribal membership integrity; and

**WHEREAS,** The ancestors of Akiachak Native Community tribal membership traditionally and customarily used lands that are now selected and owned by Calista Corporation, Bristol Bay Native Corporation and Doyon Limited to conduct subsistence hunts for moose, caribou, and black/brown bear; and

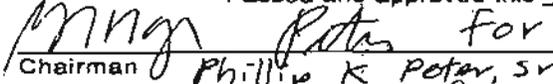
**WHEREAS,** The Akiachak Native Community tribal members continue to use those land to conduct subsistence activities for moose, caribou, and black/brown bear up to this date; and

**WHEREAS,** The Akiachak IRA Council has submitted Customary and Traditional use for moose, caribou, and black/brown bear for the Federal Subsistence Boards' approval in Game Units 17,17(B), 19, 19(C), 19(D), 21, 21 (A), and 21E.

**NOW THEREFORE BE IT RESOLVED** That the Akiachak Native Community tribal membership, at the duly called for General Membership meeting, hereby supports the efforts of the Akiachak IRA Council to request the designation of Game Units 17, 17(B), 19, 19(C), 19(D), 21, 21(A), and 21(E) as the customary and traditional Use areas for subsisting on moose, caribou, and black/brown bear.

**BE IT FURTHER RESOLVED** That the Akiachak Native Community tribal membership endorse the directive of the Akiachak IRA Council to the United States Fish and Wildlife Service to document a Subsistence Resource Study on all lands customarily and traditionally used by Akiachak residents to hunt for moose, caribou, and black/brown bear.

Passed and approved this 06 day of January 1998.

  
Chairman Phillip K. Peter, Sr.  
Attested by: Secretary/Treasurer: Anna R. R.



HH ID: \_\_\_\_\_ START TIME: \_\_\_\_\_  
 COMMUNITY: AKIACHAK 3 STOP TIME: \_\_\_\_\_  
 ID # OF PERSON RESPONDING TO SURVEY: \_\_\_\_\_

INTERVIEWER: \_\_\_\_\_  
 DATE: \_\_\_\_\_  
 CODER: \_\_\_\_\_  
 FIELD SUPERVISOR: Mike Coffing

HOUSEHOLD INFORMATION. WHO WERE MEMBERS OF THIS HOUSEHOLD IN 1998?

IN THE STUDY YEAR, DID YOU HUNT/PROCESS:

PERSON ID#	M/F	RELATION TO HH HEAD	AGE	RESIDENCE OF PERSON WHEN BORN			TOTAL YEARS IN COMM.	ETHNICITY	GAME / MM / BIRDS*		FISH / INVRTS**		FURBEARERS		PLANTS	
				PARENT WAS					HUNT?	PROCESS?	FISH?	PROCESS?	HUNT/TRAP?	PROCESS?	GATHER?	PROCESS?
								Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	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 / INVRT - should include harvesting/attempting to harvest freshwater / marine invertebrates, eg., clam digging, freshwater mussels etc.

AKIACHAK (3) HH: \_\_\_\_\_

DEMOGRAPHY (0,1)

APPENDIX B

DEMOGRAPHY CONTINUED; PAGE 2

HOUSEHOLD INFORMATION. WHO WERE MEMBERS OF THIS HOUSEHOLD IN 1998?

PERSON		RELATION	AGE	RESIDENCE OF	TOTAL	ETHNICITY	IN THE STUDY YEAR, DID YOU HUNT/PROCESS:							
ID#	M/F	TO HH	HEAD	PARENT WHEN	PERSON WAS		YEARS	GAME / MM / BIRDS*	FISH / INVRTS**	FURBEARERS		PLANTS		
				BORN	IN COMM.		HUNT?	PROCESS?	FISH?	PROCESS?	HUNT/TRAP?	PROCESS?	GATHER?	PROCESS?
							Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
11														
11														
12														
12														
13														
13														
14														
14														
15														
15														
16														
16														
17														
17														
18														
18														

164

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

\*\* FISH / INVRT - should include harvesting/attempting to harvest freshwater / marine invertebrates, eg., clam digging, freshwater mussels etc.

**APPENDIX B**

**SUBSISTENCE SALMON KEPT FROM COMMERCIAL FISHING ACTIVITIES.**

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL SALMON FISHING IN 1998? YES \_\_\_\_ NO \_\_\_\_

IF YES: PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS, IF POUNDS THEN EDIBLE WEIGHT):

SPECIES	HOUSEHOLD COMMERCIAL FISHED? Y/N	NUMBER OF COMMERCIAL CAUGHT SALMON USED BY THIS HOUSEHOLD FOR SUBSISTENCE Number	NUMBER OF COMMERCIAL CAUGHT SALMON GIVEN TO OTHERS FOR SUBSISTENCE USE		UNITS	ID #'S OF FISHERS		NOTES:
			TO CREW	TO OTHERS		PERMIT HOLDER	CREW	
			Number	Number				
CHINOOK SALMON Taryaqvak 113000001					IND 1			
CHUM SALMON Iqalluk 113000001					IND 1			
SOCKEYE SALMON Sayak 115000001					IND 1			
COHO SALMON Qakliyak 112000001					IND 1			
PINK SALMON Amaqayyak 114000001					IND 1			
UNKNOWN SALMON 119000001					IND 1			

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

**NOTES:**

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AKIACHAK ( 3 ) HH: \_\_\_\_\_

COMMERCIAL FISHING - SALMON (3A)

APPENDIX B

SUBSISTENCE FISH KEPT FROM COMMERCIAL FISHING ACTIVITIES: NON-SALMON.

DID MEMBERS OF YOUR HOUSEHOLD PARTICIPATE IN COMMERCIAL FISHING (OTHER THAN SALMON) IN 1998? 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?		USED BY	GAVE AWAY		UNITS	ID #'S OF FISHERS		NOTES:
	Y/N	INCIDENTAL	THIS HOUSEHOLD Number	TO CREW Number	TO OTHERS Number		PERMIT HOLDER	CREW	
HERRING						GAL			
120200001						4			
BROAD WHITEFISH Akakik						IND			
126404001						1			
HUMPBACK WHITEFISH Cingikeggliq						IND			
126406001						1			
ROUND WHITEFISH Caurunat						IND			
126412002						1			
CISCO Eliuyyak						IND			
126406001						1			
SHEEFISH Ciq						IND			
125600001						1			
BURBOT Maniqnaq						IND			
124800001						1			
NORTHERN PIKE Luqruiyak						IND			
125400001						1			

NOTES:

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AKIACHAK ( 3 ) HH: \_\_\_\_\_

COMMERCIAL FISHING - NON-SALMON FINFISH (3B)

APPENDIX B

SUBSISTENCE FISHING: SALMON.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SALMON IN 1998? 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	NUMBER HARVESTED BY							UNITS	RECEIVED Y/N	GAVE AWAY Y/N	NOTES
			SET NET Number	DRIFT NET Number	DIP NET Number	FISH WHEEL Number	ROD & REEL* Number	OTHER GEAR TYPE	Number				
CHINOOK SALMON Tayaqvak 11300002										IND			
CHUM SALMON Iqailuk 11100002										IND			
SOCKEYE SALMON Sayak 11500002										IND			
COHO SALMON Qakiyak 11200002										IND			
PINK SALMON Amaqayak 11400002										IND			
UNKNOWN SALMON 11900002										IND			

167

AKIACHAK ( 3 ) HH: \_\_\_\_\_

SALMON (4A)

APPENDIX B

168

SUBSISTENCE SALMON FISHING LOCATIONS:

DURING 1998, WHERE DID YOUR HOUSEHOLD SUBSISTENCE FISH FOR SALMON?

	KUSKOKWIM RIVER: ABOVE AKIAK	KUSKOKWIM RIVER: BETWEEN AKIAK TO KWETHLUK	KUSKOKWIM RIVER: BETWEEN KWETHLUK TO BETHEL	KUSKOKWIM RIVER: BELOW BETHEL	GWEEK RIVER	KISARALIK RIVER	KASIGLUK RIVER	KWETHLUK RIVER	LIST UP TO THREE OTHER AREAS WHERE YOU FISHED FOR SALMON IN 1998 STARTING WITH THE MOST IMPORTANT ONE		
	A	B	C	D	E	F	G	H	I	J	K
FISHED FOR SALMON: Y/N											

APPENDIX B

SUBSISTENCE FISHING: NON-SALMON FINFISH.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE FISH OTHER THAN SALMON IN 1998? YES \_\_\_\_ NO. \_\_\_\_

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

SPECIES	USED?	TRIED TO	DRIFT	SET	UNDER ICE	DIP	ROD &	HOOING	OTHER		UNITS	RECEIVED	GAVE	NOTES
	Y/N	HARVEST	NET	NET	NET	NET	REEL	THRU ICE	TYPE	#		Y/N	AWAY	
		Y/N	#	#	#	#	#	#				Y/N	Y/N	
HERRING Iqalluarpak 120200002											GAL 4			
HERRING EGGS 120300002											GAL 4			
SMELT Ousuuk 120499002											GAL 4			
DOLLY VARDEN Yugyuk 125008002											IND 1			
LAKE TROUT Cikigniq 125010002											IND 1			
RAINBOW TROUT Talaariq 126204002											IND 1			
GRAYLING Culugpak 125200002											IND 1			
NORTHERN PIKE Luqruiyak 125400002											IND 1			
BROAD WHITEFISH Akakiik 126304002											IND 1			
HUMPBACK WHITEFISH Cingikeggliq 126408002											IND 1			
CISCO Elluuyak 125406002											IND 1			

169

AKIACHAK ( 3 ) HH: \_\_\_\_

NON-SALMON FINFISH (8A)

APPENDIX B

SUBSISTENCE FISHING: NON-SALMON FINFISH, continued.

SPECIES	USED?	TRIED TO	DRIFT	SET	UNDER ICE	DIP	ROD &	HOOING	OTHER		UNITS	RECEIVED	GAVE	NOTES
	Y/N	HARVEST	NET	NET	NET	NET	REEL	THRU ICE	TYPE	#		Y/N	AWAY	
		Y/N	#	#	#	#	#	#				Y/N	Y/N	
ROUND WHITEFISH Caurinat 126412002											IND			
BURBOT (lush) Manignaq 124800002											IND			
BLACKFISH Imangaq, Can'giiq 124600002											GAL			
SUCKERS Cuntargak, Nepcak 125000002											IND			
STICKLEBACK (Needlefish) Cukilek 123800002											GAL			
LAMPREY EEL 122000002														
HALIBUT 121800002														

170

AKIACHAK (3) HH: \_\_\_\_\_

NON-SALMON FINFISH (6A)

**APPENDIX B**

**SUBSISTENCE NON-SALMON FISHING LOCATIONS:**

DURING 1998, WHERE DID YOUR HOUSEHOLD SUBSISTENCE FISH FOR NON-SALMON FISH?

SPECIES FISHED FOR	KUSKOKWIM RIVER: ABOVE AKIAK	KUSKOKWIM RIVER: BETWEEN AKIAK TO KWETHLUK	KUSKOKWIM RIVER: BETWEEN KWETHLUK TO BETHEL	KUSKOKWIM RIVER: BELOW BETHEL	GWEEK RIVER	KISARALIK RIVER	KASIGLUK RIVER	KWETHLUK RIVER	LIST UP TO THREE OTHER AREAS WHERE YOU FISHED FOR FISH OTHER THAN SALMON IN 1998 STARTING WITH THE MOST IMPORTANT ONE		
	A	B	C	D	E	F	G	H	I	J	K
HERRING Iqalluarpak 120200002											
HERRING EGGS 120300002											
SMELT Ousuuk 120499002											
DOLLY VARDEN Yugyat 125008002											
LAKE TROUT Cikigniq 125010002											
RAINBOW TROUT Talaarq 126204002											
GRAYLING Culuppauk 125200002											
NORTHERN PIKE Luqruuyak 125200002											
BROAD WHITEFISH Akakiik 126404002											

171

AKIACHAK ( 3 ) HH: \_\_\_\_\_

NON-SALMON FINFISH (6B: 100)

**APPENDIX B**

**SUBSISTENCE NON-SALMON FISHING LOCATIONS:**

**DURING 1998, WHERE DID YOUR HOUSEHOLD SUBSISTENCE FISH FOR NON-SALMON FISH?**

SPECIES FISHED FOR	KUSKOKWIM RIVER: ABOVE AKIAK	KUSKOKWIM RIVER: BETWEEN AKIAK TO KWETHLUK	KUSKOKWIM RIVER: BETWEEN KWETHLUK TO BETHEL	KUSKOKWIM RIVER: BELOW BETHEL	GWEEK RIVER	KISARALIK RIVER	KASIGLUK RIVER	KWETHLUK RIVER	LIST UP TO THREE OTHER AREAS WHERE YOU FISHED FOR FISH OTHER THAN SALMON IN 1998 STARTING WITH THE MOST IMPORTANT ONE		
	A	B	C	D	E	F	G	H	I	J	K
HUMPBACK WHITEFISH Cingkeggliq 126400002											
CISCO Elluuyak 126400002											
ROUND WHITEFISH Caurinat 126412002											
BURBOT (Iush) Manignaq 124800002											
BLACKFISH Imangaq, Can'gillq 124800002											
SUCKERS Cunargak, Nopcak 126000002											
STICKLEBACK (Needlefish) Cukilek 123800002											
LAMPREY EEL 122000002											
HALIBUT 121800002											

172

AKIACHAK ( 3 ) HH: \_\_\_\_\_

NON-SALMON FINFISH (6B: 100)

APPENDIX B

SUBSISTENCE HARVEST / USE OF MARINE AND FRESHWATER INVERTEBRATES (SHELLFISH).

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SALTWATER OR FRESHWATER INVERTEBRATES IN 19 \_\_\_\_ 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 Y/N	GAVE AWAY Y/N	SHELLS ON? Y/N	NOTES
			NUMBER #	UNITS				
SALTWATER CLAMS				GAL				
600699002				4				
FRESHWATER MUSSELS				GAL				
502000002				4				

173

APPENDIX B

SUBSISTENCE HARVEST / USE OF MARINE AND FRESHWATER INVERTEBRATES (SHELLFISH).

DURING 1998, WHERE DID YOUR HOUSEHOLD FISH FOR SALTWATER AND FRESHWATER INVERTEBRATES?

174

SPECIES FISHED FOR	KUSKOKWIM RIVER: ABOVE AKIAK	KUSKOKWIM RIVER: BETWEEN AKIAK TO KWETHLUK	KUSKOKWIM RIVER: BETWEEN KWETHLUK TO BETHEL	KUSKOKWIM RIVER: BELOW BETHEL	GWEEK RIVER	KISARALIK RIVER	KASIGLUK RIVER	KWETHLUK RIVER	LIST UP TO THREE OTHER AREAS WHERE YOU FISHED FOR SALTWATER AND FRESHWATER INVERTEBRATES IN 1998 STARTING WITH THE MOST IMPORTANT ONE		
	A	B	C	D	E	F	G	H	I	J	K
COLLECTED SALTWATER OR FRESHWATER INVERTEBRATES Y/N											
500000002											

AKIACHAK (3) HH: \_\_\_\_\_

INVERTEBRATES (8B: 100)

APPENDIX B

LARGE LAND MAMMALS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE LARGE LAND MAMMALS IN 1998? YES \_\_\_\_ NO \_\_\_\_

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD BE INDIVIDUALS)

SPECIES	TRIED TO		NUMBER HARVESTED	MONTH HARVESTED						UNITS	RECEIVED		GAVE AWAY	NOTES
	USED?	HARVEST		Jan	Feb	Mar	Apr	May	June		Y/N	Y/N		
	Y/N	Y/N	Number	Month										
MOOSE Tuntuvak 211800000				Jan	Feb	Mar	Apr	May	June	IND				
				Jul	Aug	Sep	Oct	Nov	Dec					
CARIBOU Tuntu 211000000				Jan	Feb	Mar	Apr	May	June	IND				
				Jul	Aug	Sep	Oct	Nov	Dec					
BLACK BEAR Tan'gerliq 210500000				Jan	Feb	Mar	Apr	May	June	IND				
				Jul	Aug	Sep	Oct	Nov	Dec					
BROWN BEAR Taqukaq 210800000				Jan	Feb	Mar	Apr	May	June	IND			WAS THE BROWN BEAR MEAT EATEN? Y N	
				Jul	Aug	Sep	Oct	Nov	Dec					
				Jan	Feb	Mar	Apr	May	June	IND				
				Jul	Aug	Sep	Oct	Nov	Dec					
										IND				

NOTES

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AKIACHAK ( 3 ) HH: \_\_\_\_\_

LARGE LAND MAMMALS (10A)

**APPENDIX B**

**LARGE LAND MAMMALS HUNTING AND HARVEST LOCATIONS.**

DURING 1998, WHERE DID YOUR HOUSEHOLD HARVEST THE FOLLOWING SPECIES?

SPECIES	Gweek River Drainage (Unit 18) Number	Kweihluk River Drainage (Unit 18) Number	Kasigliuk River Drainage (Unit 18) Number	Kisaralik River Drainage (Unit 18) Number	Tuluksak River Drainage (Unit 18) Number	Kuskokwim River: Aklak to Bethel (Unit 18) Number	Kuskokwim River: Aklak to Lower Kalskag (Unit 18) Number	Kuskokwim River: Lower Kalskag to Napaimlut (Unit 19A) Number	Kuskokwim River: Napaimlut to Stony River (Unit 19A) Number	Kuskokwim River: Stony River to McGrath (Unit 19D) Number	Lower Holitna River Drainage (Unit 19A) Number	Upper Holitna River Drainage (Unit 19B) Number
	A	B	C	D	E	F	G	H	I	J	K	L
<b>MOOSE</b>												
Tuntuvak 211800000												
<b>CARIBOU</b>												
Tuntuvak 211000000												
<b>BLACK BEAR</b>												
Tan'gerliq 210600000												
<b>BROWN BEAR</b>												
Taquiqaq 210800000												

**APPENDIX B**

**LARGE LAND MAMMALS HARVEST LOCATIONS, continued.**

**LIST OTHER AREAS HUNTED AND HARVESTED**

SPECIES	Lower Hoholilna River Drainage (Unit 19A) Number	Upper Hoholilna River Drainage (Unit 19B) Number	Stony River Drainage (Unit 19A) Number	Kisaralik Lake Area (Unit 18) Number	Yukon River drainage: downstream of Paimiut (Unit 18) Number	Yukon River drainage: upstream of Paimiut (Unit 21E) Number	Other Area 1 Write in Name and Number	Other Area 2 Write in Name and Number	Other Area 3 Write in Name and Number	Other Area 4 Write in Name and Number
	M	N	O	P	Q	R	S	T	U	V
<b>MOOSE</b> Tuntuvak 211800000										
<b>CARIBOU</b> Tuntuvak 211000000										
<b>BLACK BEAR</b> Tan'gerllq 210600000										
<b>BROWN BEAR</b> Taqukaq 210800000										

177

AKIACHAK ( 3 ) HH: \_\_\_\_\_

LARGE LAND MAMMALS (10B, 100)

APPENDIX B

SMALL LAND MAMMALS/FURBEARERS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SMALL LAND MAMMALS/FURBEARERS IN 1998? YES: \_\_\_\_ NO: \_\_\_\_

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS)

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	MONTH						NUMBER HARVESTED		TOTAL	AVERAGE		RECEIVED Y/N	GAVE AWAY Y/N	
			HARVESTED						NUMBER FOOD Number	NUMBER FUR Only Number	NUMBER HARVESTED Number	NUMBER SOLD Number	PRICE EACH Dollars			UNITS
			Jan	Feb	Mar	Apr	May	June								
BEAVER Paluqtaq 220200000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
MUSKRAT kanaqlak, tevyuli, iligvak 222400000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
SNOWSHOE HARE Maqaruq 221004000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
TUNDRA HARE Qayuqeggliq 221002000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
PORCUPINE Issaluq 222600000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
PARKA SQUIRREL (GROUND) Qanganaq 222802000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
MARMOT Cikqpak 221800000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
LAND OTTER Ciugnilinguq 221200000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
MINK Imarmilutaq 222200000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
MARTEN Qavcuuq 222000000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		
LYNX Tertuleq 221600000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND		

APPENDIX B

SMALL LAND MAMMALS/FURBEARERS, continued.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE SMALL LAND MAMMALS/FURBEARERS IN 1998? YES \_\_\_\_ NO: \_\_\_\_

IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS SHOULD INDICATE INDIVIDUALS)

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	MONTH HARVESTED						NUMBER HARVESTED		TOTAL NUMBER HARVESTED Number	NUMBER SOLD Number	AVERAGE PRICE Doll,ars	UNITS	RECEIVED Y/N	GAVE AWAY Y/N
			Jan	Feb	Mar	Apr	May	June	FOR FOOD Number	FOR FUR Only Number						
RED FOX, CROSS FOX Kaviaq 220804000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
ARCTIC FOX Qaterliaraq 220802000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
WOLF Keglunaq 223200000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
WOLVERINE Terikaniaq 223400000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
COYOTE Kayu 220400000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
WEASEL Narulgiq 223000000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
TREE SQUIRREL (RED) Qiguiq 222804000			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		
			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec						IND 1		

179

AKIACHAK ( 3 ) HH: \_\_\_\_\_

SMALL LAND MAMMALS / FURBEARERS (14A)



APPENDIX B

MARINE MAMMALS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE MARINE MAMMALS IN 1998? YES \_\_\_ NO \_\_\_  
 IF YES, PLEASE COMPLETE THE FOLLOWING TABLE (UNITS ARE INDIVIDUALS POUNDS SHOULD BE EDIBLE WEIGHT )

SPECIES	USED*?	TRIED TO HARVEST?	NUMBER HARVESTED	MONTH HARVESTED						RECEIVED	GAVE AWAY	HARVEST LOCATION	
	Y/N	Y/N	Number	Jan	Feb	Mar	Apr	May	June	IND	Y/N		Y/N
BEARDED SEAL Maktak, maklaaq, maklassuk 300802000				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
SPOTTED SEAL Issurriq 300812000				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
RINGED SEAL Nayiq 300810000				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
RIBBON SEAL Qasruliq 300808000				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
STELLER SEA LION Uginaq 301200000				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
BELUKHA WHALE Ciluq 301602000				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
WALRUS Asveq 301400000				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			
				Jul	Aug	Sep	Oct	Nov	Dec	IND 1			

\* Use includes meat and/or oil, and/or fur.

APPENDIX B

BIRDS AND EGGS.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE BIRDS OR EGGS IN 1998? 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 Y/N	GAVE AWAY Y/N	NOTES					
			SPRING			SUMMER				FALL	WINTER			
			M	A	M	J				J	A	S	O	N
TUNDRA SWAN (WHISTLING) Qugyuk 410604000									IND					
SANDHILL CRANE Quoilgaq 410802000									IND					
SNOW GEESE Kanguq 410408000									IND					
MALLARD Lagiq 410214000									IND					
HARLEQUIN (ROCK DUCK) Celuskar (ag) 410212000									IND					
WHITE-FRONTED GEESE Leqleq 410410000									IND					
LESSER CANADA GEESE Lagiq 410404080									IND					
EMPEROR GEESE Nacaullek 410408000									IND					
BLACK BRANT Neqlernaq 410402000									IND					
WIDGEON Qalkehhiq 410236000									IND					
SHOVELER Curcupak 410230000									IND					

182

AKIACHAK ( 3 ) HH: \_\_\_\_\_

BIRDS (15A)

APPENDIX B

BIRDS AND EGGS CONTINUED

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED BY SEASON (MONTHS)												RECEIVED Y/N	GAVE AWAY Y/N	NOTES	
			SPRING			SUMMER			FALL			WINTER						
			M	A	M	J	J	A	S	O	N	D	J	F				UNIT
SCAUP (BLUEBILL) Kep'alek 410226990															IND 1			
CKACKLING CANADA GEESE Lakcakcar 410404040															IND 1			
PINTAIL Uqsuqaq 410220000															IND 1			
BUFFLEHEAD (BUTTERBALL) Pugtaqulaygaq 410202000															IND 1			
GOLDENEYE Anarniinguq 410210990															IND 1			
OLDSQUAW Aarraangliq 410218000															IND 1			
BLACK SCOTER Tungunqeggliq 410228020															IND 1			
SURF SCOTER Akacakayak 410228040															IND 1			
GREEN-WINGED TEAL Tengasqaar 410232060															IND 1			
COMMON EIDER Metraq 410208020															IND 1			
COMMON MERGANSER (SAWBILL) Payirpaq 410216020															IND 1			
RED-BRESTED MERGANSER (SAWBILL) Payiq 410216040															IND 1			

183

APPENDIX B

BIRDS AND EGGS CONTINUED

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED BY SEASON (MONTHS)												RECEIVED Y/N	GAVE AWAY Y/N	NOTES	
			SPRING			SUMMER			FALL			WINTER						
			M	A	M	J	J	A	S	O	N	D	J	F				UNIT
ARCTIC LOON Tunullek 411216020															IND			
COMMON MURRE Alpaq 411218020															IND			
GULLS Naruyarpak 411212990															IND			
ARCTIC TERN Teqyaar 411228040															IND			
KING EIDER Qengallek 410206040															IND			
SPECTACLED EIDER Quageq 410206060															IND			
YELLOW BILLED LOON Tuulleqpak 411216080															IND			
RED THROATED LOON Qaqalak 411216060															IND			
STELLER'S EIDER Caqjar (aq) 410206080															IND			
COMMON LOON Tuullek 411216040															IND			

184

APPENDIX B

BIRDS AND EGGS CONTINUED

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	NUMBER HARVESTED BY SEASON (MONTHS)												RECEIVED Y/N	GAVE AWAY Y/N	NOTES	
			SPRING			SUMMER			FALL			WINTER						
			M	A	M	J	J	A	S	O	N	D	J	F				
PTARMIGAN Qangqiiq 421804990															IND			
GROUSE Egluk 421802000															IND			
															IND			
															IND			
															IND			
GULL EGGS 431212000															IND			
DUCK EGGS 430299000															IND			
GEESE EGGS 430400000															IND			
SWAN EGGS 430600000															IND			
															IND			
															IND			

185

APPENDIX B

BERRIES, PLANTS, AND WOOD.

DID MEMBERS OF YOUR HOUSEHOLD TRY TO HARVEST OR USE WILD PLANTS (INCLUDING FIREWOOD) IN 1998? YES: \_\_\_\_ NO: \_\_\_\_

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

SPECIES	USED? Y/N	TRIED TO	AMOUNT	UNIT	RECEIVED	GAVE							NOTES
		HARVEST Y/N	HARVESTED NUMBER		Y/N	AWAY Y/N							
BLUEBERRIES Curaq 601002000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
SALMONBERRIES Alsallugpiaq 601022000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
BLACKBERRIES/MOSSBERRIES Tan'gerpak 601030000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
CRANBERRIES Kaviriq 601004000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
SOURDOCK Quaggiq 602028000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
LABRADOR TEA Ayug 602018000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
MOUSEFOODS 604006000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
STINKWEED Caiggluk, Qanganaruq 602044000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
PLANTS/GREENS/MUSHROOMS 602000000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
FUNGUS 602046000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	
WILD RHUBARB 602006000				GAL 4			Jan Jul	Feb Aug	Mar Sep	Apr Oct	May Nov	June Dec	

186

AKIACHAK ( 3 ) HH: \_\_\_\_

PLANTS (17A)

APPENDIX B

BERRIES, PLANTS, AND WOOD CONTINUED

SPECIES	USED? Y/N	TRIED TO HARVEST Y/N	AMOUNT		RECEIVED Y/N	GAVE AWAY Y/N							NOTES
			HARVESTED NUMBER	UNIT			Jan	Feb	Mar	Apr	May	June	
WILD CELERY				GAL			Jan	Feb	Mar	Apr	May	June	
602032000				4			Jul	Aug	Sep	Oct	Nov	Dec	
ROSE HIPS				GAL			Jan	Feb	Mar	Apr	May	June	
602036000				4			Jul	Aug	Sep	Oct	Nov	Dec	
WOOD				CORDS			Jan	Feb	Mar	Apr	May	June	
604000000				6			Jul	Aug	Sep	Oct	Nov	Dec	
							Jan	Feb	Mar	Apr	May	June	
							Jul	Aug	Sep	Oct	Nov	Dec	
							Jan	Feb	Mar	Apr	May	June	
							Jul	Aug	Sep	Oct	Nov	Dec	
							Jan	Feb	Mar	Apr	May	June	
							Jul	Aug	Sep	Oct	Nov	Dec	
							Jan	Feb	Mar	Apr	May	June	
							Jul	Aug	Sep	Oct	Nov	Dec	

187

AKIACHAK (3) HH: \_\_\_\_\_

PLANTS (17A)



**APPENDIX B**

**EMPLOYMENT: PAGE 2**

PLEASE INDICATE THE FOLLOWING INFORMATION FOR ALL JOBS HELD BY THE EMPLOYED PERMANENT HOUSEHOLD MEMBERS 16 OR OLDER LISTED ON PAGE 1 IN 1998

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 1998	HRS/DAY	DAYS/ WEEK	WORK *** SCHEDULE	PERSONAL GROSS INCOME****
								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				

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

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

\*\*\* WORK SCHEDULE = (1) FULLTIME (35+ HOURS/WK) (2) PARTTIME (<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.

APPENDIX B

OTHER INCOME.

ANSWER ALL THAT APPLY INDICATE ANNUAL AMOUNT FOR THE PERIOD OF 1998.  
 OKAY TO LEAVE BLANK IF NOT APPLICABLE OR TO STATE SOME AMOUNT, AMOUNT UNKNOWN (-6) IF IT EXISTED.

AK PERMANENT FUND, NUMBER:		AID TO FAMILIES WITH		DIVIDENDS/INTEREST (14) \$	
* (\$1541 EA) (32) \$		DEPENDENT CHILDREN (02) \$		ADULT PUBLIC ASSISTANCE (03) \$	
SOCIAL SECURITY (07) \$		PENSION/RETIREMENT (05) \$		LONGEVITY BONUS (06) \$	
SUPP. SECURITY INCOME (SSI) (10) \$		WORK COMP/INSURANCE (08) \$		(\$250/MONTH)	
NATIVE CORP. DIVIDEND (13) \$		FOOD STAMPS (11) \$		ENERGY ASSISTANCE (09) \$	
				UNEMPLOYMENT (12) \$	
				OTHER: _____ (____) \$	

[AK PERMANENT FUND 1998 1 - \$1,541 2 - \$3,082 3 - \$4,623 4 - \$6,164 5 - \$7,704 6 - \$9,245 7 - \$10,786 8 - \$12,327 9 - \$13,868 10 - \$15,409]

FOOD:

PLEASE ESTIMATE YOUR MONTHLY EXPENSES TO PURCHASE FOOD: \$ \_\_\_\_\_ /MONTH

WHAT PERCENTAGE OF ALL THE MEAT, FISH, AND BIRDS THAT YOU ATE IN THE LAST YEAR WAS FROM WILD RESOURCES? [33]  
 \_\_\_\_ (1) NONE \_\_\_\_ (2) 1-25% \_\_\_\_ (3) 26-50% \_\_\_\_ (4) 51-75% \_\_\_\_ (5) 76-99% \_\_\_\_ (6) ALL

NOTES:

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190

AKIACHAK ( 3 ) HH: \_\_\_\_\_

OTHER INCOME (24)





APPENDIX C. CONVERSION FACTORS, AKIACHAK, 1998.

Resource	Conversion Factors (usable pounds)	Units
Chum Salmon	6.00	individual
Coho Salmon	6.00	individual
Chinook Salmon	17.00	individual
Pink Salmon	2.90	individual
Sockeye Salmon	6.00	individual
Herring	6.00	gallons
Herring Roe	6.00	gallons
Rainbow Smelt	6.00	gallons
Halibut	20.00	individual
Lamprey	6.00	gallons
Stickleback	6.00	gallons
Blackfish	6.00	gallons
Burbot	4.50	individual
Dolly Varden	1.50	individual
Grayling	1.50	individual
Pike	4.50	individual
Sheefish	6.50	individual
Sucker	1.00	individual
Rainbow Trout	2.00	individual
Broad Whitefish	4.00	individual
Cisco	0.75	individual
Humpback Whitefish	2.00	individual
Round Whitefish	1.50	individual
Black Bear	150.00	individual
Brown Bear	200.00	individual
Caribou	120.00	individual
Moose	715.00	individual
Beaver	15.00	individual
Snowshoe Hare	2.50	individual
Land Otter	3.00	individual
Lynx	4.00	individual
Mink	2.00	individual
Muskrat	0.75	individual
Porcupine	4.00	individual
Parka Squirrel (ground)	0.50	individual
Bearded Seal	300.00	individual
Ribbon Seal	92.00	individual
Ringed Seal	66.00	individual
Spotted Seal	132.00	individual
Walrus	1,100	individual
Belukha	1,000	individual
Bufflehead	0.40	individual
Common Eider	2.21	individual
King Eider	1.43	individual
Spectacled Eider	2.43	individual
Unknown Goldeneye	0.80	individual
Harlequin	0.50	individual

APPENDIX C. CONVERSION FACTOR, AKIACHAK, 1998 (continued).

Resource	Conversion Factor (usable pounds)	Units
Mallard	1.00	individual
Common Merganser	1.27	individual
Red-Breasted Merganser	0.62	individual
Longtailed Duck	0.80	individual
Northern Pintail	0.80	individual
Unknown Scaup	0.90	individual
Black Scoter	0.90	individual
Surf Scoter	0.90	individual
White-winged Scoter	0.90	individual
Northern Shoveler	0.60	individual
Green Winged Teal	0.30	individual
Wigeon	0.70	individual
Brant	1.20	individual
Cackling Canada Geese	1.20	individual
Lesser Canada Geese	2.10	individual
Emperor Geese	2.50	individual
Snow Geese	2.30	individual
White-fronted Geese	2.40	individual
Tundra Swan (whistling)	10.00	individual
Sandhill Crane	8.40	individual
Arctic (Pacific) Loon	3.00	individual
Common Loon	5.44	individual
Red-Throated Loon	2.86	individual
Yellow-Billed Loon	9.00	individual
Grouse	1.00	individual
Unknown Ptarmigan	1.00	individual
Unknown Duck Eggs	0.15	individual
Geese Eggs	0.15	individual
Swan Eggs	0.30	individual
Gull Eggs	0.30	individual
Unknown Clams	3.00	gallons
Blueberry	6.00	gallons
Boysenberry	4.00	gallons.
Low Bush Cranberry	4.50	gallons
Raspberry	4.00	gallons
Salmonberry	7.00	gallons
Blackberry (Crowberry)	5.00	gallons
Wild Rhubarb	4.00	gallons
Hudson Bay Tea	2.00	gallons
Sourdock	4.00	gallons
Wild Celery	4.00	gallons
Wild Rose Hips	3.00	gallons
Stinkweed	4.00	gallons
Mousefoods	4.00	gallons

Source: Alaska Department of Fish and Game, Division of Subsistence, Household Surveys, 1999.

APPENDIX D. STANDARD INDUSTRIAL CODES (Employer Type)

CODE	SECTOR / Industry
	<b>AGRICULTURE, FORESTRY &amp; FISHING</b>
1	Agricultural Production - Crops
2	Agricultural Production - Livestock
7	Agricultural Services
8	Forestry
9	Fishing, Hunting & Trapping
	<b>MINING</b>
10	Metal Mining
12	Coal Mining
13	Oil & Gas Extraction
14	Nonmetallic Minerals exc. Fuels
	<b>CONSTRUCTION</b>
15	General Building Contractors
16	Heavy Construction Contractors, exc. Buildings
17	Special Trade Contractors
	<b>MANUFACTURING</b>
20	Food & Kindred Products
22	Textile Mill Products
23	Apparel & Other Textile Products
24	Lumber & Wood Products
25	Furniture & Fixtures
26	Paper & Allied Products
27	Printing & Publishing
28	Chemicals & Allied Products
29	Petroleum & Coal Products
30	Rubber & Misc. Plastics Products
31	Leather & Leather Products
32	Stone, Clay & Glass Products
33	Primary Metal Industries
34	Fabricated Metal Products
35	Industrial Machinery & Equipment
36	Electronic & Other Electric Equipment
37	Transportation Equipment
38	Instruments & Related Products
39	Miscellaneous Manufacturing Industries

APPENDIX D. STANDARD INDUSTRIAL CODES (Continued)

CODE	SECTOR / Industry
	<b>TRANSPORTATION, COMMUNICATION &amp; UTILITIES</b>
40	Railroad Transportation
41	Local & Interurban Passenger Transit
42	Trucking & Warehousing
44	Water Transportation
45	Transportation by Air
46	Pipelines, exc. Natural Gas
47	Transportation Services
48	Communication
49	Electric, Gas & Sanitary Services
	<b>WHOLESALE TRADE</b>
50	Wholesale Trade - Durable Goods
51	Wholesale Trade - Nondurable Goods
	<b>RETAIL TRADE</b>
52	Building Materials & Garden Supplies
53	General Merchandise Stores
54	Food Stores
55	Automotive Dealers & Service Stations
56	Apparel & Accessory Stores
57	Furniture & Homefurnshings Stores
58	Eating & Drinking Places
59	Miscellaneous Retail
	<b>FINANCE, INSURANCE &amp; REAL ESTATE</b>
60	Depository Institutions
61	Nondepository Institutions
62	Security & Commodity Brokers
63	Insurance Carriers
64	Insurance Agents, Brokers & Service
65	Real Estate
67	Holding & Other Investment Offices
	<b>SERVICES</b>
70	Hotels & Other Lodging
72	Personal Services
73	Business Services
75	Auto Repair, Services & Parking

APPENDIX D. STANDARD INDUSTRIAL CODES (Continued)

CODE	SECTOR / Industry
76	Miscellaneous Repair Services
78	Motion Pictures
79	Amusement & Recreation Services
80	Health Services
81	Legal Services
82	Education Services
83	Social Services
84	Museums, Botanical, Zoological Gardens
86	Membership Organizations
87	Engineering & Management Services
88	Private Households
89	Miscellaneous Services
300	FEDERAL GOVERNMENT
400	STATE GOVERNMENT
	LOCAL GOVERNMENT
500	Administration
550	Education