WILD FISH AND GAME HARVEST AND USE BY RESIDENTS OF FIVE UPPER TANANA COMMUNITIES, ALASKA, 1987-88

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ABSTRACT

This report summarizes the results of a household survey conducted in five Upper Tanana region communities in Alaska: Dot Lake, Tanacross, Tok, Tetlin, and Northway. The study was undertaken to update resource harvest and use data for this area and to provide a baseline of resource harvest and use, demographic, and other economic data to aid in understanding the possible impacts of the construction and operation of a proposed over-the-horizon backscatter radar facility. A total of 195 households were interviewed about their level of fish and wildlife harvest and use during a 12-month period from June 1987 through May 1988.

Dot Lake residents harvested an average of 377.7 pounds per household or 114.5 pounds per capita. Moose was an important contributor to the Dot Lake harvest comprising 34.2 percent of the total edible pounds, while fishing for all species of fish resulted in 45.3 percent of the total output. Tanacross residents harvested an average of 684.9 pounds per household or 250.4 pounds per capita. Moose hunting and whitefish fishing together accounted for 62 percent of the total harvest in Tanacross and salmon fishing accounted for an additional 15 percent of the annual harvest. Tok residents harvested an average of 439.6 pounds per household or 149.2 pounds per capita. Moose hunting and sockeye salmon fishing accounted for about 44 percent of the total harvest by Tok residents. Tetlin residents harvested an average of 854.1 pounds per household or 213.5 pounds per capita. Fishing for whitefish accounted for 49.4 percent of the total harvest, which was the greatest single-resource harvest found in the region. Moose hunting added another 29.7 percent of the total harvest. Northway residents harvested an average of 1,001 pounds per household or 278.0 pounds per capita. Whitefish fishing accounted for the largest portion of the Northway total at 36.0 percent. Moose hunting was the second largest contributor comprising 26.8 percent. The 278.0 pounds per capita harvest reported in Northway was the highest for the five study communities.

In total, households from the five communities harvested an average of 568.6 pounds per household or 182.8 pounds per capita. In general, moose hunting and whitefish fishing accounted

for the greatest portion of the overall harvest with these two activities comprising over one-half the total harvest. The lack of a local salmon fishery resulted in the comparatively small role of salmon fishing (15.6 percent of the total) which contrasts with other interior Alaska communities.

Differences between household harvest levels were found to be associated with three household characteristics: length of time a household head resided in the local area, ethnicity of a household head, and number of people in the household. A fourth characteristic, total income of the household, was not found to have any single or clear relationship to the total household harvest level. Households headed by someone born within the region harvested about twice the amount of wild food as those households that were headed by someone born outside the region. Households headed by an Alaska Native harvested, on average, 2.4 times the amount of wild food as that harvested by non-Native households.

The Wrangell-St. Elias National Park and Preserve was used by 26.7 percent of the Upper Tanana households. The highest rate of use was found in Tok where 34.9 percent of households had used the park and preserve, followed by Tanacross where 23.5 percent of households had used the park and preserve. The park and preserve was used for fishing, moose hunting, sheep hunting, caribou hunting, and trapping. Use of specific areas within the park and preserve was documented for each community. Use of the specific sites proposed for construction of the over-the-horizion backscatter radar facility was also documented. Plans to construct the backscatter radar facility were cancelled in March 1991. This summary of quantitative harvest data on hunting, fishing, and trapping creates a baseline expected to aid in addressing other land development and resource use issues in the Upper Tanana area.

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CHAPTER 1. INTRODUCTION

Many modern travelers become acquainted with the upper Tanana River valley by driving the portion of the Alaska Highway which stretches from western Canada into Alaska's interior. The miles of highway offer the traveler vistas of spruce-covered hills and snow-capped mountain peaks, and oftentimes a glimpse of a moose feeding on willows at a nearby pond. Dozens of species of wildlife can be encountered and fish are abundant in the vast network of lakes, rivers, and streams. This 100-mile wide valley is also home to about 1,700 people, living in the communities of Dot Lake, Tanacross, Tok, Tetlin, and Northway (Fig. 1). The area is commonly referred to as the "Upper Tanana" region of interior Alaska. Over one third of the residents are Alaskan Natives. Over 95 percent use wild fish and wildlife resources in their households. This report describes their use of fish and wildlife resources during the period between June 1987 and May 1988.

The United States Air Force selected the Tanana River valley and the Copper River valley to the southwest as a favorable site to locate an Alaska based modern radar facility called the Over-the-Horizon-Backscatter. The system was designed to warn of attacking aircraft from as far as 2,000 miles by bouncing radar signals off upper atmospheric layers and scattering them over the horizon. The specific plan called for a radar transmitter located near Gakona along the Copper River and two radar receivers near Tok. The projected construction costs exceeded hundreds of millions of dollars and local communities anticipated new jobs in construction and maintenance of the facility. In March 1991, the U. S. Air Force cancelled the backscatter project due to the reduced Soviet military threat (*Anchorage Daily News* March 7, 1991).

During the planning phase of the backscatter radar system, concerns were raised by local residents and state officials regarding the potential negative impacts the development might have on existing subsistence uses of fish and wildlife, as well as the direct impacts to the fish, wildlife, and habitat resources. Numerous agencies and consulting firms were delegated specific aspects to research for assessing these potential impacts. In April 1988, the Division of Subsistence,

Alaska Department of Fish and Game, the University of Alaska's Arctic Environmental Information and Data Center (AEIDC) (as an associate contractor of the U.S. Air Force), and the National Park Service (NPS) agreed to cooperate in a subsistence research project in the Copper River basin and Upper Tanana areas. The general purpose of the project was to update existing information and record baseline information on subsistence activities of area residents in order to provide a context for assessing potential impacts resulting from the backscatter radar development.

The Division of Subsistence provided the principal investigators, research design, supervision of field staff, preliminary compilation and analysis of survey results, as well as final reports. AEIDC provided a share of funding for staff and other support. NPS provided local hire positions to serve as community assistants and project facilitators, and other administrative support.

The same research objectives and methodology were applied to both the Upper Tanana and Copper River basin components of this research project. However, different field staff were employed in each of the two regions because the overall study area straddled separate administrative regions of the Division of Subsistence. This report encompasses only those findings from the Upper Tanana communities of Dot Lake, Tanacross, Tok, Tetlin, and Northway. Survey findings from the 23 Copper River basin communities surveyed in 1988 are contained in Division of Subsistence Technical Paper No. 180 (Fall, Stratton, and Walker forthcoming). Households along the "Tok Cutoff" within seven miles of the Alaska Highway were included in the Tok sampling unit described in this report. Households situated farther south than seven miles were included in sampling units described in the Copper River basin report (Fall, Stratton, and Walker forthcoming). A summary of the survey findings, from both the Copper River and Upper Tanana communities, is presented in McMillan and Cuccarese (1988).

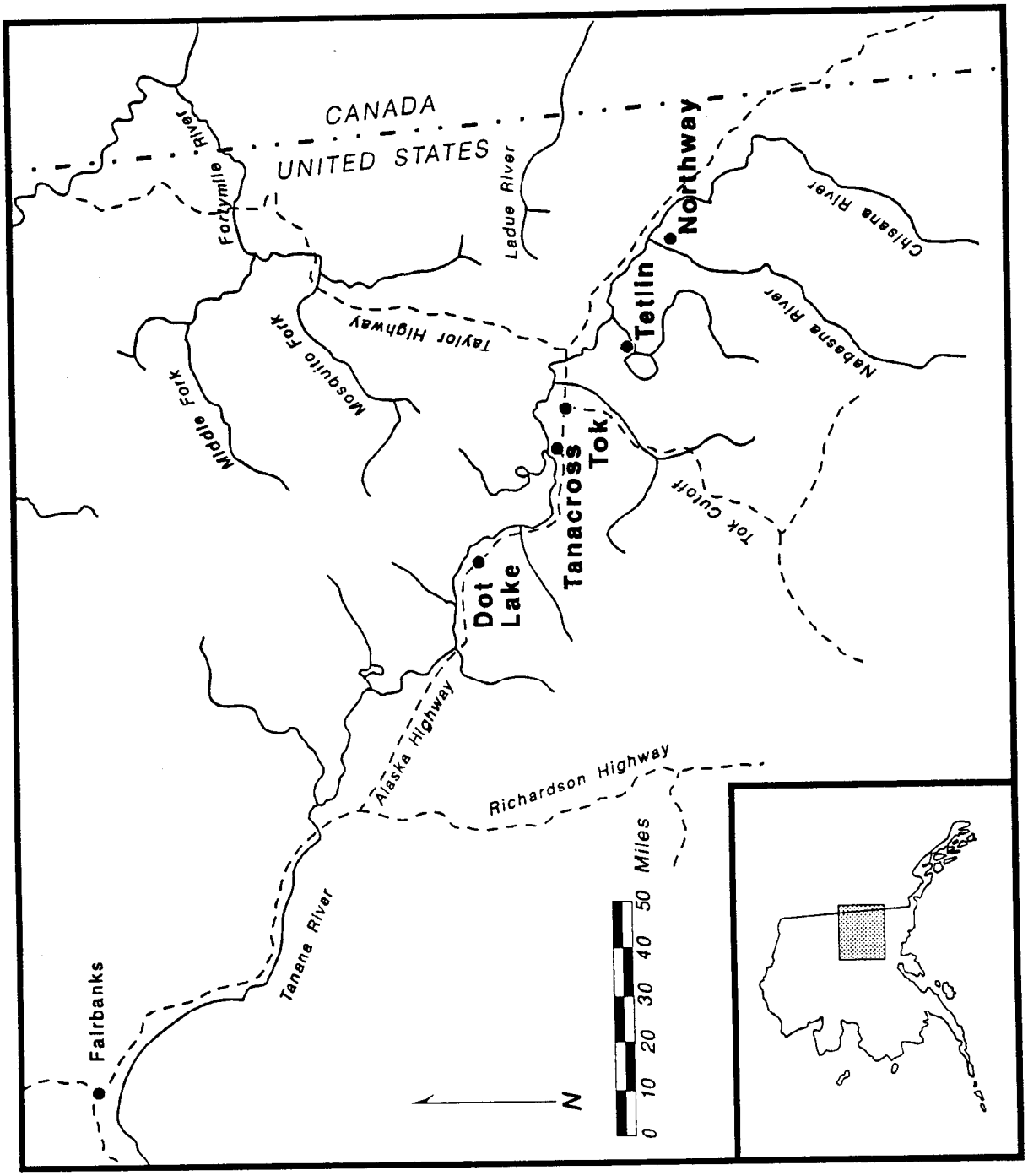


Fig. 1. Location of study area.

STUDY OBJECTIVES

The general purpose of the project was to update quantitative subsistence harvest and use data in the areas potentially affected by the backscatter development and to record baseline information for communities where no previous research had been undertaken. The Upper Tanana study area consisted of Dot Lake, Tanacross, Tok, Tetlin, and Northway. To meet this purpose, household interviews were conducted with a sample of community households. Research objectives included:

a) estimates of the percentage of households in each community sample which used, harvested, or shared each type of wild resource during a 12-month study period from June 1987 through May 1988;

b) estimates of harvest quantities of wild resources during a 12-month study period for each community in terms of numbers of animals, birds, or fish and in pounds usable weight per household and per capita;

c) maps of areas used for resources harvests over the previous 20 years (1968-1988) for the communities of Tok and Tanacross;

d) an assessment of levels of resource harvest effort at and near the proposed radar project sites;

e) an assessment of historic and present subsistence use of 13 areas of the Wrangell-St. Elias National Park and Preserve by sampled households organized by community sample;

f) an overview of involvement in cash-producing activities in each sample area, including kinds of jobs, length of employment, and monetary income;

g) an estimate of the population and demographic structure of each community; and

h) an indication of the intensity of use of harvest areas by Tok, Tanacross, and Tetlin, to be based on maps compiled in conjunction with "c" (above) or already in existence.

METHODOLOGY

Interviews were conducted with 195 (36.1 percent) of the households in five Upper Tanana communities between June and August 1988. Prior to starting survey work in each

community, researchers sought permission from the appropriate local governing body. Meetings were arranged with the village council in Dot Lake, Tanacross, and Tetlin where the project was discussed and approved. The Northway Village Council did not meet to discuss the project, but offered approval. In Tok, research staff discussed the project with the local Upper Tanana/Fortymile Fish and Game Advisory Committee. Tok does not have an organized governing body or incorporated municipality.

General Survey Design

The majority of questions addressed the time period from June 1987 to May 1988, the 12 months preceding administration of the survey. Surveys were conducted in June, July, and August 1988. Research staff contacted a household head of the households selected for interview (see sampling methods below). A time was scheduled for the interview at the respondent's convenience, generally within the next day. Most interviews took place in the respondent's home and lasted between 30 minutes to 2 hours, depending the number of fishing, hunting, or trapping activities the household had been engaged in.

Several Division of Subsistence and other personnel conducted the interviews throughout the three months in the five communities. Generally, one of three division researchers conducted interviews in Dot Lake, Tanacross, Tok, and Northway. A local resident from Tanacross assisted in the communities of Tanacross and Tok, and a resident of Northway assisted during interviews in Northway. The local assistant positions were provided by the Wrangell-St. Elias National Park and Preserve. Interviews in Tetlin were conducted by a researcher from the U. S. Fish and Wildlife Service who had previously conducted a subsistence survey in that community in 1984. In addition, a university student volunteer assisted by conducting some of the interviews in Tok.

Survey Instrument

A 15-page survey form (Appendix 1) was used during household interview sessions to collect quantitative information in a systematic fashion. The form was designed to encompass details of resource use of all members of the household. The first part covered household composition and demographic information. The next section and majority of the survey addressed the use, harvest effort, harvest, and distribution of each of approximately 50 different wild resources. A list of the commonly used resources is provided in Appendix 2. These included fish, game, furbearer, bird, and plant species. Following this were questions on the use of specific zones around the proposed backscatter radar sites, which were depicted on 1:63,360 scale maps (Appendix 1), and questions on the use of specific areas within the Wrangell-St. Elias National Park and Preserve. The park and preserve area questions referred the respondent to a 1:1,027,000 scale map depicting 13 specific areas (Appendix 1). The areas were selected by Alaska Department of Fish and Game (ADF&G) and National Park Service (NPS) staff in an effort to separate preserve areas from park areas as much as possible and to link areas to drainages or other natural features that NPS staff found useful. In addition to the resources listed on the survey instrument associated with the park use for hunting, respondents were systematically asked about fishing. Remaining questions on the survey instrument addressed the household's employment pattern, income sources, and monthly expenses. A final open-ended question asked for any comments regarding fish and game related issues. The same survey instrument was used in the Copper River basin component of the overall research project in an effort to derive comparable data.

Sampling Procedure

The household was selected as the sampling unit. Interviews were conducted with 195 of the 540 households (36.1 percent) identified in the five communities (Table 1). The first step was

TABLE 1. NUMBER AND PERCENTAGE OF SAMPLED HOUSEHOLDS BY COMMUNITY AND SAMPLING STRATA, FIVE UPPER TANANA COMMUNITIES, 1988.

Community	Strata	Total households	Number sampled	Percentage sampled
Dot Lake	Total[a]	20	15	75.0 %
Tanacross	Total[a]	34	27	79.4
Tok	"Low"	(251)	(23)	(9.2)
	"High"	(116)	(70)	(60.3)
	Total	367	93	25.3
Tetlin	"Low"	(15)	(5)	(33.3)
	"High"	(14)	(10)	(71.4)
	Total	29	15	51.7
Northway	Total[a]	90	45	50.0
Grand Total		540	195	36.1

[a] Random selection was from a single stratum in Dot Lake, Tanacross, and Northway.

to compile a current list of households for each of the five communities. This task was accomplished by using, as a starting point, the following sources: household lists from previous surveys, telephone directories, and community maps. This tentative list was then reviewed by knowledgeable local residents and modified in order to reflect current residency in the community.

Households were then selected at random, using a simple random sample for Dot Lake, Tanacross, and Northway and a stratified random sample in Tok and Tetlin. The sampling fractions used in each community ranged from 25.3 percent in Tok to 79.4 percent in Tanacross (Table 1). In terms of absolute number sampled, Tok had the highest with 93 households sampled and Dot Lake and Tetlin were the lowest, each with 15 households sampled. The original research design called for the use of simple random samples in each of the communities, with sampling fractions of 50 percent in Dot Lake, Tanacross, Tetlin, and Northway, and 30 percent in Tok. Sample sizes were increased in the smaller communities in an effort to improve the level of accuracy in data extrapolations. For each community, the confidence intervals for

subsistence output fell between 15 and 30 percent, which suggests an efficient allocation of interviewing effort.

In two communities, Tok and Tetlin, a stratified sampling procedure was used. Households were categorized as to their general pattern of fish and wildlife harvesting, then placed in either a "high harvesting" or "low harvesting" stratum. Within each resulting stratum, there was less variation between household patterns than was found within the community as a whole. In sampling each stratum separately, then extrapolating proportionally to the whole community, the statistical measures have lower variance. An additional benefit is that a higher proportion of households which are active in harvest activities can be sampled.

For the Tok sample, the classification into "high" or "low" harvesting groups was based on two elements: 1) record of previous year moose, caribou, and salmon harvest of over 200 pounds, or 2) verification by at least two of six local key respondents. Information on moose and salmon harvest was obtained from ADF&G moose permit and Copper River salmon permit data. Thirteen of the total 368 Tok households (3.5 percent) displayed moose, caribou, and salmon harvests over 200 pounds, and 112 of the total 368 households (30.0 percent) were identified by at least two of the key respondents. The key respondents were asked which households were more active than an average household in fishing, hunting, or trapping during the last year. Nine of these households were distinguished by both elements. The result was that 116 households were placed in the "high harvesting" strata, and the remaining 251 households were placed in the "low harvesting" strata.

Although the same classification elements were considered for the Tetlin sample stratification, key respondent verification was relied on as permit data on moose or salmon harvests were unavailable. In Tetlin, 14 of 29 households (48.3 percent) were placed in the "high harvesting" stratum, and the remaining 15 households (51.7 percent) were placed in the "low harvesting" stratum.

Survey data were manually transcribed onto coding sheets, entered into computer data files for compilation and analysis by the division's data management staff using the Statistical

Package for the Social Sciences and Excel. Harvest quantities were converted into pounds edible weight using standard conversion factors adjusted for the biological differences of species live weight in the Upper Tanana region (Appendix 3).

Mapping Procedure

As part of this project, areas used by Tanacross and Tok residents for hunting, fishing, and trapping were recorded on maps. Geographic areas used by Dot Lake, Tetlin, and Northway residents had been documented previously during recent subsistence studies (Case 1986; Halpin 1987; Martin 1983). In Tok and Tanacross, a key respondent sample of households (19 and 6 respectively) was used for recording areas used for wildlife harvesting, with additions made during a final community review. The geographic extent of the following activities were recorded: fishing (by species), moose hunting, caribou hunting, bear hunting, small game hunting, waterfowl hunting, trapping, and berry picking. The time period for information shown on maps was 1968 to 1988 (the last 20 years), but excluding years prior to residency in the region. Household level maps were collected at 1:250,000 scale and aggregated into an overall community pattern for each activity. The final maps were drafted at a reduced scale by AEIDC and initially contained in their report (McMillan and Cuccaress 1988).

Previous Research

The earliest description of the people in the Upper Tanana area came from Allen (1900) who led a military reconnaissance through the area in 1885. The primary ethnographic description was by McKennan (1959) who spent nearly one year living with area residents in 1929-30. Other works by McKennan followed additional field studies in the 1940s, 1960s, and 1970s. Guedon (1974) conducted an ethnographic study with Tetlin residents in the late 1960s. Osgood (1971) described results from his own field research in 1932 and summarized historical

information on the neighboring Han Indians to the north near Eagle, including a thorough description of the relationship between the Han and the Upper Tanana. A variety of other research topics include possessory rights of the villages of Tetlin, Tanacross, and Northway (Goldschmidt 1948), caribou hunting practices (Murie 1935), demographic information (Hajdukovich 1932), educational facilities (Beck 1930), and a description of a potlatch ceremony (Endicott 1928; Guedon 1981; and Isaac 1988).

More recent anthropological works describing resource use include Vitt (1971); Shinkwin, Aigner and Andrews (1980); Johnson, Paul, and Thomas (1978); and Johnson, Charles, and Miller (1978). A proposal to construct a natural gas pipeline along the Alaska Highway prompted several local studies (Buge 1979; Dames and Moore 1980; Naylor, Gooding, and Scott 1976; Shinkwin and Aigner 1979).

After enactment of the 1971 Alaska Native Claims Settlement Act (ANCSA), inventories were made of the historic cultural sites in the Ahtna region (Reckord 1983b) and Doyon region (Andrews 1977). Prior to the 1980 Alaska National Interest Lands Conservation Act (ANILCA) several studies were conducted regarding land and resource use in the neighboring upper Yukon River and upper Copper River areas, including Caulfield (1979), Murray and Dean (1978), and Reckord (1983a). Once the conservation units were established, national park and refuge planning activities resulted in the compilation of subsistence information in various planning documents (Shea 1978; United States Department of the Interior 1985, 1988).

The Division of Subsistence has conducted research on a number of activities in the greater study area, including caribou hunting (Stratton 1982a; 1983) and salmon fishing (Stratton 1982b; Fall and Stratton 1984; Haynes, Case, Fall, Halpin, and Robert 1984). Other studies have focused on subsistence patterns of a specific community, such as Dot Lake (Martin 1983), Tetlin (Halpin 1987), and Northway (Case 1986). Copper River communities were surveyed in 1983 using a methodology similar to that employed in this study (Stratton and Georgette 1984, 1985).

CHAPTER 2. REGIONAL BACKGROUND

The study region addressed in this report includes the upper portion of the Tanana River drainage, as well as portions of the surrounding Fortymile, Ladue, White, and Copper River drainages (Fig. 2). Although the Upper Tanana is often described as an isolated area, historical accounts of this region reveal contact and trade between inhabitants of the Upper Tanana and neighboring areas recorded as early as 1885 (Allen 1900). People have moved back and forth to harvest fish and wildlife resources in the upper Yukon River region, the Tanana River valley, and the Copper River basin. Moreover, some game species, such as caribou, migrate in and out of the Tanana River drainage.

NATURAL ENVIRONMENT

Physical

The Nabesna River and Chisana River cascade from the northern slopes of the Wrangell Mountains to the Northway-Tetlin lowlands where they join together forming the Tanana River. From this point directly downriver from Northway, the Tanana flows 440 miles before joining the Yukon River. Near its confluence with the Robertson River, a series of rapids hampers navigation along this portion of the river. Most of the tributaries entering the Tanana River from the south are fed by glacial meltwater in the Wrangell Mountains and the Alaska Range and are generally heavily silt-laden. Tributaries entering from the north run clear.

To the north of the Tanana River valley lies the Yukon-Tanana uplands, an extensive series of rolling hills cut by tributaries of the Fortymile, Charley, Sam, Mansfield, Goodpaster, Salcha, and Ladue rivers. Elevations in the uplands typically range from 2,000 to 3,000 feet but extend to over 6,000 feet. South of the Tanana River lie the Mentasta Mountains and Nutzotin

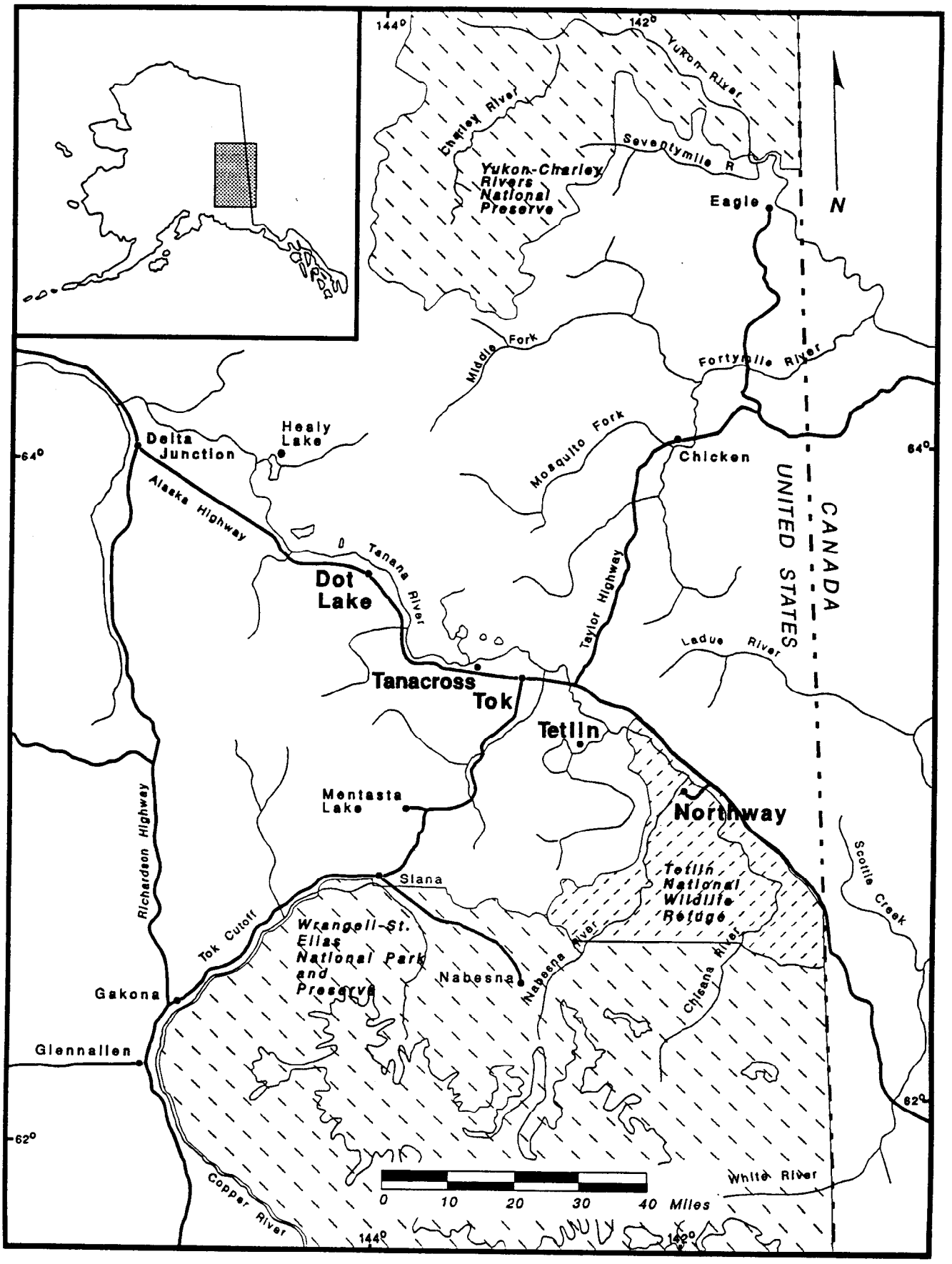


Fig. 2. Location of Upper Tanana communities.

Mountains with elevations of 3,000 to 8,000 feet. Further south lie the glacier covered slopes of the Wrangell Mountains and the Alaska Range with peaks up to 16,000 feet.

Near the confluence of the Nabesna and Chisana rivers, the Northway-Tetlin lowlands are comprised of a series of lakes and wetlands. Much of this area was selected by Congress in 1980 for the 700,000-acre Tetlin National Wildlife Refuge due to its highly productive fish and wildlife habitat. Directly west are the Tetlin River and Tetlin Lake.

Natural access routes to the Upper Tanana region are afforded by the river and valley bottom to the west, overland routes through the Fortymile River drainage to the north, lowland areas near the U.S.-Canada border to the east, and a small number of mountain passes to the south. These passes include Skolai Pass leading towards the Nizina River-McCarthy area, Suslota Pass and Mentasta Pass leading to the Slana River, and the area between Jack Creek and Tanada River northwest of Nabesna. Highways now traverse all of these access routes except Skolai Pass deep in the heart of the Wrangell Mountains and Suslota Pass only 12 miles southeast of Mentasta Pass.

Climate

The Upper Tanana area offers a continental climate, marked by warm summers, cold winters, and low precipitation. Summer temperatures commonly reach over 90 degrees Fahrenheit and winter temperatures commonly dip to -50 degrees Fahrenheit. The area receives an average of 12 inches of precipitation annually.

Flora and Fauna

A short growing season, shallow soils, and permafrost limit the size of forest growth in many locations. Three forest ecosystems are represented in the region: bottomland spruce-popular, lowland spruce-hardwood, and upland spruce-hardwood (Wahrhaftig 1965). In

addition, many of the higher elevations, those above 3,500 feet, are covered by low brush and alpine tundra. Trees include white spruce (*Picea glauca*), black spruce (*Picea mariana*), paper birch (*Betula papyrifera*), balsam popular (*Populus balsamifera*), and willow (*Salix* sp.). Forest fires up to several thousand acres in size play a role in modifying vegetation and altering wildlife habitat.

A diversity of edible plant species found in the Upper Tanana area have been used by residents for a variety of purposes. Edible berries include alpine berry (*Arctostaphylos alpina*), bog blueberry (*Vaccinium uliginosum*), bog (lowbush) cranberry (*Vaccinium vitis-idaea*), crowberry or blackberry (*Empetrum nigrum*), highbush cranberry (*Viburnum edule*), nagoonberry (*Rubus arcticus*), pea-vine root (*Hedysarum alpinum*), raspberry (*Rubus idaeus*), and salmonberry or cloudberry (*Rubus chamaemorus*). Other edible plants used include rosehips (*Rosa acicularis*), Labrador or Hudson Bay tea (*Ledum groenlandicum*), and wild rhubarb (*Polyganum alaskanum*). Additionally, several other plant species have been used by Upper Tanana residents for medicinal purposes (Halpin 1987:25).

Indigenous fish resources in the region include Arctic grayling (*Thymallus arcticus*), broad whitefish (*Coregonus nasus*), burbot (*Lota lota*), Dolly Varden (*Salvelinus malma*), humpback whitefish (*Coregonus pidschian*), lake trout (*Salvelinus namaycush*), least cisco (*Coregonus sardinella*), northern pike (*Esox lucius*), round whitefish (*Prosopium cylindraceum*), longnose sucker (*Catostomus catostomus*). Of these, the whitefish species play an especially important role in the area's domestic economies.

Few salmon ascend the Tanana River upstream of the mouth of the Goodpaster River, so salmon resources are virtually unavailable in the upper Tanana River. Salmon are abundant in the Copper River to the south, including the chinook or king salmon (*Oncorhynchus tshawytscha*) and coho or silver salmon (*Oncorhynchus kisutch*) which enter the Copper River in mid-May and reach spawning grounds mid- to late June. Also in the Copper River from mid-August through September are sockeye or red salmon (*Oncorhynchus nerka*). Pink salmon or "humpies" (*Oncorhynchus gorbuscha*) are available in coastal areas such as Prince William Sound.

The Yukon River to the north also offers chinook salmon and chum salmon (*Oncorhynchus keta*).

Introduced fish species include landlocked coho salmon (*Oncorhynchus kisutch*), rainbow trout (*Salmo gairdneri*), and sheefish (*Stenodus leucichthys*). These fish have been made available by lake and stream stocking programs.

Moose (*Alces alces*) are found throughout low and moderate elevations in the region. Habitat use varies through different seasons, with most moose wintering on lowland ranges. Caribou (*Rangifer tarandus*) are also common throughout the region, however their presence is seasonal and dependent on herd migrations. Caribou herds entering the Upper Tanana area include the Fortymile Herd, Mentasta Herd, Nabesna Herd, and Nelchina Herd. The Macomb Herd and Chisana Herd are resident herds in the upper Tanana River area.

Dall sheep (*Ovis dalli*) are found on slopes of the Mentasta Mountains, Wrangell Mountains, Alaska Range, and at higher elevations of the Yukon-Tanana Uplands. Both black bear (*Ursus americanus*) and brown bear (*Ursus arctos*) are found in the region.

Furbearers species include beaver (*Castor canadensis*), land otter (*Lutra canadensis*), lynx (*Felis canadensis*), marten (*Martes americanus*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), porcupine (*Erethizon dorsatum*), red fox (*Vulpes vulpes*), red squirrel (*Tamiasciurus hudsonius*), wolf (*Canis lupus*), wolverine (*Gulo gulo*), ermine or short-tailed weasel (*Mustela erminea*), weasel (*Mustela nivalis*), and hare (*Lepus americanus*).

The Tanana River valley is used as a migration route for waterfowl and local wetlands provide ideal nesting habitat. Waterfowl species include American widgeon (*Anas americana*), bufflehead (*Bucephala albeola*), Canada goose (*Branta canadensis*), canvasback (*Aythya valisineria*), common goldeneye (*Bucephala clangula*), greater scaup (*Aythya marila*), greater white-fronted goose (*Anser albifrons*), green-winged teal (*Anas crecca*), lesser scaup (*Aythya affinis*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), oldsquaw (*Clangula hyemalis*), sandhill crane (*Grus canadensis*), snow goose (*Chen caerulescens*), surf scoter (*Melanitta perspicillata*), white-winged scoter (*Melanitta fusca*). Upland

game birds include ruffed grouse (*Bonasa umbellus*), sharp-tailed grouse (*Tympanuchus phasianellus*), spruce grouse (*Dendragapus canadensis*), and willow ptarmigan (*Lagopus lagopus*).

In 1988, several residents of Upper Tanana communities traveled to coastal areas to harvest marine resources such as halibut (*Hippoglossus stenolepis*), shrimp, and crab. Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) were also taken in coastal locations such as Prince William Sound and Kodiak.

HISTORY

Native inhabitants of the Tanana River drainage were primarily members of the several bands collectively referred to as Tanana Athabaskans. In the study area, these bands included the Mansfield-Ketchumstuk Band, the Tetlin-Last Tetlin Band, the Lower Nabesna Band, the Scottie Creek Band, and the Upper Nabesna-Upper Chisana Band (McKennan 1959:17). Further downriver to the west was another Tanana band, the Healy River-Joseph Band.

Neighboring groups to the Tanana included the Han to the north, the Kluane or Tutchone to the east, and the Ahtna to the south. Ahtna bands whose territory bordered on the Upper Tanana were the Mentasta Band and the Slana-Batzulnetas Band. Both before and after historic contact in the region, these neighboring groups engaged in contacts that included trade, resource sharing, and marriage.

Contacts with Euroamerican traders, explorers, and settlers began in the late 1800s and continued through the 20th century. Several historic events and developments are described below and summarized in Table 2.

Early Exploration and Historic Contact

By 1843, Russian traders attended spring trade fairs at the mouth of the Tanana River at "Nuklukayet" which drew Natives from along the Tanana, Yukon, and Koyukuk rivers. Following

TABLE 2. CHRONOLOGY OF UPPER TANANA HISTORIC EVENTS

Date	Event	Source
1861	Trading post established at mouth of Tanana River "Nuklukayet".	(Webb 1985)
1875	Harper and Bates traverse Tanana Valley overland from Belle Isle on the upper Yukon River.	(Brooks 1900)
1870s	Trading posts established along Yukon River at Rampart, Belle Isle, Fort Reliance, and Ogilvie.	(McKennan 1981)
1882	Gold discovered in Fortymile River drainage.	(Webb 1985)
1885	H. T. Allen's expedition traveled through Upper Tanana area, visited Batzulnetas, Nandell's Village (Last Tetlin), Tetlin, and Kheeltat's Village (Mansfield).	(Allen 1900)
1886	Placer gold mining in Fortymile drainage at Franklin Creek.	(Webb 1985)
1897-98	Klondike gold seekers traveled Indian trails through Upper Tanana area.	(Abercrombie 1900)
1898	A. H. Brooks conducted geological survey in White River and Tanana River districts.	(Brooks 1900)
1902	Military telegraph line connected Valdez (Fort Liscum) and Eagle (Fort Egbert). Maintence stations at Ketchumstuk, Joseph, and Tanana Crossing.	(Mitchell 1982)
1903	Chicken established.	(Orth 1971)
1910	Valdez-Eagle telegraph line abandoned.	(Mitchell 1982)
1910-12	Trading posts established at Healy Lake, Tanacross, Tetlin, and Nabesna Village.	(Guedon 1974)
1912	Episcopal mission of St. Timothy established at Tanana Crossing (Tanacross).	(Stuck 1920)
1913	Stampede at Chisana brought hundreds of gold seekers to region.	(Capps 1916)
1915	First Tanana Chiefs Conference.	(Patty 1971)
1923	First school organized in Tetlin.	(Guedon 1974)
1930	Tetlin Indian Reserve established by federal executive order.	(E.O. 5365, 1930)
1930-34	Nabesna Road linked with Richardson Highway.	(Naske 1986)
1931	Federal Indian Bureau assumes Native education.	(Simeone 1982)
1942	Alaska Highway completed.	(Simeone 1982)

TABLE 2. continued

Date	Event	Source
1942	Airfields enlarged at Northway and Tanacross.	(Case 1986; Darbyshire and Associates 1980)
1946	Nabesna Village residents relocated across the Nabesna River to the present site of Northway.	(Northway 1987)
1946	Area families settle at Dot Lake winter trapping camp and site of highway construction camp.	(Martin 1983)
1946	Tok established as a townsite near highway construction camp.	(Darbyshire and Associates 1980)
1946	Alaska Highway in use for civilian travel.	(Naske 1986)
1952	Taylor Highway completed.	(Naske 1986)
1954	U. S. Army began construction of eight-inch Haines-Fairbanks pipeline.	(Darbyshire and Associates 1980)
1970-76	Tanacross residents relocated to site south of the Tanana River.	(Darbyshire and Associates 1980)
1971	Alaska Native Claims Settlement Act (ANCSA).	(Public Law 92-203)
1980	Alaska National Interest Lands Conservation Act (ANILCA).	(Public Law 96-487)

the transfer of Alaska from Russia to the United States in 1867, assets of the Russian American Company were sold to the Alaska Commercial Company (A.C.Co.), which later became the Northern Commercial Company. The British-owned Hudson Bay Company continued trading at Fort Yukon until a survey in 1869 by Lieutenant Charles Raymond of the U. S. Army determined that Fort Yukon was actually west of the United States-Canada border and, therefore, not located on Canadian soil as was previously believed (Raymond 1900:23; Webb 1985:50).

Other trading posts in the upper Yukon River drainage included a post at Belle Isle established in 1873 by the Alaska Commercial Company near present-day Eagle and a post at Fort Reliance established in 1875 near the mouth of the Klondike River in Canadian territory (Osgood 1971:8-9). In 1877, a second firm, the Western Fur Trading Company, began competing

with A.C.Co. in Alaska for available furs which resulted in highly favorable prices being offered to Native fur trappers. This second company sold its interests to A.C.Co. in 1883, bringing to an end this locally favorable trading relationship (Simeone 1982:67). The significance of these trading posts along the Yukon River was that they made trade goods such as rifles, flour, sugar, and lard available to the people in the Upper Tanana, although indirectly. At the same time, an increased emphasis on trapping was incorporated into the previous patterns of seasonal harvest activities. This 1880 period is regarded as the beginning of historic contact with Native inhabitants of the Upper Tanana (McKennan 1969:336).

As part of the U. S. Army explorations in the upper Yukon River area, Lieutenant Frederick Schwatka traveled down the Yukon River in 1883. Both his official reports to the military and popular reports to the public served to publicize Alaska and its natural resources and attract a greater number of prospectors and explorers to the interior of Alaska and Yukon Territory.

The first well-documented travel into the Tanana River drainage took place in 1885 when Lieutenant Henry Allen led a party up the Copper River crossing over into the Tanana and Yukon River drainages. When visiting the Native settlement of Batzulnetas on the Copper River, Allen found its inhabitants using trade goods obtained from trading stations along the Yukon River. The party crossed over Suslota Pass and visited villages of Nandell's (Last Tetlin), Tetlin, and Kheeltat's (Mansfield) before floating down the Tanana River (Allen 1900).

Early Gold Rush Period

Gold discoveries at Stewart River in 1884 and Franklin Creek on the Fortymile River in 1886 brought miners to areas just north of the Tanana River drainage. These strikes were followed by other gold discoveries and more prospectors. The most significant rush took place at the Klondike River where a 1897 gold discovery brought thousands of people to the region. In winter 1898-99, between 20,000 and 30,000 people camped near Dawson, most arriving by way of

Skagway and the Chilkoot Pass. Some miners felt there should be an all American route to the gold fields and petitioned government officials for a new route. In 1898, Captain William Abercrombie mapped a route northward along the Copper River, the Slana River, over Mentasta Pass, along the Little Tok River, across the Tanana River, and north to the Fortymile River. The route, much of which followed Native trails, was used by 3,500 people between March and June of 1898 (Abercrombie 1900).

This course was also selected in 1900 for a telegraph line after the United States government responded to the requests for more rapid communication to the mining area (Mitchell 1982). Construction on the Washington-Military Cable and Telegraph System (WAMCATS) began in 1901 between Fort Liscum in Valdez and Fort Egbert in Eagle, with maintenance stations at 40-mile intervals along the line at locations such as Gulkana, Chistochina, Mentasta, Tanacross (Tanana Crossing), and Ketchumstuk (Mitchell 1982). Many of these stations later became sites for trading or settlement. A second line connected at Ketchumstuk and extend westward to Tanana and on to Nome. A few years after completion, the communication function of the telegraph line was replaced by wireless radio facilities and the line was abandoned by 1910 (Webb 1985:167).

The overland Valdez-Eagle route was also scheduled for road and railroad development in order to accommodate the developing commerce at Eagle. The tentative road was to cross the Tanana River at Tanacross (Tanana Crossing). This crossing was the destination of trader E. T. Barnette in 1901 when he was delayed by low water conditions further downriver at the site where Fairbanks now stands. A nearby gold discovery and rapid population influx there resulted in the proposed road to Eagle being redirected towards Fairbanks. It turned northwest at Gulkana and crossed the Tanana River at Big Delta and circumvented the Upper Tanana. By 1910, the new Valdez-Fairbanks road was heavily used and became an indirect source of trade goods for residents of the Upper Tanana area. The road was later upgraded and renamed the Richardson Highway (Naske 1986). A second road connected to the Richardson Highway at Slana and ran eastward to the mining settlement of Nabesna, along the Nabesna River. Trade

relationships with the Upper Tanana residents also developed to the south at the Kennicott copper mining development near McCarthy, which was connected by railroad to Cordova in 1911.

A gold strike along the Chisana River led to the "Chisana Stampede" of 1913, a rapid influx of people and development of a town of about 150 houses. Miners relied heavily on local food sources since the location of Chisana was remote and food supplies from outside were difficult to obtain. An estimated 2,000 sheep were taken within a 20-mile radius of Chisana during winter 1913-14 (Capps 1916). By 1920, the town of Chisana was all but abandoned, although trading posts remained in the region at Tanacross, Tetlin, Nabesna Village, and Gardiner Creek (Guedon 1974:14).

Community Development

Dot Lake

The Dot Lake site was historically used as a winter trapping camp by members of the Mansfield-Kechumstuk Band of Athabaskans of the Upper Tanana region (Isaac 1988). A road construction camp was built at Dot Lake in the early 1940s for crews working on the construction of the Alaska Highway. The highway construction was a substantial event bringing about significant change in the Upper Tanana area. Prior to its construction, the area lay in relative isolation despite the presence of overland trails and travel along the Tanana River. After its construction, the main overland highway connecting Alaska to the contiguous 48 states ran directly through the valley.

New job opportunities were created and there was a resulting shift in area settlements. Several Athabaskan families relocated to Dot Lake in winter 1946-47 from Native settlements at Paul's Cabin and Tanacross. Other settlers trace ancestry to George Lake, Sand Lake ("Sam Lake"), Ketchumstuk, or Healy Lake. In 1988, many of the original residents, their descendants,

and others resided in households located in the portion of the community referred to as Dot Lake Native Village and most were members of the Dot Lake Village corporation. A second settlement trend began in the late 1940s when a missionary couple from Washington State settled in Dot Lake and founded a children's home. Several other families associated with the children's home have since moved to Dot Lake, primarily from outside the state (Martin 1983:18). In 1988, this group resided in households located along the highway. A post office and school were built in the late 1940s, and the lodge and gas station complex along the highway was built in 1973. Dot Lake Native Village is the traditional village council representing a portion of community members. Households along the highway also receive grants for area developments through a non-profit organization.

Tanacross

Tanacross residents trace their ancestry to the Mansfield-Ketchumstuk Band, which resided in settlements including Mansfield Village and Ketchumstuk. Mansfield Village, referred to as "Kheeltat's Village" by H. T. Allen in 1885, was located at a fishing site by the outlet stream of Lake Mansfield, six miles north of present-day Tanacross. Ketchumstuk was located near caribou hunting areas along the Mosquito Fork of the Fortymile River, about 50 miles northeast of Tanacross. Area residents began settling seasonally at Tanana Crossing after construction of the Eagle-Valdez Telegraph line began in 1902.

The establishment of an Episcopal mission at Tanana Crossing came in 1912 as the Episcopal church expanded its effort in Alaska under the leadership of Bishop Rowe. This site was selected because it was central to many Native settlements in the area while not favoring any one group and because of the availability of buildings abandoned by the U. S. Signal Corps after closure of the telegraph line (Simeone 1982:92). Tanana Crossing became seasonally occupied by area Natives, but the substantial costs in supplying the mission led to its intermittent operation between 1921 and 1931. In 1932, a school opened and more people moved from Mansfield

Village to Tanana Crossing. By 1939, Mansfield and Ketchumstuk residents had permanently settled at the Tanacross site on the north of side of the Tanana River. The Tanacross Indian Reorganization Act council was chartered in 1942. Compulsory school attendance beginning in the 1950s was also a factor in the increased year-round residency in the settlement.

In the mid 1930s, an airfield was built on the south side of the Tanana River. The airfield was resurfaced for military use in 1942 and support camp facilities were built. Due to the periodic flooding of the river on the north bank and the greater access to the highway on the south bank, residents relocated their community directly across the Tanana River in the early 1970s. All residents moved to the new site by 1976.

Tok

Tok originated as a camp for crews working on the construction of the Alaska Highway and Glenn Highway in 1942. Civilian travel on the highway began in 1946 under restrictive permit conditions imposed by Canadian officials (Naske 1986:222). Tok was officially established as a townsite in 1946 and had its first school in 1947. From 1947 to 1971, the U. S. Customs office located its border station at Tok. Tok's role as a transportation hub was further enhanced by construction of the Taylor Highway which began in 1946 and was completed in 1952 (Naske 1986:246). Between 1954 and 1979, an eight-inch fuel pipeline extending from Haines to Fairbanks was operated by the U. S. Army. This pipeline ran through Tok, and a pump station was located on the west side of Tok. In 1976, the U. S. Coast Guard built a LORAN (Long Range Aids to Navigation) station at Tok which consisted of four 700-foot transmission towers. Tok is now the site for several local, state, and federal government offices and serves as a subregional center. Tok is not incorporated as a municipality, but the community formed a non-profit corporation (Tok Umbrella Corporation) which receives development grants from the state of Alaska.

Tetlin

The history of Tetlin can be traced to two primary settlements, Nandell's Village (Last Tetlin) and Tetlin, and other now-abandoned settlements in the area. Area residents were members of the Tetlin and Last Tetlin Band. Last Tetlin and Tetlin were visited by Allen in 1885.

Local trading contacts were available after 1909 when Captain Northway traveled to the mouth of the Tetlin River. The first trading post was established at Tetlin in 1912, and trading posts continued to be operated in the area by Milo and John Hajdukovich and W. H. Newton in the 1920s (Guedon 1974:13). Tetlin leader Chief David died in 1919 and was succeeded by Chief Peter. Chief Peter helped to organize Tetlin's first school in 1923, and to build the first school building in 1929. Residents at Last Tetlin resettled at Tetlin in the late 1920s.

In 1930, 768,000 acres of land used by Tetlin residents was set aside as the Tetlin Indian Reserve following a federal executive order signed by President Hoover. This land settlement was unique and preceded passage of the Indian Reorganization Act (IRA) in 1934 which gave congressional authorization for establishing reservations. After the 1971 passage of ANCSA, Tetlin Village was able to chose between obtaining full title to the Tetlin Indian Reserve or participating in settlement benefits offered to other villages. Tetlin residents chose to receive full title to their former reserve (Arnold 1976:199).

A post office opened in Tetlin in 1932 and an airstrip was constructed in 1946. The airstrip and boat travel on the Tetlin River have provided the primary means of travel to and from the community. In 1981, a winter road was built in order to transport materials for constructing a steel bridge over the Tetlin River which runs through the center of the village site. This unpaved road is used when the ground is frozen during winter months and is passable by four-wheel-drive vehicles.

Northway

In the eastern portion of the Tanana River drainage, aboriginal bands included the Lower Nabesna Band, Scottie Creek Band, and Upper Nabesna-Upper Chisana Band. Travel routes, such as one to Dawson, were used by area residents for trade before local trading posts were established. Subsequent to Allen's 1885 exploration of the Copper and Tanana rivers, Brooks and Peters traversed the upper Chisana and Nabesna drainages in 1898 and 1899 (Brooks 1900). Gold and copper discoveries at the turn of the century were followed by a substantial strike at Chisana in 1913. After the short-lived stampede at Chisana in 1913-14, two trading posts remained in the area at Gardiner Creek and at the lower Nabesna River. Area residents settled at the Nabesna River site ("Old Nabesna") and a school was constructed in 1939 (Northway 1987). By 1940 the site was abandoned due to flooding and the population relocated to the east bank of the Nabesna River. A post office was established at the new site in 1941, and the community name was changed to Northway the following year. Many residents were employed in the construction of the Alaska Highway and the airport facility located at Northway. Other Nabesna and Chisana groups settled at Northway during this period and by 1960, remaining members of outlying bands settled in Northway (Case 1986).

POPULATION

Aboriginal population numbers were estimated to be much higher than those found in the late 1800s by early explorers (McKennan 1959:19). Most explorers reported local accounts of an epidemic that had killed many residents. McKennan (1959:19) suggested that the accounts were of an 1851 scarlet fever epidemic that spread through the Chilkat and upper Yukon River areas.

Early population estimates for the Upper Tanana area are summarized in Table 3. The earliest reference was the 1880 census which listed 700 people for all of the Tanana River area

TABLE 3. ESTIMATES OF UPPER TANANA POPULATION, 1885-1939.

Year	Settlement or area	Population	Source
1880	All Tanana River	700	1880 census[a]
1885	Mansfield (Kheeltat's)	52	Allen 1900
1885	Nandell's village	80	Allen 1900
1885	Tetlin	17	Allen 1900
1899(July)	Mansfield	50	Rice 1900
1899(Aug.)	Mansfield	65	Griffith 1900
1890	Upper Tanana River Settlements	203	1890 census[a]
1908	Upper Copper, Nabesna, Chisana, White rivers	45-50	Capps 1916
1910	Tanana District	430	1910 census[a]
1910	Fortymile District	341	1910 census[a]
1910	Nabesna District	103	1910 census[a]
1920	Tanana Districts (east of Fairbanks)	163	1920 census[a]
1920	Fortymile District (including Tanana Crossing)	317	1920 census[a]
1920	Tanana Crossing	101	1920 census[a]
1920	Chisana	148	1920 census[a]
1930	Tanana Crossing	86	Dept. of Int. 1930
1930	Tetlin	55	Dept. of Int. 1930
1930	Nabesna	54	Dept. of Int. 1930
1930	Scottie Creek	24	Dept. of Int. 1930
1930	Bansonetta (Batzulnetas)	30	Dept. of Int. 1930
1930	Chisana	15	Dept. of Int. 1930
1930	Mansfield village	39	1930 census[a]
1930	Tanana Crossing	80	1930 census[a]
1930	Chicken	20	1930 census[a]
1930	Franklin	19	1930 census[a]
1930	Chisana	13	1930 census[a]
1930	Nabesna village	54	1930 census[a]
1939	Tanacross	135	1939 census[a]
1939	Tetlin	66	1939 census[a]
1939	Chicken	41	1939 census[a]
1939	Franklin	5	1939 census[a]
1939	Nabesna village	23	1939 census[a]
1939	Nabesna Indian village	85	1939 census[a]

[a] U.S. Bureau of the Census as reported in Rollins (1978).

(Rollins 1978). More detailed population counts for the Upper Tanana area were available as early as 1885, when Allen observed 34 men, 28 women, and 18 children at Nandell's Village (Last Tetlin) and 6 men, 4 women, and 7 children at nearby Tetlin (Allen 1900). There were four houses at Nandell's and two at Tetlin. At Kheeltat's (Mansfield), he counted 28 men, 18 women, and 6 children. Allen noted signs that the some of the people present at those settlements were likely visiting from nearby camps. No doubt the exploration party attracted special attention or concern in the area.

Visitors to Mansfield in 1899 counted 50 people in July and 65 in August of 1899 (Rice 1900; Griffith 1900). These were reportedly Ketchumstuk Indians who used both the uplands area for caribou hunting and riverine areas for fishing. Mitchell, in January 1902, found 13 families at the Middle Fork of the Fortymile River who fished at Healy Lake to the west during the summer (Mitchell 1982). Capps (1916:21) reported in 1908 that there were "45 to 50" Natives living in upper reaches of the Copper, Nabesna, Chisana, and White rivers, which is representative of the "Chisana-Nabesna" band.

The 1890 United States census counted a total of 203 people in upper Tanana River settlements, all of whom were Native (Rollins 1978). There were 73 people reported at Kheeltat's (Mansfield) and 47 reported in the Tetlin Lake area.

These early accounts, as well as the later census figures, reflect the pattern of mobility and changing settlement location. The figures reflect the movements between harvest sites or seasonal settlements and the founding or abandonment of some settlements. In general, however, much of the area population resided in small and widely separated and dynamic settlements. Guedon (1974:12) lists the following bands residing the Upper Tanana area at the beginning of this century: Tetlin, Last Tetlin, Chisana-Upper Nabesna, Nabesna, and Mansfield and Ketchumstuk. A sixth band, "Birch Lake"-Healy Lake was located to the west in the central portion of the Tanana River valley. In 1929, McKennan (1959) estimated that the Native population of the five bands in the area to total 152: Tetlin (34), Last Tetlin (18), Upper Chisana-Upper Nabesna (16), Scottie Creek (25), and Lower Nabesna (59). Census figures from

1930, the following year, reported populations at Mansfield Village (39), Tanacross Village (80), Chicken Village (20), Franklin Village along the Fortymile River (19), Chisana (13), and Nabesna Village (54). McKennan (1959:19) considered that the population level had remained stable between 1900 and 1929.

Census figures from 1910 list 103 inhabitants in the Nabesna district, 430 in the Tanana district, and 341 in the Fortymile district, for a total of 874 in the region. By 1920, there were 148 people at Chisana, 163 in the Tanana district (east of Fairbanks), and 317 in the Fortymile district (Rollins 1978).

Population counts from years 1950 to 1988 are shown in Table 4. All communities, except Tanacross and Tetlin, have increased in size from 1960 to 1988. The largest growth in population has been in Tok, where state land disposals during the early 1980s have made land available for building sites. A state land disposal along the Robertson River, also offered during the early 1980s, may result in a few additional year-round residents in the future.

RESOURCE USE ISSUES

Because of the Upper Tanana region's diverse resource base, the public's high interest level in hunting, fishing, and trapping, and the varied background of those using the resources, there are often differences of opinion regarding the use of area resources. Perennial resource management issues include determining the optimum balance between predator and prey populations, for example, between wolf and moose, and what means should be used to achieve it are widely discussed. Another balance involves maximizing wildlife habitat for one species, such as moose, while at the same time maximizing habitat for another species, such as furbearers. Fire management practices directly affect the habitats used by these animals. Another management issue is the near absence of baseline biological data on area fish populations such as whitefish. In the absence of such data, managers cannot estimate a sustained yield harvest level

TABLE 4. POPULATION OF FIVE UPPER TANANA COMMUNITIES, 1950-88.

Community	1950[a]	1960[a]	1970[a]	1980[b]	1988[c]
Dot Lake	[d]	56	42	67	83
Tanacross	137	102	84	117	96
Tok	104	129	214	589	908
Tetlin	73	122	114	107	92
Northway	196	196	40[e]	185	364

[a] Source: Rollins (1978)
[b] Source: United States Department of Commerce (1981)
[c] Source: Alaska Department of Labor (1990)
[d] Census data not available.
[e] Northway 1970 census contacted only 10 Natives and 30 non-Natives in the Federal Aviation Administration complex.

other than to assume past harvest levels were at or below the sustained yield level, since harvests continue over time without encountering evidence of major stock declines.

Regulatory issues frequently turn on the allocation of resources among user groups. For example, during the study period local hunters wished to have greater caribou hunting opportunity. Multiple caribou herds, herd mixing, differing modes of access to harvest areas, and different seasons of harvest all provide complexity to caribou allocation. Many of the allocation issues are framed in the context of relative hunting opportunity for local hunters and those for non-local hunters, especially hunters from the Fairbanks area. Access to harvest areas provided by the Alaska Highway and Taylor Highway results in high numbers of both local and non-local moose and caribou hunters. Among residents within the region, encroachment on another community's traditional use area generates concern among those with longer family ties or history of use of an area, for example, when trappers trap in locations previously used by other trappers.

Eligibility rules for hunts are criticized by some hunters who are determined ineligible to participate. For example, although a number of Tok residents historically hunted sheep in GMU

11 (Fig. 3), federal regulations since 1990 have not allowed Tok residents to participate in that particular hunt. A concern of several Northway residents is that their community is not listed as a resident zone community for the Wrangell-St. Elias National Park and Preserve, prohibiting community residents from hunting in the park and preserve without application, permit review, and qualification determined by federal officials.

Other issues include the concerns by many hunters that air boats needlessly disturb area waterfowl. Tetlin caribou hunters are critical of season closures which are applicable during the only times of the year when animals are close to Tetlin. Dot Lake hunters have to compete with urban hunters for resources along road system.

A major issue is whether short state hunting seasons and restrictive bag limits provide for customary and traditional seasons and harvest levels. In some cases reporting requirements do not conform with traditional cultural practices. Differences between regulations and hunting practices result in some level of out-of-season and unreported harvests, as well as tension between subsistence users and outside managers and enforcement. Another issue is whether harvests are depressed for Upper Tanana residents because of competition from non-local hunters for moose and caribou, particularly along road-accessible hunting areas. Also, the question remains whether game populations are depressed because of increasing harvest pressure from urban hunters, local hunters, and predators.

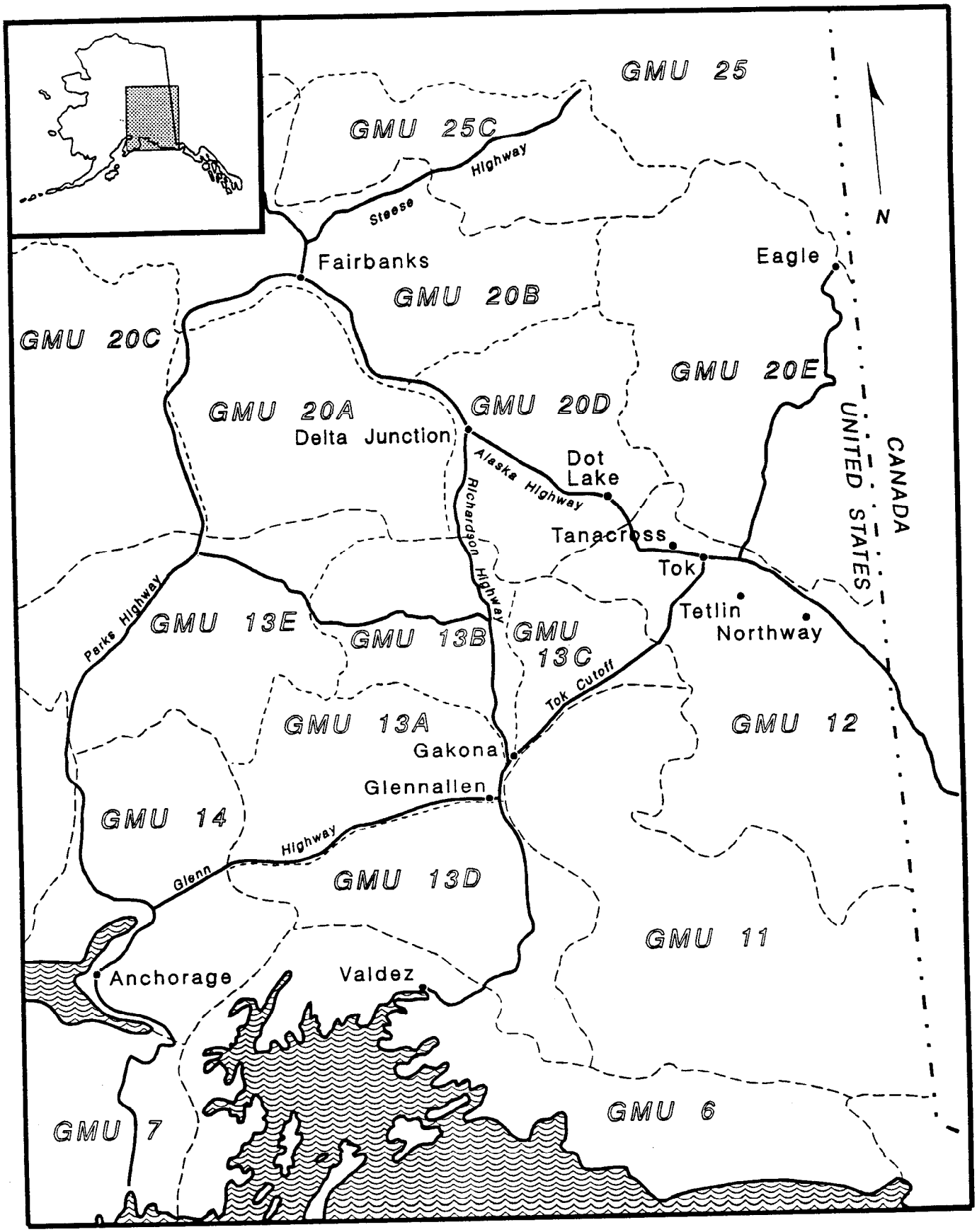


Fig. 3. Location of game management units.

CHAPTER 3. CONTEMPORARY DEMOGRAPHY AND ECONOMY

DEMOGRAPHIC CHARACTERISTICS

Demographic characteristics of each of the five Upper Tanana communities are listed in Table 5. Overall, there were 540 households with an estimated population of 1,680 people in 1988. Tok, with an estimated population of 1,081, was the largest of the five communities with nearly two-thirds of the region's inhabitants. Northway was the second largest community with an estimated population of 324. Tetlin, Tanacross, and Dot Lake populations were smaller with estimated sizes of 116, 93, and 66 respectively. The smallest average household size was found in Tanacross (2.7 people) and the largest in Tetlin (4.0 people).

Communities differed in the percentage of population that was Alaska Native. The lowest percentage was found in Tok where only 11 percent of the population was Alaska Native, lower than the 1988 statewide average of 15.3 percent (Alaska Department of Labor 1990). The highest percentage of Alaska Natives was found in Tetlin (100 percent) and Tanacross (97.3 percent). The Northway population was 76.5 percent Native and Dot Lake 40.8 percent Native. Despite the low percentage of Natives in the Tok population, there were still an estimated 119 Native residents living in 40 Native households, a larger number of Native households than was found in either Dot Lake, Tanacross, or Tetlin.

There were also differences in the settlement entry patterns found in the five communities. Tetlin and Tanacross had the smallest percentage of their population that was born outside the state, 1.2 and 4.1 percent respectively. In contrast, Tok had 69.8 percent of its population born outside the state. The different residency patterns are also expressed in the percentage of households having a household head or spouse who was a lifelong resident of the Upper Tanana area, with the greatest percentages among Tanacross (90.0 percent) and Tetlin (90.3 percent) households (Table 5).

TABLE 5. DEMOGRAPHIC CHARACTERISTICS OF FIVE UPPER TANANA COMMUNITIES, 1988.[a]

Characteristic	Dot Lake	Tanacross	Tok	Tetlin	Northway	All
Number of households	20	34	367	29	90	540
Population (expanded)	66	93	1,081	116	324	1,680
Average household size	3.30	2.74	2.95	4.00	3.60	3.11
Percentage of population, male	53.1	59.5	58.2	64.9	55.6	58.0
Percentage of population, female	46.9	40.5	41.8	35.1	44.4	42.0
Percentage of households, Native[b]	60.0	100.0	10.8	100.0	77.8	34.2
Percentage of population, Native	40.8	97.3	11.0	100.0	76.5	35.8
Percentage of households, household heads or spouse born in:[c]						
Upper Tanana area	34.6	90.0	7.7	90.6	59.2	26.0
Other Alaska area	7.7	2.5	7.4	6.3	11.8	7.8
Outside Alaska	57.7	7.5	85.0	3.1	28.9	66.2
Percentage of total population born in:						
Upper Tanana area	38.8	93.2	20.1	92.7	66.0	38.7
Other Alaska area	16.3	2.7	10.1	6.0	15.4	10.7
Outside Alaska	44.9	4.1	69.8	1.2	18.5	50.6
Percentage of households, household heads or spouses who are lifelong residents of the Upper Tanana area	29.2	90.0	7.2	90.3	59.2	25.3
Mean length of residency for households in Upper Tanana area based on household head or spouse (excluding lifelong residents of the Upper Tanana area)	9.7	18.5	12.9	27.7	12.5	12.9

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Characteristics reported by sample households were expanded on a household basis to estimate total community characteristics.
[b] Native households are defined as those in which the household head or spouse is Alaska Native.
[c] Categories mutually exclusive.

The percentage of community population is shown by age category and by gender in Table 6. The largest age category was the 30-39 year-olds which represented 21.7 percent of the total population in the five communities. Males outnumbered females in all five communities and overall in the region; 58.0 percent of the population were male. Tetlin had the highest proportion of males in the population at 64.9 percent and Dot Lake the lowest proportion at 53.1 percent. In the 20-29 and 40-49 age classes males outnumbered females in all communities; however, females equalled or outnumbered males in the 30-39 age class in Dot Lake, Tok, and Tetlin.

EMPLOYMENT CHARACTERISTICS

Employment characteristics of each of the five Upper Tanana communities are listed in Table 7. In all, there were an estimated 752 of 1,173 adults (64.1 percent) who were employed during at least a portion of the preceding year. An estimated 630 adults (53.7 percent) were employed for 12 consecutive months of the year.

The highest employment rate was found in Tok where 547 of the 782 adults (70 percent) were employed during part of the year. Adults were defined as those age 18 or over. Lower employment rates were found in the other four communities where the percentage of adults holding some employment during the year ranged between 51.5 percent (Northway) and 56.8 percent (Dot Lake). The percentage of employed adults who were employed for 12 consecutive months of the year was highest in Tok (59.8 percent) and lowest in Tanacross (13.8 percent). In Tanacross, only 5 of the 69 adults (7.2 percent) held employment during each of the preceding 12 months.

The average number of months worked by adults holding some employment is also shown in Table 7. In Tanacross, the average employed adult worked 5.4 months of the preceding 12 months. Employed adults in Dot Lake and Tok worked over 9 of the preceding 12 months.

TABLE 6. PERCENTAGE OF TOTAL COMMUNITY POPULATION BY AGE CATEGORY, FIVE UPPER TANANA COMMUNITIES, 1988.[a]

Age category	Dot Lake			Tanacross			Tok			Tetlin			Northway			All		
	male	female	total	male	female	total	male	female	total	male	female	total	male	female	total	male	female	total
0-4	4.1%	0.0%	4.1%	1.4%	1.4%	2.7%	4.9%	1.2%	6.1%	3.6%	2.6%	6.2%	4.3%	4.3%	8.6%	4.5%	1.9%	6.3%
5-9	6.1	4.1	10.2	4.1	2.7	6.8	4.3	4.3	8.6	6.4	2.4	8.8	4.3	6.8	11.1	4.5	4.6	9.1
10-19	8.2	14.3	22.4	6.8	10.8	17.6	10.3	4.8	15.1	24.0	2.6	26.6	13.0	8.6	21.6	11.5	6.1	17.5
20-29	8.2	2.0	10.2	5.4	5.4	10.8	8.5	5.3	13.8	12.3	2.4	14.7	8.0	5.6	13.6	8.5	5.0	13.5
30-39	2.0	6.1	8.2	13.5	9.5	23.0	11.3	12.5	23.8	6.4	11.4	17.8	10.5	8.0	18.5	10.6	11.2	21.7
40-49	12.2	12.2	24.5	12.2	4.1	16.2	8.4	6.8	15.2	3.6	1.2	4.8	6.8	4.9	11.7	8.1	6.1	14.2
50-59	4.1	2.0	6.1	8.1	1.4	9.5	3.4	2.4	5.8	3.6	4.8	8.5	4.3	2.5	6.8	3.9	2.5	6.4
60-69	4.1	2.0	6.1	1.4	4.1	5.4	6.0	1.6	7.6	1.2	3.8	5.0	2.5	2.5	4.9	4.6	2.1	6.7
70-79	2.0	0.0	2.0	2.7	1.4	4.1	1.2	2.6	3.8	2.6	1.2	3.8	1.2	1.2	2.5	1.4	2.1	3.5
80-89	0.0	2.0	2.0	1.4	0.0	1.4	0.0	0.2	0.2	1.2	2.6	3.8	0.6	0.0	0.6	0.3	0.4	0.6
90+	2.0	2.0	4.1	2.8	0.0	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.3
Total	53.1	46.9	100.0	59.5	40.5	100.0	58.2	41.8	100.0	64.9	35.1	100.0	55.6	44.4	100.0	58.0	42.0	100.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Characteristics reported by sample households were expanded on a household basis to estimate total community characteristics.

TABLE 7. EMPLOYMENT CHARACTERISTICS OF FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Characteristic	Dot Lake	Tanacross	Tok	Tetlin	Northway	All
Total number of adults[b]	44	69	782	72	206	1,173
Number of adults employed during part of study year	25	37	547	38	106	752
Percentage of total adults employed during study year	56.8	53.6	70.0	52.8	51.5	64.1
Number of jobs held by employed adults	27	43	599	48	124	840
Average number of jobs held per employed adult	1.1	1.2	1.1	1.3	1.2	1.1
Percentage of employed adults employed year-round[c]	57.9	13.8	59.8	34.6	41.5	53.7
Average number of months worked, employed adults	9.5	5.4	9.2	6.9	7.9	8.9
Average number of months worked, all employed household heads	9.9	5.7	9.5	7.7	8.0	9.1
Average household earned income, employed households	$20,300	$19,303	$25,012	$12,060	$19,405	$23,446
Average household earned income from all jobs, all households	$15,225	$14,106	$23,537	$7,191	$11,894	$20,002

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Characteristics reported by sample households were expanded on a household basis to estimate total community characteristics.
[b] Adults are defined as those age 18 or older.
[c] Year-round means during all 12 months of the year.

The average income level earned by household members also varied between communities. The highest was reported in Tok where households earned an average of $23,537. Tetlin households earned an average of $7,191 during the study year, a level less than one-third that found in Tok. Average earned levels in Dot Lake, Tanacross, and Northway were $15,225, $14,106, and $11,894 respectively.

Occupational types for the jobs held by adults in each of the five Upper Tanana communities are shown in Table 8. Overall, most of the jobs were in the "professional, technical, managers" category (39.6 percent), the "service workers" category (28.4 percent), and the "structural" category (12.8 percent). Service workers were the greatest percentage in Dot Lake, Tanacross, and Tetlin and professional, technical, managers were the greatest in Tok and Northway and second greatest in Dot Lake and Tetlin. The occupational types are those used by the U.S. Department of Labor and are defined in Appendix 4.

Jobs were also listed by the employer type, as presented in Table 9. Services, local government, federal government, self employed-crafts, retail trade, and construction were the most frequently listed employer types. In Dot Lake, services and religious organizations were predominant. In Tanacross, federal government, local government, and construction were the most common employer types. In Tok, services and self employment were most common. In Tetlin, local government and services were most common. In Northway, the greatest two categories were federal government and local government. Definitions of the employer types are listed in Appendix 5.

The location of jobs held by the residents of the five Upper Tanana communities is shown in Table 10. Overall, 85.8 percent of jobs were located in the resident's home community. An additional 5.2 percent were held in other Upper Tanana area communities, and 7.2 percent were held outside the region. In Tanacross, 23.5 percent of jobs were located outside the Upper Tanana area. These jobs were either fire fighting jobs with the Bureau of Land Management or construction jobs outside the region.

TABLE 8. PERCENTAGE OF JOBS BY OCCUPATIONAL TYPE HELD BY ADULTS IN FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Occupational type[b]	Dot Lake	Tanacross	Tok	Tetlin	Northway	All
Professional, technical, managers	30.0 %	11.8 %	46.7 %	21.0 %	24.2 %	39.6 %
Clerical and sales	0.0	2.9	3.8	2.9	4.8	3.7
Service workers	45.0	47.1	21.9	52.1	40.3	28.4
Agriculture, fisheries, forestry	5.0	5.9	0.8	0.0	1.6	1.3
Processing	0.0	0.0	0.0	0.0	1.6	0.2
Machine trade	10.0	5.9	10.9	2.9	3.2	9.0
Benchwork	0.0	0.0	0.3	0.0	0.0	0.2
Structural	10.0	26.5	10.3	21.0	17.7	12.8
Armed forces	0.0	0.0	1.8	0.0	0.0	1.3
Recreation-based occupations	0.0	0.0	0.3	0.0	0.0	0.2
Motor freight and transportation	0.0	0.0	2.9	0.0	4.8	2.8
Artists and craftsmen	0.0	0.0	0.3	0.0	1.6	0.4

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Characteristics reported by sample households were expanded on a household basis to estimate total community characteristics.
[b] See Appendix 4 for definitions.

TABLE 9. PERCENTAGE OF JOBS BY EMPLOYER TYPE HELD BY ADULTS IN FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Employer type[b]	Dot Lake	Tanacross	Tok	Tetlin	Northway	All
Commercial fishing	0.0 %	0.0 %	0.6 %	0.0 %	3.2 %	0.9 %
Construction	15.0	20.6	8.5	2.9	11.3	9.4
Manufacturing	5.0	0.0	0.0	0.0	0.0	0.2
Transportation, communication, utilities	0.0	0.0	8.5	5.9	1.6	6.6
Retail trade	10.0	0.0	10.7	0.0	12.9	9.9
Wholesale trade	5.0	0.0	0.3	0.0	0.0	0.4
Finance, insurance, real estate	0.0	2.9	0.0	0.0	0.0	0.1
Services	30.0	11.8	27.4	33.6	12.9	24.9
Federal government	5.0	26.5	8.0	9.2	27.4	11.7
State government	0.0	11.8	7.8	0.0	6.5	7.1
Local government	10.0	23.5	8.2	48.3	19.4	12.9
Self employed, crafts	0.0	2.9	14.4	0.0	4.8	11.1
Guiding	0.0	0.0	0.3	0.0	0.0	0.2
Religious organization	20.0	0.0	1.8	0.0	0.0	1.9
Other	0.0	0.0	3.6	0.0	0.0	2.6

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Characteristics reported by sample households were expanded on a household basis to estimate total community characteristics.

[b] See Appendix 5 for Definitions.

TABLE 10. LOCATION OF JOBS HELD BY RESIDENTS OF FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.

Community	Estimated number of jobs	Percentage of jobs held in: Home community	Other Upper Tanana community	Other Alaska community	Other or missing
Dot Lake	27	75.0 %	20.0 %	5.0 %	0.0 %
Tanacross	43	38.2	35.3	23.5	2.9
Tok	599	86.9	3.5	7.2	2.4
Tetlin	48	100.0	0.0	0.0	0.0
Northway	124	93.5	1.6	4.8	0.0
Total	840	85.8	5.2	7.2	1.8

The community with the lowest rate of employment outside the community was Tetlin where none of the sample respondents held outside employment during the study year. Some Tetlin residents had worked seasonally in other years on construction projects along the Alaska Highway or at restaurants in Tok, but access to employment outside the community was impaired by having only river, air, or winter road transportation to and from Tetlin. However, Tok and Northway also had a high proportion of jobs held locally, both over 85 percent.

Many of the jobs held by Tanacross residents were actually in nearby Tok. Of the estimated 43 different jobs held, only 38.2 percent were in Tanacross, with an additional 35.3 percent located in Tok, resulting in a total of 73.5 percent of jobs in what could be considered the "local" area. Nearly one-quarter of the jobs held by Tanacross residents were located outside the Upper Tanana area, the highest proportion found in any of the study communities. These jobs were either fire fighting jobs with the Bureau of Land Management or construction jobs outside the region and most lasted less six weeks or less in duration.

CHAPTER 4. REGIONAL HARVEST AND USE PATTERN

HISTORIC AND CONTEMPORARY SEASONAL HARVEST CYCLE

Historic Seasonal Harvest Cycle

Up until the early part of the 20th century, the Upper Tanana Athabaskans were a semi-nomadic hunting and fishing people (McKennan 1959; Guedon 1974). The high level of movement was in response to the seasonal and geographic dispersion of game and fish resources within the Upper Tanana area. People were able to work together in large groups only at specific locations during particular times of the year when resources were concentrated in abundance, such as at caribou fences during fall caribou migrations or at fish weirs during July whitefish runs in local streams. During other times of the year, people occupied numerous scattered camps in areas near more dispersed resources.

The following quote by Chief Sam, a leader of the Upper Nabesna Band, clearly illustrated the close interrelationship between annual movement and resources in the Upper Tanana region:

> In the old days the people seldom stayed in the village. Always they were on the trail, hunting and camping. In July, whitefish were dried and cached at the fish camp. Then the people went moose hunting, caching the meat. In the winter they visited the caches and then when the caribou came they went and killed caribou. After the moose season the people went up to the head of the Nabesna to secure sheepskins for the winter. Then they would return to the village; make their clothes; and then take the winter hunting trails to Ladue Creek, the Chisana Basin and the White River. In the spring when the leaves were coming out they returned to the village. They would take birch bark and sew it together to make new tents, and then wait for the caribou to come back again. (McKennan 1959:46)

While the specific areas mentioned above apply to the annual movement of Upper Nabesna band, a similar close relationship between resource availability and human movements was found among other Upper Tanana bands.

Guedon (1974) noted the variation between bands in both the resource base available within their territories and the degree of mobility required to utilize those resources. She listed three terrain types (hills, marshes, and mountains) and observed that the bands had differential access to these terrain types and their associated resources. As a result, there were variations in the seasonal harvest cycle resulting from local environmental factors which directly affected which resources were available throughout the year.

While VanStone (1974) has referred to the Upper Tanana as "restricted wanderers," Guedon (1974) and McKennan (1959) have both referred to the Upper Tanana as "central-based wanderers:"

> . . . it was a semi-nomadic life which periodically brought back the population to several meeting places for short periods of time, followed by periods of wandering. The movements of the population were directed, of course, by the localities where game could be found most easily. This consideration also determines permanent or semi-permanent facilities such as game fences and fish weirs and so, finally the camp sites . . . (Guedon 1974:38).

Regardless of the label, subsistence resources influenced both the extent and duration of a group's mobility in the Upper Tanana area.

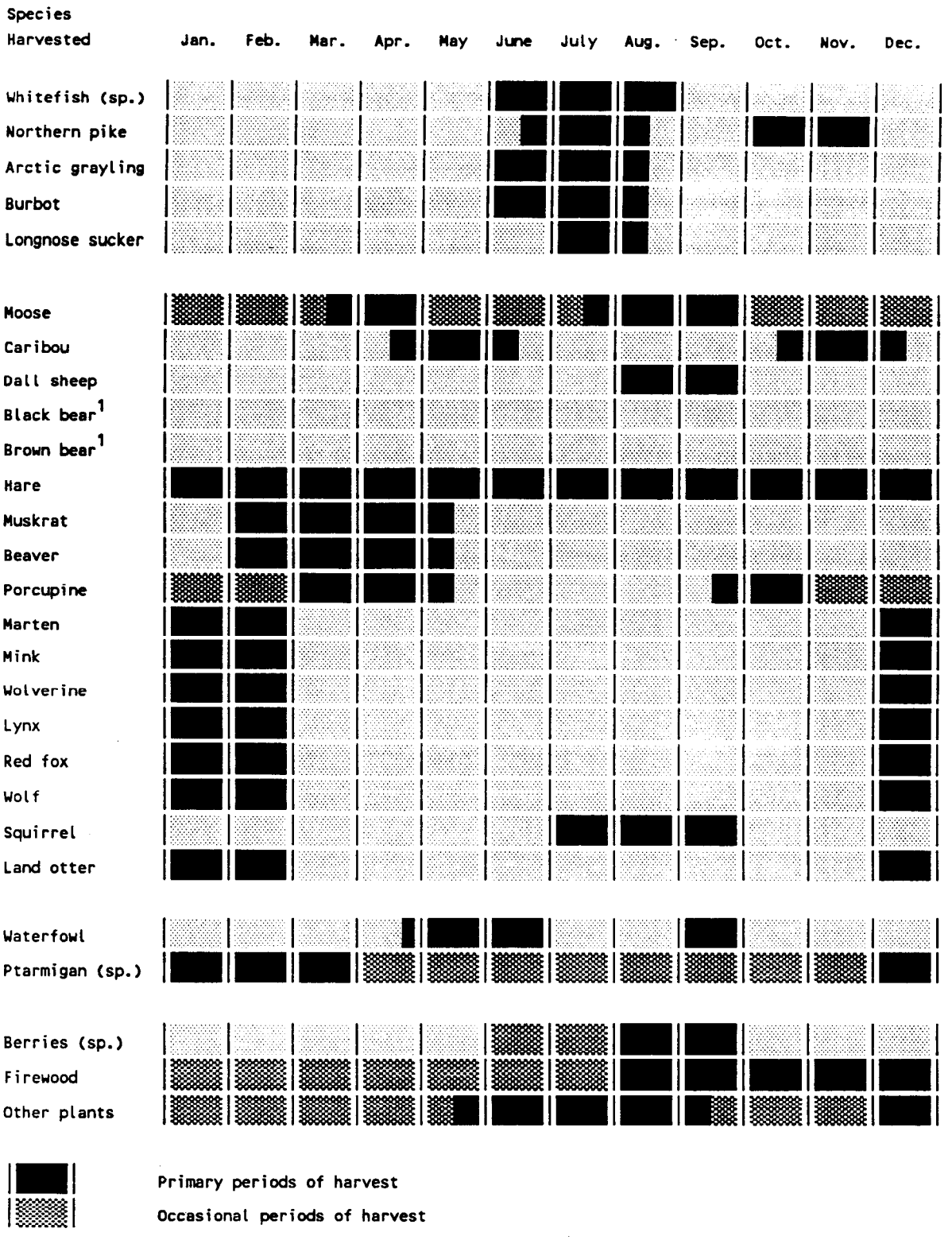
Guedon (1974:40) observed that the Upper Nabesna band displayed the highest degree of mobility and the greatest use of small scattered camps throughout the year. In the area occupied by this band, sheep were the primary resource available for exploitation, since the area was less well suited for moose, caribou, whitefish, and waterfowl. However, these other resources were not available in concentrations which allowed for predictable long-term settlement. In contrast, the Tetlin and Last Tetlin bands occupied an area which offered immediate access to whitefish, caribou, muskrat, and beaver making occupation of a major camp or village nearly year-round possible. These two bands displayed the lowest degree of mobility. The Mansfield-Ketchumstuk band relied most heavily on caribou hunting, as evidenced by the upland network of caribou fences and associated villages, and also relied on fishing in the clear water tributaries of the Tanana River and Mosquito Fork (Guedon 1974:48).

The basic historic seasonal harvest cycle of subsistence activities in the Upper Tanana region is shown in Figure 4. The annual cycle was dependent on available resources and concomitant population movements. While this seasonal round was generally applicable throughout the entire Upper Tanana area, local variation did occur, both in terms of resources and activities (Guedon 1974). In general, caribou, moose, sheep, whitefish, and waterfowl were the most important resources to the Upper Tanana Athabaskans.

Whitefish runs in area streams reached a peak in July. At this time of year, people occupied fish camps and fished intensively for the duration of the run. Comparable to the caribou sites, whitefish sites were well known and used. Historically and contemporarily these long-established fish camp sites, especially for whitefish fishing were located in close proximity to strategic fishing sites on clear water streams where a fish weir could be built. Weirs were constructed of willow branches woven around posts set into the streambed. Once constrained, the fish were caught in fish traps or by use of dip nets.

Other fish species were targeted during October and at other times of the year. According to Guedon (1974) fish were taken at unclaimed, but strategic spots, in streams and lakes. Pike fishing occurred in October and November, from creek and lake outlets which remained clear of ice. Hooks or small nets were used for pike. Burbot, grayling, trout, and suckers were also harvested at this time. In the Ketchumstuk area where creeks were shallow, people also built dams out of gravel and "drove" whitefish and grayling towards the obstruction (Guedon 1974:33). Longnose suckers were caught and used for dog food (McKennan 1959:32; Guedon 1974:33).

Caribou passed through the Upper Tanana region in a number of large herds on a semi-annual basis passing through once in the early summer (April-June) and once in the early winter (October-December) (McKennan 1959). The migratory patterns of the caribou were fairly stable and consistent and, thus, allowed for construction of semi-permanent caribou fences across major migration routes. Descriptions and photographs of the fences are contained in Murie (1935). Area residents hunted caribou by driving them along several-mile long fences then



[1] Specific seasonal data not available.

Fig. 4. Historic seasonal round of subsistence activities, Upper Tanana region (after McKennan 1959; Guedon 1974).

ensnaring them with snares placed in gaps of the fence or dispatching them with bow and arrow or spears. One fence described by Murie (1935) terminated with a corral. Murie (1935) mentions fences located near the Little Fork of the Dennison River, near Ketchumstuk, and near the North Fork of the Fortymile River. Caribou fences were also located near Last Tetlin and Chisana (Guedon 1974:30). Based on descriptions of caribou hunting practices by Tanacross residents, Murie estimated that the fences generally were used prior to 1921 (1935:3). Settlements were established in conjunction with these fences. Caribou drives usually were conducted by several small groups working cooperatively. Settlements usually consisted of caribou skin tents which provided living and work areas (VanStone 1974).

Since caribou fences were effectively used only during caribou migrations, when most animals were taken, other means were used to hunt solitary caribou. The most common means by which this was done was by individual hunters, men, wearing snowshoes to track the animals, then dispatching them with bow and arrow (Guedon 1974:30). According to McKennan (1959) however, this later method was extremely difficult due to the superb endurance of the caribou.

McKennan (1959) emphasized the importance of caribou to the Upper Tanana. Caribou not only provided food for humans and dogs, but they also provided raw material for clothing, shelters and boats, and sinew for the construction of snowshoe netting, snare cords, and lashings (McKennan 1959:47).

Intensive moose hunting typically occurred in later summer (August-September) before the caribou drive and in the late winter (March-April). In addition, moose hunting generally occurred throughout the year, with the above-mentioned periods being times of increased emphasis (Guedon 1974:30). As a rule, moose are neither social nor migratory, thus exhibiting major differences from caribou. As a result, moose were most commonly hunted much like single caribou – with bow and arrow and snowshoe tracking. During winter hunting, tracking was an effective means of locating the moose, although often the hunter would have to follow the animal for an entire day prior to dispatching it (McKennan 1959). Another means by which moose were taken was with the use of fences and snares, although the method differed somewhat

from caribou hunting. McKennan (1959:59) states that straight fences were set through the woods and along well used trails, and dogs were used to chase the animal along these fences. Finally, McKennan (1959:49) mentions the use of fire by the Upper Tanana in order to encourage moose browse. Snares and bow and arrow hunting became less common with the introduction of the rifle (Guedon 1974; McKennan 1959; Osgood 1971). In general, harvests were conducted by several men who left the fish camp to hunt. Women and children stayed at the fish camp and finished processing fish, as well as collected berries and other plants (VanStone 1974).

Sheep hunting was an annual activity, taking place in August or September immediately after late summer moose hunting and prior to caribou hunting. Sheep hunting was best done at this time since once animals entered into the rut their meat was too strong tasting and they would lose weight (Guedon 1974:31). Since sheep inhabited mountainous areas, hunting involved travel away from semi-permanent camps. Hunters had to use caution to avoid getting caught by early season snowfall in the Mentasta, Nutzotin, and Chisana mountains. In general, men, rather than dogs, chased the sheep into snares. Sheep were utilized both for their meat and for their skins, which were commonly used for sleeping bags and winter clothing.

Black and brown bear hunting occurred sporadically with no set time of the year for their harvest. Generally speaking, bear hunting was considered to be a dangerous activity. Both Guedon (1974) and McKennan (1959) note that historically, hunting of bears was done as much for prestige as for the meat and fur.

Small mammals that were harvested for food included hare, muskrat, squirrel, and porcupine. Harvesting of smaller animals often occurred incidentally to other hunting activities, such as moose hunting for example. Hare were taken throughout the year; the preferred time to harvest was late summer and fall. Muskrat were the focus of activity in early spring (February, March, and April). While beaver were at their fattest in fall, Guedon (1974) states that their meat was too strong tasting and as a result they were preferentially taken later on in February through April.

Prior to this century beaver were abundant in the Upper Tanana region and as such they were readily harvested for their fur and meat (McKennan 1959:30). Historically, other furbearers were harvested as well. Fur trapping occurred in conjunction with other subsistence activities. With the more important role played by the fur trade in the earlier part of this century, trapping of furbearers became a primary rather than secondary activity.

Furbearers taken solely for the fur included marten, mink, wolverine, red fox, wolf, and squirrel. Lynx were taken for their fur and fat, which was used in cooking. These fur animals were primarily harvested from December through February, the period when the furs were in the best condition and travel was made easier by snowfall. Coyotes were first observed in the region in 1913 after which they were harvested (McKennan 1959).

Migratory waterfowl comprised a significant component of the diet. As in many other areas of Alaska, migratory waterfowl provided the first source of fresh meat in spring (May and June). The Upper Tanana region is a primary nesting area for many species of migratory waterfowl and their seasonal contribution to the Upper Tanana diet was important. Migratory waterfowl arrived at a time when fall and winter caribou meat supplies were running low, and many other sources of meat were no longer or not yet available. On an annual basis, ducks and geese did not contribute a major portion of meat to the year's diet, however, they were an important resource in that they provided fresh meat at a time when starvation was common.

Ptarmigan and grouse also provided an important contribution to the Upper Tanana Athabaskan diet. Ptarmigan and grouse hunting occurred throughout the year. For the time period from December through March these birds were intensively harvested.

Berries were harvested from August to the first frost (Guedon 1974:28). Rosehips were picked in September, hedysarum roots in spring, and wild rhubarb in summer. Firewood was taken year-round and its availability close to semi-permanent settlements was reduced over time.

Contemporary Seasonal Harvest Cycle

While contemporary patterns of resource and land use have changed in many ways, they were still rooted in historic patterns. Contemporary seasonal harvest activities for Dot Lake, Tanacross, Tok, Tetlin, and Northway have been influenced by hunting and fishing regulations.

The seasonal round of subsistence activities by Dot Lake residents during 1983, as described by Martin (1983:34), is presented in Figure 5. The 1983 pattern differs from the historic pattern by indicating longer periods of fishing, particularly in fall. Also, in 1983 less time was spent harvesting hare, and, in general, there were shorter periods of hunting big game primarily due to regulations. The Dot Lake pattern differs from the other community patterns in showing a shorter period of muskrat and beaver trapping.

The seasonal round of subsistence activities by Tanacross residents during 1984, as described by Haynes *et al.*(1984:15), is presented in Figure 6. The 1984 pattern differs from the historic pattern in showing longer fishing periods, for example, later burbot fishing in November and December. Coyote trapping was indicated in 1984; however, squirrel hunting was not and the periods for taking muskrat and hunting waterfowl in the spring were shorter. In contrast to the other communities, several Tanacross residents still hunted porcupine during late summer in 1984.

The seasonal round of subsistence activities by Tok residents during 1984, as described by Haynes *et al.*(1984:40), is presented in Figure 7. The Tok pattern differs from the other communities by displaying primary periods of black and brown bear harvest, year-round firewood collecting, and later fall salmon fishing. Additionally, Tok residents did not indicate waterfowl hunting activities during spring or early summer months.

The seasonal round of subsistence activities by Tetlin residents during 1983-84 as described by Halpin (1987:31) is presented in Figure 8. The pattern for Tetlin in 1983-84 differs from the historic pattern by showing burbot fishing continuing later into fall and less ptarmigan hunting during summer. The lack of caribou hunting in 1983-84 is believed to be an anomaly

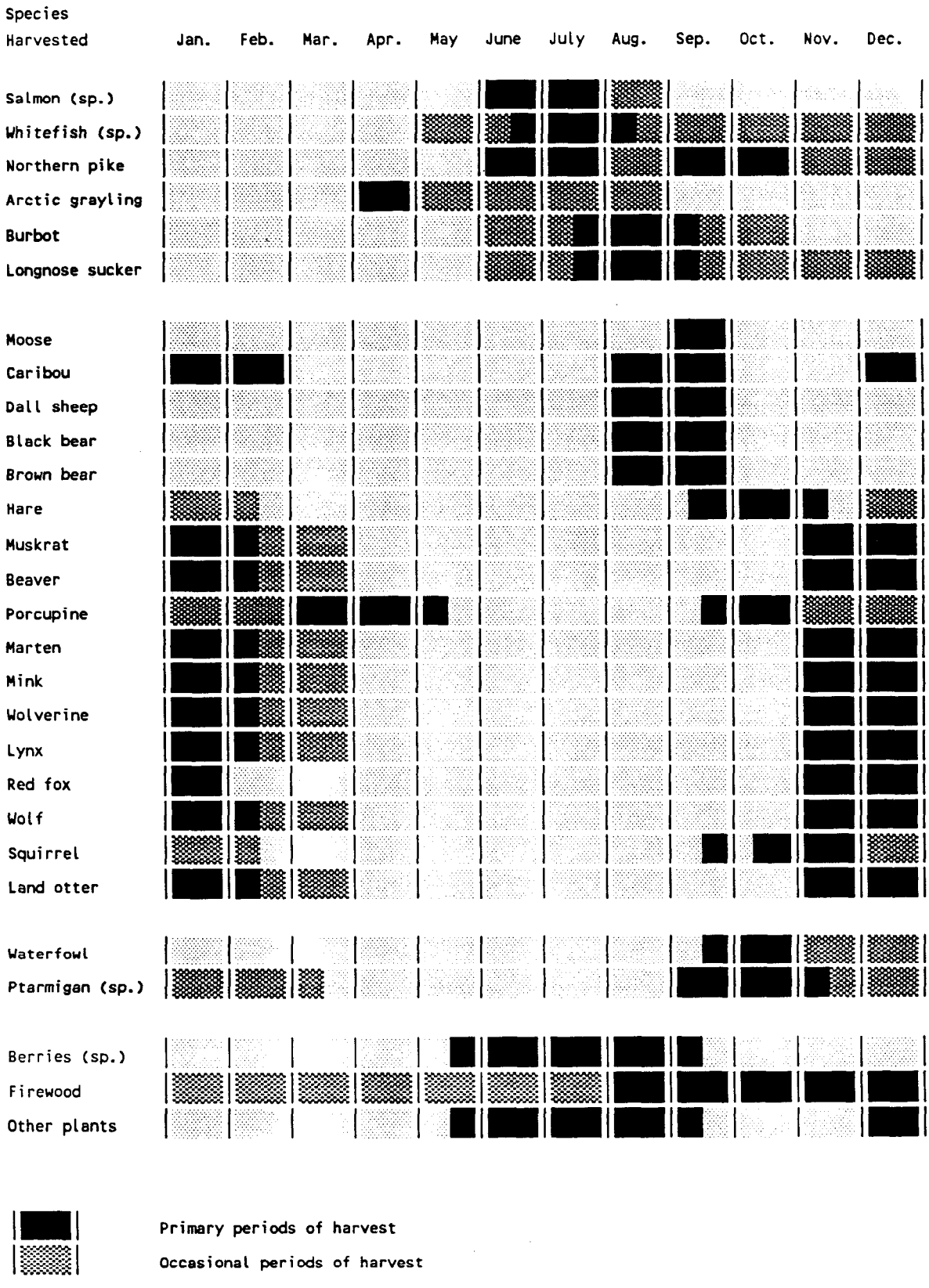


Fig. 5. Seasonal round of subsistence activities, Dot Lake, 1983 (after Martin 1983:34).

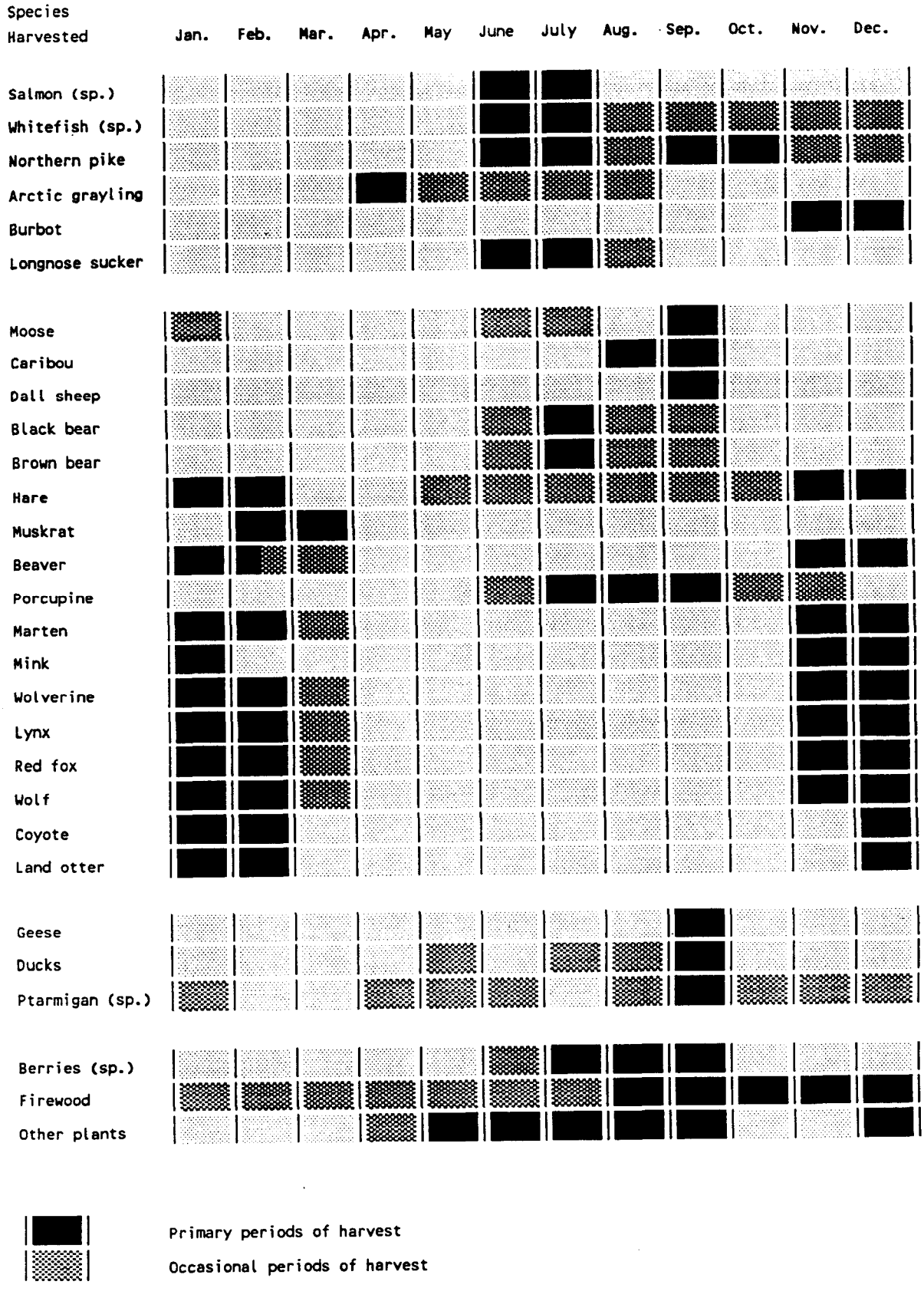


Fig. 6. Seasonal round of subsistence activities, Tanacross, 1984 (after Haynes *et al.* 1984:15).

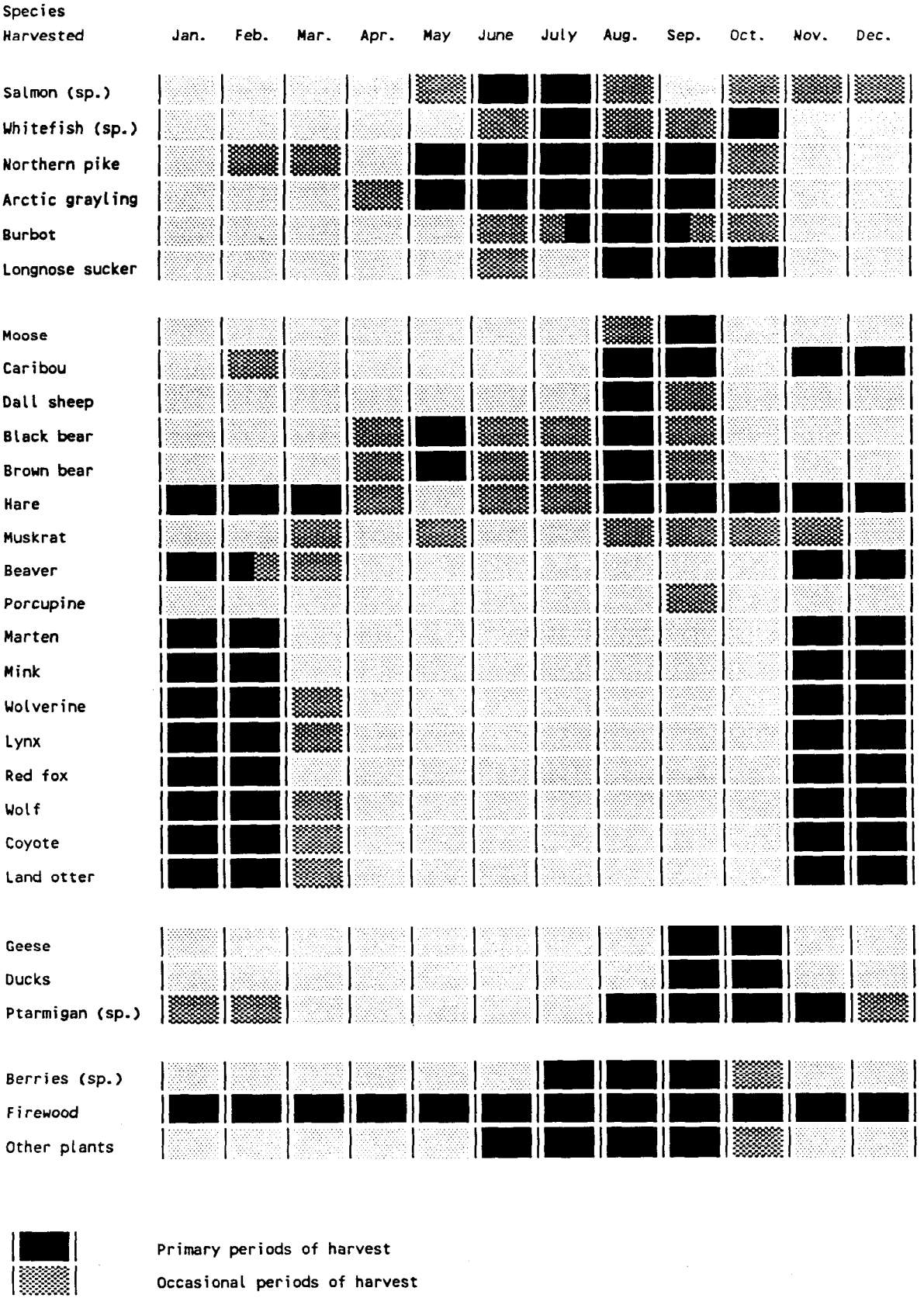


Fig. 7. Seasonal round of subsistence activities, Tok, 1984 (after Haynes *et al.* 1984:40).

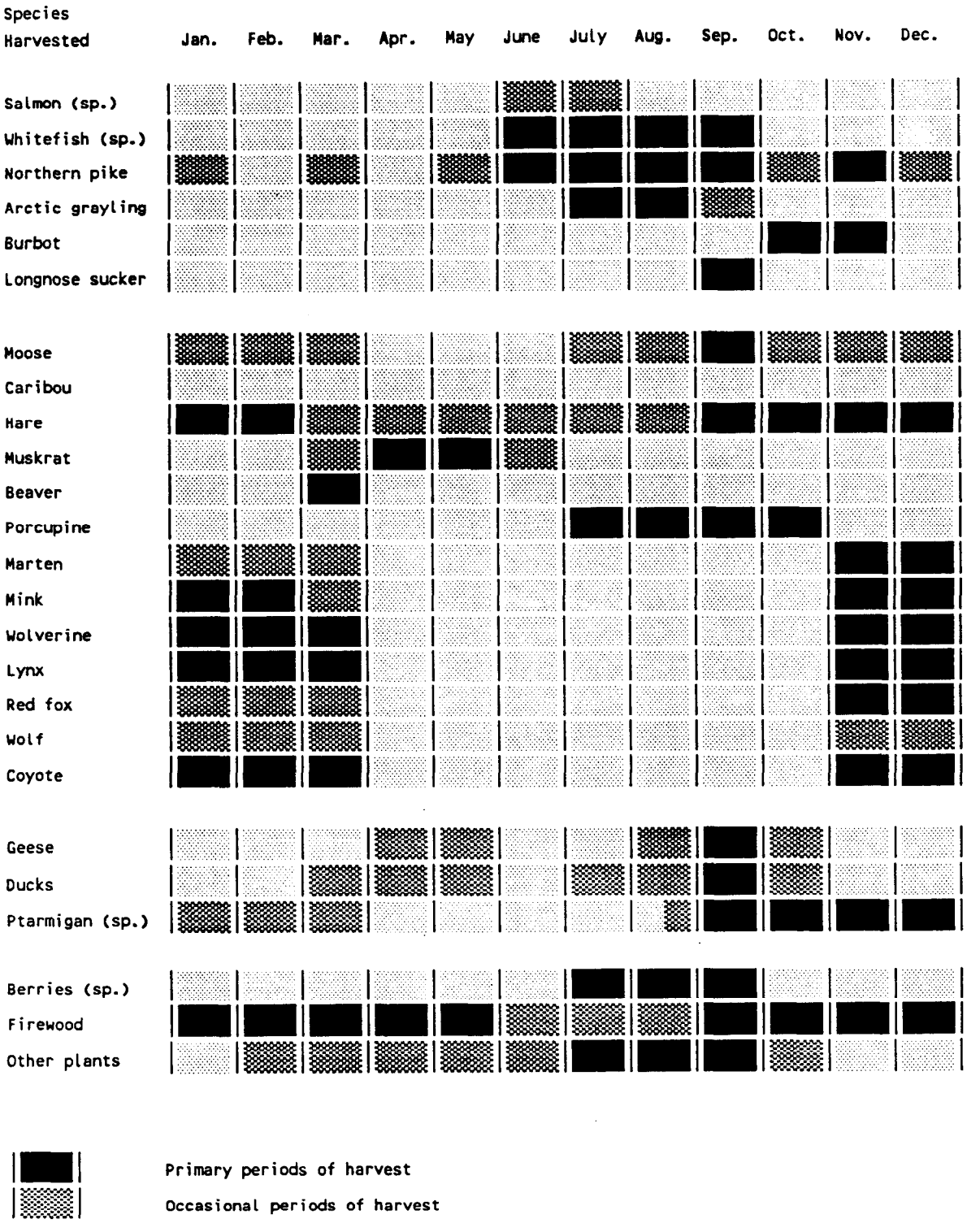


Fig. 8. Seasonal round of subsistence activities, Tetlin, 1983-84 (after Halpin 1987:31). (NOTE: Caribou were not present during 1983-84 study period. Caribou were harvested during fall and winter in other years when available.)

since caribou were not present in the Tetlin area at that time. Caribou were harvested during fall and winter in other years when available. The Tetlin pattern differed from that of the other communities by displaying a longer and more intense harvest effort for muskrats.

The seasonal round of subsistence activities by Northway residents during 1985 as described by Case (1986:37) is presented in Figure 9. Northway also displayed a longer period of fishing during the fall. Northway differed from the other communities by indicating muskrat trapping activity during the fall.

REGIONAL SUBSISTENCE ACTIVITIES

This section describes contemporary harvest activities by residents in the five Upper Tanana study communities. It includes species taken, location of harvest, and harvest methods.

Differences between regulations and harvest practices (both historic and contemporary) can result in some level of out-of-season and unreported harvests, as well as tension between subsistence users and outside managers and enforcement. Competition from non-local hunters for moose and caribou, particularly along road-accessible hunting areas, can result in depressed game populations and curtailed harvest opportunity for residents of the Upper Tanana area. Many hunters described problems they encountered with not having an adequate harvest opportunity due to shortened season length, permit requirements, or competition from other hunters in the field.

Fishing for Salmon

Because few salmon ascend the Tanana River upstream from the mouth of the Goodpaster River, most all of the salmon fishing by Upper Tanana residents took place in the Copper River drainage. Households also reported traveling to salmon fishing sites along the Yukon River near Eagle.

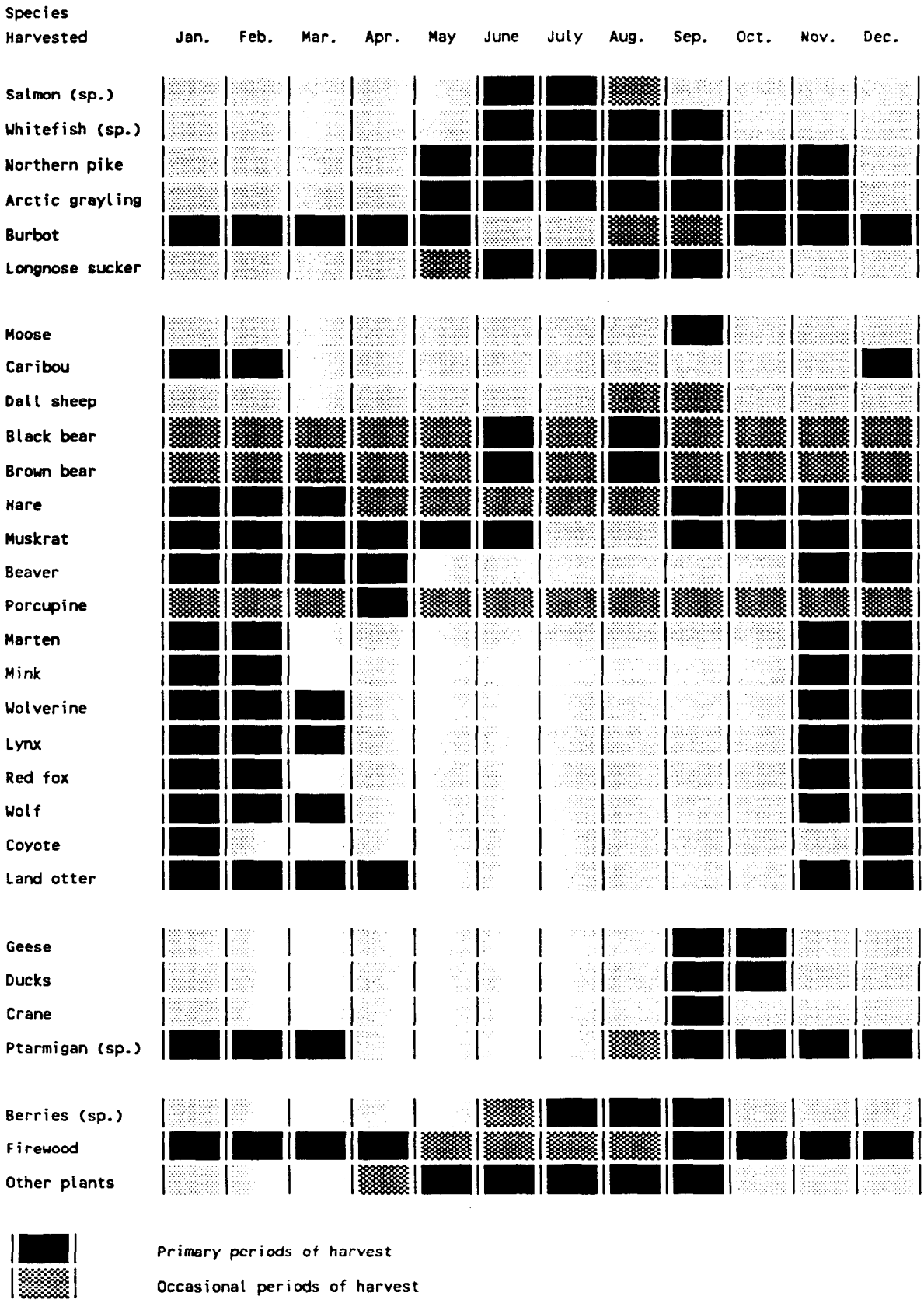


Fig. 9. Seasonal round of subsistence activities, Northway, 1985 (after Case 1986:37).

Salmon species in the Copper River drainage include chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*Oncorhynchus kisutch*), and sockeye salmon (*Oncorhynchus nerka*). Pink salmon (*Oncorhynchus gorbuscha*) were available at sites in coastal areas such as Prince William Sound. The Yukon River to the north also offers chinook salmon and chum salmon (*Oncorhynchus keta*). Recent stocking programs have made landlocked coho salmon (*Oncorhynchus kisutch*) available at some Upper Tanana area lakes.

Most salmon fishing by residents of the Upper Tanana took place at sites along the Copper River between Slana and Copper Center. Slana was a popular destination because of its close proximity to Upper Tanana communities and because of a historic pattern of use there by Upper Tanana residents.

Fishwheels on the Copper River were generally shared among members of several households, either among related households or among friends. Fishwheels were used either sequentially between the households or cooperatively. Several Upper Tanana residents said that wheels they used were owned by residents of Copper River basin communities. In many cases, the Upper Tanana fishermen were related to the owners and had used the equipment and fishing site for many years. Travel to fishing sites included either single-day trips or overnight trips, depending on travel distances involved.

Fish were either processed at the fishing site or packed in ice for transport back to the community for processing. Canning, smoking, or freezing were common methods of preserving salmon. Harvest amounts transported home in 1987 were generally modest, ranging to about 40 chinook salmon, 200 coho salmon, or 300 sockeye salmon. Average harvest levels were much lower. In addition to fishwheels and dip nets used along the Copper River, rod-and-reel gear was used for landlocked salmon in area lakes.

A permit was required of fishermen for subsistence salmon fishing in the Copper River in 1987. In 1984, the Alaska Board of Fisheries determined that there were customary and traditional uses of Copper River salmon by residents in the Copper River basin and by Upper Tanana residents, specifically the residents of Dot Lake, Tanacross, Tok, Tetlin, and Northway.

In 1990 and 1991, all Alaskan residents, regardless of community of residence, could participate in the subsistence salmon fishery of the Copper River.

Fishing for Non-salmon Fish Species

A variety of fish resources other than salmon are available in the Upper Tanana area, including several whitefish species which are locally abundant at particular times of the year. In 1987-88, the harvest of these non-salmon fish species accounted for 33.8 percent of the total edible pounds of all fish and wildlife resources harvested by the residents of the five study communities. In one community, Tetlin, non-salmon fish accounted for 57.9 percent of the total harvest.

Whitefish species included broad whitefish (*Coregonus nasus*), humpback whitefish (*Coregonus pidschian*), least cisco (*Coregonus sardinella*), and round whitefish (*Prosopium cylindraceum*). Other indigenous fish resources in the region include Arctic grayling (*Thymallus arcticus*), burbot (*Lota lota*), Dolly Varden (*Salvelinus malma*), lake trout (*Salvelinus namaycush*), longnose sucker (*Catostomus catostomus*), and northern pike (*Esox lucius*). Northern pike were harvested as adult fish and in the Northway area, as juvenile fish locally called "pickle." Introduced fish species included rainbow trout (*Salmo gairdneri*) and sheefish (*Stenodus leucichthys*). A small number of residents traveled to coastal Alaska to harvest marine resources such as halibut (*Hippoglossus stenolepis*), pink salmon, shrimp, and crab.

There were different fishing patterns depending on the community and the particular fish resource. Most communities displayed a pattern of harvesting non-salmon fish in nearby areas at harvest sites which could easily be accessed and which had been used historically. The best examples of this general pattern were Tanacross residents' use of the Lake Mansfield area, Tetlin residents' use of the Tetlin River, and Northway residents' use of the Nabesna River-Charlieskin Creek area. Dot Lake residents fished at a variety of traditional sites within 20 miles of the community. Tok residents fished at the greatest variety of locations including grayling

fishing sites along the Taylor Highway in the Fortymile River drainage to the north; pike, burbot, and whitefish fishing sites along the Tanana River and its sloughs; and trout, grayling, and pike fishing sites at aircraft-accessible lakes in the Mentasta Mountains to the south.

Fishermen relied on knowledge about the availability of the kinds of fish at specific sites and when the fish were most abundant. Whitefish run during June or July from lakes to the main stem of rivers, and return during August. Their concentrated movement along area streams and rivers allows for greater efficiency of their harvest at these times.

Whitefish were taken using set gill nets at lake or at eddy sites in streams or rivers. Most net sites were accessible by water or by roadway and were generally checked daily. Whitefish were also taken using dip nets at weirs placed in a small streams. Weir construction and maintenance was the effort of certain households, and the use of the weir by other households was generally allowed by permission of the builder.

Burbot were caught by means of a set longline placed on a river bed, generally before or shortly after freeze-up, or by jigging later in the winter through the ice. Adult pike, grayling, and trout were generally caught with hook and line used with a rod-and-reel. Funnel-style mesh traps or hook and line were used to harvest juvenile pike ("pickle") near freeze-up.

Fish harvests by residents of Upper Tanana communities took place under subsistence and sport fishing regulations. A sport fishing licence was required to harvest fish with rod-and-reel gear by those 16 years of age or older. A permit for subsistence fishing in the Tanana River drainage above the mouth of the Wood River has been required, although the requirement was little known to fishermen and not enforced as of 1988.

Hunting Large and Small Game

Moose (*Alces alces*) and caribou (*Rangifer tarandus*) were the most commonly hunted large game species by Upper Tanana community households during the contemporary period, with about one-quarter of the households harvesting these species and over one-half of the

households using these species between June 1987 and May 1988. Other large game species taken included Dall sheep (*Ovis dalli*), black bear (*Ursus americanus*), and brown bear (*Ursus arctos*). Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) were also taken by a few hunters in coastal locations such as Prince William Sound and Kodiak.

Small game species classified by the Department of Fish and Game for regulating hunting included hare (*Lepus americanus*) and upland game birds. Porcupine (*Erethizon dorsatum*) is an unclassified species for regulatory purposes.

Moose were hunted primarily along rivers, lakes, and streams or near road-accessible terrain. Moose harvest areas were extensive, ranging from areas near Eagle to the north to areas near Chistochina and Nabesna, 180 miles to the south. Caribou hunting also took place throughout the Fortymile River drainage, and the Tanana River valley upstream from Dot Lake. Dall sheep were taken in mountainous areas in the Alaska Range, Mentasta Mountains, Nutzotin Mountains, Wrangell Mountains, the Tanana-Yukon Uplands, Mount Sorenson, Glacier Mountain, Mount Eldridge, upper Seventymile River, Mount Harper, Blue Lake, Crescent Creek, White River, Lime Creek, Chitistone River, Goat Trail, and Nizina River. Several Tok residents explained that they tried to obtain one of a limited number of drawing permits for the Tok Management Area as their preference for sheep hunting, and failing that, they selected other sheep hunting locations in GMUs 11, 12, or 20 (Fig. 3).

Black bear were taken primarily at bait stations set out by hunters from Tok. The practice of using bait stations was uncommon in other communities. Other hunters took black bear and brown bear incidental to other hunting activities, such as moose or caribou hunting. A few hunters intentionally sought brown bear during fall or spring throughout the Upper Tanana area.

In pursuing moose, most hunters accessed moose hunting areas by boat, highway vehicle, or off-road vehicle. Hunters hiked to lookout locations and looked for evidence of moose activity along travel routes. Once moose were shot, the animal was sectioned in the field, so that it could be handled more easily and transported. Most of the meat was frozen, although

some hunters preferred to dry some or all of meat they used. Canning was less common. Fresh meat and organs were shared within the community and some area residents tanned the hides at home for use in clothing and crafts. Values concerning the use and consumption of meat, hides, and other products were taught by older family members in cases when hunting parties often included older and younger relatives. Most hunters utilized a camp during periods of intense hunting, although some simply made day trips from their community.

Caribou hunting areas were accessed by means of highway vehicle, off-road vehicle, hiking, aircraft, or by snowmachine. Hunters were attentive to reports from others regarding the current location and migration path of caribou herds.

Game hunting was restricted by regulation to specific open seasons established by the Board of Game. During the 1987-88 regulatory year, residents of GMU 12 communities, Dot Lake, and Mentasta Lake, were able to take one bull moose between September 1 to 20 in most of GMU 12. State residents from other communities were limited to a September 1 to 15 season. Moose hunting by local and non-local state residents was limited to September 1 to 10 for the portions of GMU 20E in the Fortymile River and Ladue River drainages.

Caribou hunting during the 1987-88 regulatory year in GMUs 12, 20D north of the Alaska Highway, and 20E (areas in the range of the Fortymile Herd) was limited to August 10 to September 30 and December 1 to February 28 for subsistence hunters, with a bag limit of one bull provided that only antlerless bulls could be taken from December 1 to February 28. Non-subsistence hunters were limited to a August 10 to September 20 season in these GMUs. In GMU 20D south of the Alaska Highway all caribou hunters were restricted to an August 10 to September 30 season, with a bag limit of one bull for subsistence hunters and a limited number (150) of drawing permits available to non-subsistence hunters.

Trapping

Furbearer species taken by residents of Upper Tanana communities included beaver (*Castor canadensis*), land otter (*Lutra canadensis*), lynx (*Felis canadensis*), marten (*Martes americanus*), mink (*Mustela vison*), muskrat (*Ondatra zibethicus*), red fox (*Vulpes vulpes*), red squirrel (*Tamiasciurus hudsonius*), wolf (*Canis lupus*), wolverine (*Gulo gulo*), and weasel (*Mustela nivalis*). Of these, muskrat and marten were taken in the largest quantity.

Most trapping took place on traplines maintained by individual trappers. Trapping areas reflected a pattern of local management of resources since it was in a trapper's own interest to harvest individual traplines on a sustained yield level. Rights to harvest fur animals in these areas, while not legally recognized through regulation or permit, were generally recognized by other trappers in the local area. Such rights were most often passed from family member to family member or between trapping partners. Traplines had been used by successive generations of a family in most cases. Occasionally, a trapper trapped in an area where his right to use was subject to dispute.

Since traplines were near or reasonably accessible to the trapper's residence, the community level pattern for most communities generally displayed a series of contiguous individual traplines extending out from the community in several directions. In the case of Tok, the overall community pattern was more discontinuous because of a higher level of aircraft use for accessing trapping areas and lower frequency of multi-generational families in the community or long-established traplines near the community.

Furbearer species were harvested by means of spring-loaded traps or snares. The choice of the set configuration and bait used varied with the targeted species. Carcasses were brought to the trapper's cabin or home for skinning. Furs were stretched and dried for later sale or use within the household. In many households furs were sewn into clothing, hats, mittens, and used on parka ruffs. These products were then either used within the household, shared with others, traded, sold, or given away at community events such as potlatches.

Trappers checked traps on a regular basis every few days. Some used cabins located along their traplines. In 1988, most trappers used snowmachines for travel. A few used aircraft. Snowshoes were used when traveling on foot.

Trapping is also subject to state regulation. In GMU 12, during the 1987-88 regulatory year, trapping was allowed beginning November 1 for all fur species except squirrels, which had an open year-round season, muskrat whose season opened September 20, wolves whose season opened October 1, and lynx whose season opened December 1. Closing dates for the different species generally came after pelt conditions were no longer prime. There was a 15 per season bag limit for beaver and no season bag limit for the other species.

Hunting Birds

The Upper Tanana area contains both productive wetland habitat and a variety of upland habitats offering bird hunting opportunities. Bird hunting offered a source of fresh meat for area residents during times of the year when other wild food were not available. Birds accounted for between 2.1 percent and 3.5 percent by weight of the total edible harvest in the five communities between June 1987 and May 1988.

Waterfowl species taken included American widgeon (*Anas americana*), bufflehead (*Bucephala albeola*), Canada goose (*Branta canadensis*), canvasback (*Aythya valisineria*), common goldeneye (*Bucephala clangula*), greater scaup (*Aythya marila*), greater white-fronted goose (*Anser albifrons*), green-winged teal (*Anas crecca*), lesser scaup (*Aythya affinis*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), northern shoveler (*Anas clypeata*), oldsquaw (*Clangula hyemalis*), sandhill crane (*Grus canadensis*), snow goose (*Chen caerulescens*), surf scoter (*Melanitta perspicillata*), and white-winged scoter (*Melanitta fusca*). Upland game birds included ruffed grouse (*Bonasa umbellus*), sharp-tailed grouse (*Tympanuchus phasianellus*), spruce grouse (*Dendragapus canadensis*), and willow ptarmigan (*Lagopus lagopus*).

Wetland areas in the Upper Tanana area provide excellent habitat for migratory ducks and geese. Virtually all of the river-accessible wetlands were used by residents for waterfowl hunting. River travel conditions varied considerably depending on the depth of water, so access to all harvest areas was not always assured. Knowledge of travel routes was required for safe and efficient travel through the wetland areas. Road-accessible areas were also used.

River boats were used where rivers and streams are deep enough to permit travel. Canoes were used in more shallow waters. Users of air boats were not considered favorably by those who think their noise disturbs ducks.

The closure of waterfowl hunting during spring and August represented the most divisive regulatory influence on local bird hunting activities. Some area residents objected to the ban and hunted during traditional times of the year, that is, April, May, June, and August. Other residents observed the September 1 opening. Both groups of waterfowl hunters were very concerned with the health and size of waterfowl populations.

Gathering Berries and Wood

A diversity of edible plant species found in the Upper Tanana area have been used by residents for a variety of purposes, and considerable time and effort go into their harvest. Between June 1987 and May 1988, 65.4 percent of households in the five communities used edible plants and 50.6 percent used locally harvested wood. This did not include wood purchased through commercial sources.

Edible berries include alpine berry (*Arctostaphylos alpina*), bog blueberry (*Vaccinium uliginosum*), bog (lowbush) cranberry (*Vaccinium vitis-idaea*), crowberry or blackberry (*Empetrum nigrum*), highbush cranberry (*Viburnum edule*), nagoonberry (*Rubus arcticus*), pea-vine root (*Hedysarum alpinum*), raspberry (*Rubus idaeus*), salmonberry or cloudberry (*Rubus chamaemorus*). Other edible plants used included rosehips (*Rosa acicularis*), Labrador or Hudson Bay tea (*Ledum groenlandicum*), and wild rhubarb (*Polyganum alaskanum*).

Additionally, several other plant species have been used by Upper Tanana residents for medicinal purposes (Halpin 1987:25). Trees include white spruce (*Picea glauca*), black spruce (*Picea mariana*), paper birch (*Betula papyrifera*), balsam popular (*Populus balsamifera*), and willow (*Salix* sp.).

Berries were collected at locations generally near the local communities. Sites were accessible either by road or river travel, although several residents were able to walk to locations from their residence. More distant sites included areas along the Taylor Highway or Tok Cutoff where the road provided access to different vegetation types. Knowledge of picking areas was required since different kinds of berries became available throughout the summer. Berry picking trips were generally day-long outings with several family members or friends.

Firewood was cut along highways, rivers, and trails which were accessible to vehicles. Since timber resources accompany land ownership, residents had to be aware of the land status before cutting firewood. The Alaska Department of Natural Resources issued permits for woodcutting in specific designated state-owned land. Native village corporation lands were also managed for controlled timber harvests. Local highway construction projects such as the widening of the Alaska Highway provided timber in readily accessible areas. Other forest products such as birch for sled construction, birch bark and spruce roots for basket making, or other wood for making other tools had to be carefully selected.

REGIONAL HARVEST LEVELS AND PARTICIPATION RATES

This section describes findings from the 1988 household survey conducted Dot Lake, Tanacross, Tok, Tetlin, and Northway. Participation in harvest activities and resource sharing are presented as are estimates of the overall harvest quantities.

Resource harvest and use characteristics for the five Upper Tanana communities are presented in Table 11. Included are data showing the percentage of households which used, attempted harvest, actually harvested, received, and gave wild resources; the diversity of

TABLE 11. RESOURCE HARVEST AND USE CHARACTERISTICS OF FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988[a].

Community	For any resource, percentage of households which					Mean number of resources per household[b]					Pounds harvested	
	Used	Attempted harvest	Harvested	Received	Gave	Used	Attempted harvest	Harvested	Received	Gave	Per household	Per capita
Dot Lake (N=20)	100.0 %	100.0 %	100.0 %	86.7 %	60.0 %	10.7	7.3	6.8	5.0	3.7	377.7	114.5
Tanacross (N=34)	96.3	96.3	96.3	96.3	63.0	10.4	8.1	7.2	3.7	2.5	684.9	250.4
Tok (N=367)	94.1	87.7	84.2	79.7	28.8	8.6	7.1	6.4	2.6	0.9	439.6	149.2
Tetlin (N=29)	100.0	89.7	89.7	89.7	79.3	10.3	8.0	7.2	4.1	2.3	854.1	213.5
Northway (N=90)	100.0	95.6	95.6	93.3	60.0	11.8	10.7	9.0	4.1	3.0	1,001.0	278.0
All (N=540)	95.7	90.1	87.8	83.8	40.0	9.4	7.8	6.9	3.1	1.5	568.6	182.8

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.
[b] Based on a maximum of 51 resource types.

resources used; and the average quantities harvested as measured in edible pounds per household and pounds per person.

Overall in the region, the average per capita harvest of wild food was 182.8 pounds. The average household harvested 568.6 pounds. Sharing between households was evident in the large percentage (83.8 percent) of households that received wild food from other households. The average household received three different resource types from others. A total of 95.7 percent of Upper Tanana households used wild foods during the year (Table 11). On the average, households harvested seven different wild resources and used about nine. Variations between communities in the resource harvest and use pattern are discussed in chapter 5.

The proportion of the total harvest represented by seven resource categories is shown in Table 12 and in Figure 10. Overall in the five communities, big game accounted for 39.5 percent of the total harvest and non-salmon fish accounted for 33.8 percent. The remaining 26.7 percent consisted of salmon (15.6 percent), small game-furbearers (5.4 percent), birds (3.2 percent), edible plants (2.4 percent), and marine invertebrates (<.05 percent).

Estimates of the per capita harvest and household harvest (in pounds) and of the total harvest (in number) are presented for each resource type in Table 13. The two activities which resulted in the greatest harvest quantities were moose hunting and whitefish fishing. Taken together, they accounted for over one-half the total harvest. Salmon fishing, which took place in the Copper River drainage, resulted in 28.6 pounds per capita, or 15.6 percent of the total. This contrasts with many other interior Alaska communities along major salmon-producing streams where salmon fishing yields over one-half of the total subsistence harvest (Andrews 1988; Case and Halpin 1990; Marcotte 1990; Sumida 1988; Sumida and Andersen 1990). In the Upper Tanana, the contribution of non-salmon fish, as a category, was second only to big game. Hare accounted for most of the small game food harvest as measured in pounds, which supports hare's importance in Upper Tanana subsistence (Guedon 1974). Marten and muskrat were the primary furbearer resources in terms of the numbers taken for fur. Muskrat are also eaten. This shows the continued importance of muskrat hunting, a pattern described by Guedon (1974). Nearly

TABLE 12. TOTAL EDIBLE POUNDS HARVESTED AND PERCENTAGE OF TOTAL HARVEST BY RESOURCE CATEGORY, FIVE UPPER TANANA COMMUNITIES, 1987-88.[a]

Resource	Dot Lake		Tanacross		Tok		Tetlin		Northway		All	
	lbs.	(%)	lbs.	(%)	lbs.	(%)	lbs.	(%)	lbs.	(%)	lbs.	(%)
Salmon	1,329	(17.6)	3,598	(15.4)	38,147	(23.6)	286	(1.1)	4,684	(5.2)	48,044	(15.6)
Non-salmon fish	2,094	(27.7)	8,231	(35.3)	37,351	(23.2)	14,353	(57.9)	41,873	(46.5)	103,902	(33.8)
Big game	3,177	(42.0)	9,250	(39.7)	72,153	(44.7)	7,535	(30.4)	29,146	(32.4)	121,261	(39.5)
Small game and furbearer	308	(4.1)	1,001	(4.3)	4,673	(2.9)	1,464	(5.9)	9,164	(10.2)	16,610	(5.4)
Birds	148	(2.0)	498	(2.1)	5,363	(3.3)	667	(2.7)	3,135	(3.5)	9,812	(3.2)
Marine invertebrates	0	(0.0)	0	(0.0)	49	(<.05)	0	(0.0)	0	(0.0)	49	(<.05)
Edible plants	499	(6.6)	709	(3.0)	3,581	(2.2)	461	(1.9)	2,088	(2.3)	7,338	(2.4)
All resources	7,555	(100.0)	23,287	(100.0)	161,317	(100.0)	24,767	(100.0)	90,091	(100.0)	307,017	(100.0)

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Characteristics reported by sample households were expanded on a household basis to estimate total community characteristics.

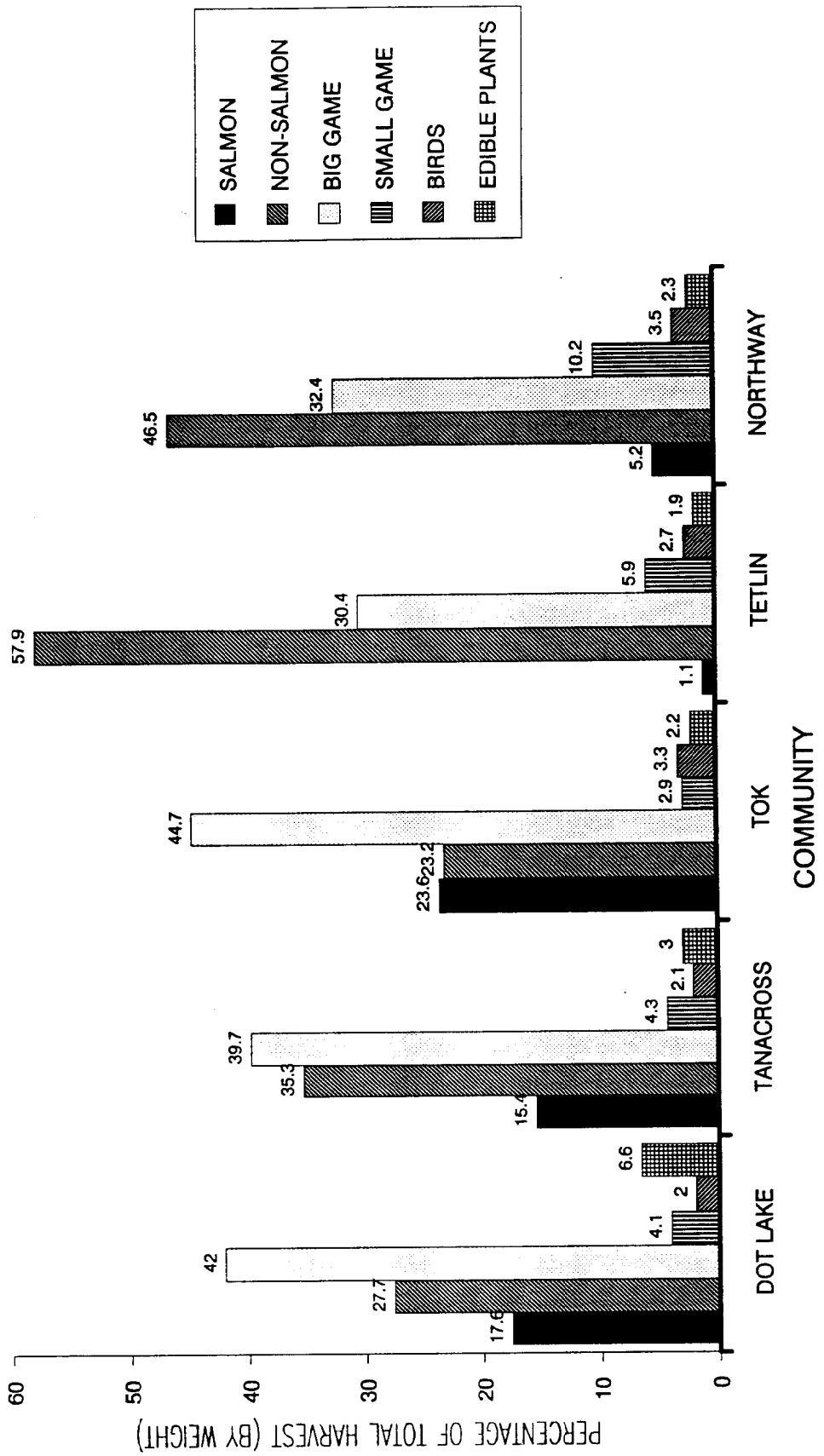


Fig. 10. Percentage of total harvest by resource category, five Upper Tanana communities, 1987-88.

TABLE 13. LEVELS OF HOUSEHOLD HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES OF FIVE UPPER TANANA COMMUNITIES COMBINED, JUNE 1987 - MAY 1988.[a]

Resource	Percentage of households which					Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated total harvest (number)	95 percent confidence interval (+/-)
	Used	Attempted harvest	Harvested	Received	Gave				
Salmon	**73.7 %**	**36.8 %**	**35.1 %**	**57.5 %**	**8.6 %**	**28.6**	**89.0**	-	**23.8%**
Chinook salmon	37.5	13.7	13.0	29.6	1.8	4.0	12.6	391	30.4
Sockeye salmon	40.3	15.0	14.0	31.5	5.2	12.5	39.0	5,139	45.4
Chum salmon	6.6	5.6	5.6	3.0	0.5	2.0	6.1	462	82.4
Pink salmon	3.2	2.9	2.9	0.6	0.2	0.5	1.6	293	66.2
Coho salmon	21.1	10.6	10.2	14.4	2.0	7.4	23.0	2,320	35.7
Landlocked salmon	10.5	10.2	10.2	0.3	0.3	0.8	2.3	902	67.7
Unknown salmon	8.6	1.1	1.1	7.4	0.5	1.4	4.4	584	76.0
Non-salmon fish	**84.7**	**72.2**	**72.2**	**35.1**	**20.9**	**61.8**	**192.4**	-	**15.0**
Arctic grayling	58.4	52.6	51.3	9.5	11.2	3.4	10.6	8,185	20.6
Burbot	42.6	34.4	34.0	10.7	7.6	4.7	14.7	3,304	25.3
Dolly Varden	1.9	1.7	1.7	0.2	0.4	0.1	0.2	129	54.7
Halibut	21.1	6.6	6.6	15.7	1.3	2.7	8.4	4,556 (pounds)	48.8
Lake trout	19.5	18.5	18.5	1.6	3.0	1.4	4.2	1,144	33.3
Longnose sucker	6.1	4.1	5.8	1.0	1.2	0.7	2.1	1,654	60.5
Northern pike (lg.)	34.7	29.6	29.6	7.0	7.0	5.0	15.7	3,022	24.7
Northern pike (sm.)	6.4	5.4	5.4	1.7	1.0	1.3	4.0	2,185	63.2
Rainbow trout	29.0	27.7	27.7	2.4	2.7	3.1	9.6	3,699	37.6
Sheefish	2.9	2.9	2.9	0.0	0.0	0.6	2.0	293	171.5
Whitefish *sp.*	45.1	33.3	32.9	18.6	13.3	38.8	120.8	31,056	19.0
Big game	**79.5**	**65.7**	**41.8**	**59.0**	**22.2**	**72.2**	**224.6**	-	**21.4**
Bison	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
Black bear	20.4	14.9	7.2	13.6	2.9	2.0	6.2	54	25.6
Brown bear	1.5	3.6	1.2	0.3	0.0	0.0	0.0	7	52.0
Caribou	58.6	42.4	22.2	38.0	10.6	12.2	37.9	158	34.4
Dall sheep	4.4	7.4	2.8	1.3	0.3	0.6	1.7	14	45.4
Deer	2.5	2.1	2.1	0.6	0.9	0.8	2.6	33	53.7
Moose	71.7	55.9	26.2	50.1	17.5	56.6	176.1	147	24.8
Small game and furbearer	**56.6**	**54.0**	**53.7**	**12.6**	**12.4**	**9.9**	**30.8**	-	**24.9**
Beaver	4.4	3.4	2.8	1.5	1.1	0.6	1.8	70	45.7
Coyote	3.4	3.7	3.4	0.0	0.3	0.0[b]	0.0[b]	43	71.4
Hare	51.4	49.2	48.4	8.0	9.4	7.1	22.2	7,990	22.8
Land otter	1.1	1.4	1.1	0.0	0.0	0.0[b]	0.0[b]	12	84.9

Table 13 (Five Upper Tanana Communities) continued

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated total harvest (number)	95 percent confidence interval (+/-)
Small game and furbearer (continued)									
Lynx	4.9 %	11.7 %	4.9 %	0.0 %	0.0 %	<.05	0.1	63	42.7%
Marten	24.8	24.8	22.8	2.0	0.9	0.0[b]	0.0[b]	3,375	33.9
Mink	6.9	7.5	6.9	0.0	0.0	0.0[b]	0.0[b]	200	44.5
Muskrat	13.4	12.2	11.7	1.7	2.7	2.0	6.3	4,489	43.5
Porcupine	7.3	7.5	5.4	2.3	1.7	0.1	0.4	47	32.5
Red fox	13.1	14.8	13.1	0.0	0.6	0.0[b]	0.0[b]	311	33.5
Red squirrel	2.4	2.4	2.4	0.0	0.0	<.05	<.05	111	181.2
Weasel	3.6	3.5	3.2	0.4	0.3	0.0[b]	0.0[b]	106	69.5
Wolf	3.8	4.8	3.8	0.0	0.0	0.0[b]	0.0[b]	30	72.6
Wolverine	3.5	4.1	3.5	0.0	0.0	0.0[b]	0.0[b]	47	131.1
Birds	**65.4**	**61.2**	**61.2**	**12.6**	**14.0**	**5.8**	**18.2**	-	16.9
Crane	1.0	1.0	1.0	0.0	0.0	0.1	0.3	25	108.3
Duck *sp.*	34.0	29.5	29.2	8.5	10.7	2.6	8.0	5,848	28.1
Goose *sp.*	8.8	9.1	7.9	3.6	2.7	0.2	0.6	228	56.3
Grouse *sp.*	59.3	56.2	56.2	4.8	9.0	2.2	6.9	7,425	22.0
Ptarmigan *sp.*	35.6	34.2	33.6	3.4	6.7	0.8	2.4	2,592	20.7
Swan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0
Waterfowl eggs	0.8	1.3	0.8	0.0	0.3	<.05	<.05	6 (dozen)	74.5
Marine invertebrates	**0.3**	**0.3**	**0.3**	**0.0**	**0.0**	**<.05**	**0.1**	-	**123.9**
Crab *sp.*	0.3	0.3	0.3	0.0	0.0	<.05	<.05	25 (pounds)	122.6
Shrimp	0.3	0.3	0.3	0.0	0.0	<.05	<.05	25 (pounds)	122.6
Edible plants	**65.4**	**62.9**	**62.6**	**10.7**	**7.5**	**4.4**	**13.6**	-	**28.9**
Berries	54.0	51.8	50.9	5.0	5.4	3.8	11.8	1,590 (gallons)	30.1
Plants	26.8	24.9	24.9	3.4	3.1	0.6	1.8	977 (quarts)	32.8
Wood	**50.6**	**45.0**	**44.7**	**7.3**	**2.6**	**0.0[b]**	**0.0[b]**	**8,184 (cords)**	**147.1**
All resources	**95.7**	**90.1**	**87.8**	**83.8**	**40.0**	**182.8**	**568.6**	-	**13.4**

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests. N=540 households with 1,680 people.

[b] Resource not eaten.

one-half of the bird harvest was accounted for by ducks and over one-third by grouse. Together ducks and grouse accounted for almost all the bird harvest.

Several harvest activities appeared to result in only a small proportion of the total harvest, for example fishing for arctic grayling, burbot, and northern pike and hunting for black bear, hare, muskrat, and ptarmigan. Yet these activities are considered integral parts of the overall subsistence pattern by many residents. Such activities were of great importance to particular individuals, in particular times of the year, or in particular years of resource abundance.

The estimated total harvest (in number) was expanded from the harvests reported by sample households. The confidence interval, expressed as a percentage of the estimated total harvest, represents a range within which there is a 95 percent likelihood that the actual harvest quantity is contained.

Table 13 also shows the percentage of households which used, attempted to harvest, actually harvested, received, or gave each of the resource types. Moose and whitefish, the two resources which comprised over one-half of the overall harvest quantity, were used by 71.7 percent and 45.1 percent of households respectively. Seventy-four percent of households used salmon, yet salmon were virtually non-existent in the upper Tanana River drainage. Over one-half of the households used Arctic grayling, caribou, grouse, and berries. Sharing between households, as indicated by the percentage of households which received, is particularly evident with the following resources: chinook salmon (29.6 percent), sockeye salmon (31.5 percent), caribou (38.0 percent), and moose (50.1 percent).

CHAPTER 5. COMMUNITY HARVEST AND USE PATTERNS

This chapter more closely examines each of the five individual study communities and their pattern of fish and wildlife harvests, including community demographic and employment characteristics, harvest locations, and harvest levels. Resource harvest and use characteristics for each community are presented in Tables 14 to 18. Estimates of the per capita and per household harvest (in pounds) and of the total harvest (in number) are presented for each resource type, along with the confidence interval of those estimates expressed as a percentage of the estimated total harvest. Confidence intervals represent a range within which there is a 95 percent likelihood of containing the actual harvest quantity. These tables also show the percentage of households which used, attempted to harvest, actually harvested, received, or gave each of the resource types.

DOT LAKE

Dot Lake, located along the Alaska Highway 140 miles southeast of Fairbanks had a population of 67 in 1980 and 83 in 1988 (Alaska Department of Labor 1990) (Fig. 1). Based on the 1988 subsistence survey, the community of Dot Lake, including the Native Village of Dot Lake, was composed of 20 households, with an estimated population of 66. Of these people, 40.8 percent were Alaska Native and 59.2 percent were non-Native.

A random sample of 15 of the 20 households (75 percent) identified in Dot Lake were interviewed during the 1988 study. The sample included households located in the village and households situated along the Alaska Highway.

TABLE 14. LEVELS OF HOUSEHOLD HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, DOT LAKE, JUNE 1987 - MAY 1988.[a]

Resource	Percentage of households which					Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
	Used	Attempted harvest	Harvested	Received	Gave				
Salmon	**80.0 %**	**20.0 %**	**20.0 %**	**73.3 %**	**13.3 %**	**20.1**	**66.4**	**-**	**61 %**
Chinook salmon	53.3	6.7	6.7	46.7	6.7	1.0	3.4	4	100
Sockeye salmon	33.3	13.3	13.3	26.7	6.7	4.2	13.6	67	68
Chum salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Pink salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Coho salmon	6.7	6.7	6.7	6.7	0.0	10.8	35.7	133	98
Landlocked salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Unknown salmon	46.7	6.7	6.7	46.7	6.7	4.1	13.6	67	97
Non-salmon fish	**93.3**	**73.3**	**73.3**	**33.3**	**46.7**	**31.7**	**104.7**	**-**	**23**
Arctic grayling	66.7	53.3	53.3	20.0	46.7	4.8	15.8	452	32
Burbot	26.7	13.3	13.3	13.3	13.3	0.5	1.6	13	69
Dolly Varden	6.7	6.7	6.7	0.0	0.0	0.6	1.8	40	97
Halibut	6.7	6.7	6.7	0.0	0.0	3.0	10.0	200 (pounds)	98
Lake trout	60.0	40.0	40.0	26.7	26.7	3.7	12.1	121	46
Longnose sucker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Northern pike (lg.)	0.0	0.0	0.0	6.7	6.7	0.0	0.0	0	-
Northern pike (sm.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Rainbow trout	60.0	40.0	40.0	26.7	20.0	6.9	22.8	327	60
Sheefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Whitefish *sp.*	73.3	46.7	46.7	33.3	40.0	12.3	40.4	385	37
Big game	**93.3**	**60.0**	**33.3**	**73.3**	**20.0**	**48.1**	**158.8**	**-**	**44**
Bison	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Black bear	26.7	6.7	6.7	20.0	0.0	1.2	3.8	1	100
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Caribou	66.7	40.0	20.0	53.3	13.3	7.9	26.0	4	50
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Deer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Moose	73.3	46.7	20.0	66.7	20.0	39.1	129.0	4	50
Small game and furbearers	**73.3**	**53.3**	**53.3**	**20.0**	**13.3**	**4.7**	**15.4**	**-**	**38**
Beaver	6.7	6.7	6.7	0.0	0.0	<.05	<.05	4	100
Coyote	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Hare	66.7	46.7	46.7	20.0	13.3	4.6	15.1	201	47
Land otter	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-

Table 14 (Dot Lake) continued

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
Small game and furbearers (continued)									
Lynx	6.7 %	6.7 %	6.7 %	0.0 %	0.0 %	0.0	0.0	8	100 %
Marten	20.0	20.0	20.0	0.0	0.0	0.0[b]	0.0[b]	83	59
Mink	13.3	13.3	13.3	0.0	0.0	0.0[b]	0.0[b]	3	66
Muskrat	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Porcupine	6.7	6.7	6.7	0.0	0.0	0.1	0.3	1	100
Red fox	6.7	6.7	6.7	0.0	0.0	0.0[b]	0.0[b]	1	100
Red squirrel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Weasel	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Wolf	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Wolverine	6.7	6.7	6.7	0.0	0.0	0.0[b]	0.0[b]	1	100
Birds	73.3	60.0	60.0	40.0	46.7	2.2	7.4	-	26
Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Duck *sp.*	46.7	26.7	26.7	33.3	26.7	0.6	1.8	51	54
Goose *sp.*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Grouse *sp.*	53.3	46.7	46.7	13.3	33.3	1.1	3.7	148	32
Ptarmigan *sp.*	46.7	33.3	33.3	13.3	26.7	0.6	1.8	75	43
Swan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Waterfowl eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (dozen)	-
Marine invertebrates	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	29
Crab *sp.*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Shrimp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Edible plants	93.3	93.3	93.3	13.3	46.7	7.6	24.9	-	-
Berries	93.3	93.3	93.3	13.3	40.0	6.9	22.6	113 (gallons)	31
Plants	73.3	73.3	73.3	13.3	26.7	0.7	2.2	45 (quarts)	24
Wood	66.7	60.0	60.0	13.3	20.0	0.0[b]	0.0[b]	77 (cords)	32
All resources	100.0	100.0	100.0	86.7	60.0	114.5	377.7	-	30

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests. N=20 households with 66 people.

[b] Resource not eaten.

TABLE 15. LEVELS OF HOUSEHOLD HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, TANACROSS, JUNE 1987 - MAY 1988.[a]

Resource	Percentage of households which					Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
	Used	Attempted harvest	Harvested	Received	Gave				
Salmon	**85.2 %**	**22.2 %**	**22.2 %**	**81.5 %**	**11.1 %**	**38.7**	**105.8**	**-**	**37 %**
Chinook salmon	51.9	7.4	7.4	51.9	3.7	2.3	6.4	13	61
Sockeye salmon	48.1	7.4	7.4	48.1	0.0	6.6	18.2	151	74
Chum salmon	3.7	3.7	3.7	0.0	3.7	1.9	5.3	25	87
Pink salmon	3.7	3.7	3.7	3.7	3.7	6.4	17.4	201	89
Coho salmon	33.3	18.5	18.5	18.5	7.4	21.4	58.5	371	43
Landlocked salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Unknown salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Non-salmon fish	**85.2**	**74.1**	**74.1**	**40.7**	**33.3**	**88.5**	**242.1**	**-**	**16**
Arctic grayling	55.6	51.9	51.9	7.4	22.2	2.4	6.6	324	22
Burbot	18.5	11.1	11.1	7.4	7.4	3.2	8.9	126	71
Dolly Varden	11.1	7.4	7.4	3.7	0.0	0.6	1.7	65	86
Halibut	11.1	0.0	0.0	11.1	0.0	0.0	0.0	0 (pounds)	-
Lake trout	3.7	0.0	0.0	3.7	0.0	0.0	0.0	0	-
Longnose sucker	22.2	18.5	18.5	3.7	3.7	0.9	2.6	126	42
Northern pike (lg.)	51.9	51.9	51.9	3.7	14.8	12.6	34.5	419	19
Northern pike (sm.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Rainbow trout	18.5	14.8	14.8	3.7	7.4	0.8	2.2	53	49
Sheefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Whitefish *sp.*	85.2	70.4	70.4	18.5	29.6	67.8	185.5	3,003	18
Big game	**85.2**	**74.1**	**37.0**	**66.7**	**29.6**	**99.4**	**272.1**	**-**	**26**
Bison	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Black bear	3.7	3.7	3.7	0.0	3.7	1.6	4.3	3	66
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Caribou	63.0	51.9	18.5	44.4	14.8	10.6	28.9	8	37
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Deer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Moose	81.5	66.7	29.6	63.0	22.2	87.3	238.9	13	30
Small game and furbearer	**77.8**	**74.1**	**74.1**	**18.5**	**29.6**	**10.8**	**29.4**	**-**	**20**
Beaver	11.1	3.7	3.7	7.4	0.0	<.05	<.05	5	80
Coyote	7.4	7.4	7.4	0.0	0.0	0.0[b]	0.0[b]	4	50
Hare	77.8	74.1	74.1	3.7	29.6	9.8	26.9	611	15
Land otter	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-

Table 15 (Tanacross) continued

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
Small game and furbearer (continued)									
Lynx	0.0 %	7.4 %	0.0 %	0.0 %	0.0 %	0.0	0.0	0	-
Marten	22.2	22.2	22.2	0.0	0.0	0.0[b]	0.0[b]	303	45 %
Mink	3.7	3.7	3.7	0.0	0.0	0.0[b]	0.0[b]	1	100
Muskrat	22.2	7.4	3.7	18.5	0.0	<.05	<.05	13	84
Porcupine	22.2	18.5	18.5	3.7	0.0	0.9	2.5	19	57
Red fox	11.1	11.1	11.1	0.0	0.0	0.0[b]	0.0[b]	14	57
Red squirrel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Weasel	0.0	3.7	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Wolf	3.7	3.7	3.7	0.0	0.0	0.0[b]	0.0[b]	4	75
Wolverine	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Birds	**85.2**	**70.4**	**70.4**	**18.5**	**33.3**	**5.3**	**14.6**	-	**27**
Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Duck *sp.*	51.9	40.7	40.7	14.8	29.6	1.7	4.6	207	27
Goose *sp.*	25.9	18.5	18.5	7.4	3.7	0.4	1.1	24	41
Grouse *sp.*	74.1	63.0	63.0	11.1	22.2	2.1	5.8	398	28
Ptarmigan *sp.*	44.4	37.0	37.0	7.4	11.1	1.1	3.0	204	54
Swan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Waterfowl eggs	3.7	3.7	3.7	0.0	0.0	<.05	0.1	1 (dozen)	100
Marine invertebrates	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	-	-
Crab *sp.*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Shrimp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Edible plants	**96.3**	**88.9**	**88.9**	**18.5**	**14.8**	**7.6**	**20.8**	-	**24**
Berries	70.4	66.7	66.7	3.7	3.7	6.9	18.8	160 (gallons)	25
Plants	25.9	25.9	25.9	0.0	3.7	0.7	2.0	69 (quarts)	44
Wood	**88.9**	**77.8**	**77.8**	**14.8**	**14.8**	**0.0[b]**	**0.0[b]**	**305 (cords)**	**14**
All Resources	**96.3**	**96.3**	**96.3**	**96.3**	**63.0**	**250.4**	**684.9**	-	**15**

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests. N=34 households with 93 people.

[b] Resource not eaten.

TABLE 16. LEVELS OF HOUSEHOLD HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, TOK, JUNE 1987 - MAY 1988.[a]

Resource	Percentage of households which					Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
	Used	Attempted harvest	Harvested	Received	Gave				
Salmon	**79.4 %**	**44.6 %**	**43.2 %**	**58.3 %**	**8.8 %**	**35.3**	**103.9**	**-**	**31 %**
Chinook salmon	40.8	16.3	15.9	31.0	0.9	5.2	15.4	326	34
Sockeye salmon	43.2	16.8	15.9	31.7	6.1	16.4	48.2	4,315	54
Chum salmon	8.2	7.3	7.3	3.9	0.5	2.8	8.2	425	91
Pink salmon	3.9	3.9	3.9	0.0	0.0	0.2	0.7	91	82
Coho salmon	24.8	11.8	11.4	16.9	2.3	7.8	23.0	1,574	50
Landlocked salmon	15.5	15.1	15.1	0.5	0.5	1.2	3.4	902	69
Unknown salmon	7.8	0.9	0.9	6.4	0.0	1.7	5.0	447	97
Non-salmon fish	**80.8**	**67.6**	**67.6**	**28.4**	**10.4**	**34.5**	**101.8**	**-**	**22**
Arctic grayling	55.7	49.3	49.3	6.9	5.4	3.0	8.9	4,664	31
Burbot	40.2	32.9	32.9	7.8	3.2	4.7	13.8	2,118	36
Dolly Varden	0.9	0.9	0.9	0.0	0.0	<.05	<.05	13	92
Halibut	27.5	8.8	8.8	20.5	1.4	3.9	11.6	4,256 (pounds)	52
Lake trout	22.9	22.9	22.9	0.0	1.8	1.7	5.0	918	40
Longnose sucker	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Northern pike (lg.)	27.2	22.9	22.9	5.2	5.0	3.6	10.5	1,375	50
Northern pike (sm.)	0.5	0.5	0.5	0.5	0.0	<.05	0.1	33	127
Rainbow trout	35.0	34.5	34.5	1.8	2.3	4.2	12.3	3,227	43
Sheefish	4.3	4.3	4.3	5.2	0.0	1.0	2.9	292	177
Whitefish *sp.*	25.9	18.1	18.1	10.0	3.2	12.4	36.5	6,385	37
Big game	**73.5**	**61.2**	**42.7**	**49.2**	**19.0**	**66.8**	**196.6**	**-**	**24**
Bison	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Black bear	23.9	16.3	7.7	16.2	2.3	2.3	6.6	39	33
Brown bear	2.3	3.6	1.8	0.5	0.0	0.0	0.0	6	83
Caribou	60.1	42.3	24.5	36.5	9.3	13.5	39.9	112	47
Dall sheep	5.4	9.3	3.6	1.4	0.5	0.8	2.2	12	50
Deer	3.6	3.2	3.2	0.9	1.4	1.3	3.8	33	54
Moose	63.9	48.6	23.8	39.0	15.0	48.9	144.1	81	39
Small game and furbearer	**42.7**	**42.2**	**42.2**	**8.2**	**3.6**	**4.3**	**12.7**	**-**	**34**
Beaver	3.2	2.7	2.7	0.5	0.9	0.7	2.1	53	58
Coyote	4.3	4.8	4.3	0.0	0.5	0.0[b]	0.0[b]	39	79
Hare	35.9	35.5	35.5	4.8	2.3	3.6	10.5	2,562	39
Land otter	0.0	0.5	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-

Table 16 (Tok) continued.

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
Small game and furbearer (continued)									
Lynx	3.6 %	8.4 %	3.6 %	0.0 %	0.0 %	0.0	0.0	23	43 %
Marten	22.9	20.8	19.9	3.0	1.4	0.0[b]	0.0[b]	2,272	49
Mink	3.6	4.5	3.6	0.0	0.0	0.0[b]	0.0[b]	26	57
Muskrat	3.6	4.1	3.6	0.0	0.9	0.0	0.0	485	61
Porcupine	2.7	2.7	2.7	0.0	0.5	<.05	0.2	13	53
Red fox	12.0	12.9	12.0	0.0	0.9	0.0[b]	0.0[b]	182	46
Red squirrel	3.0	3.0	3.0	0.0	0.0	0.0	0.0	109	189
Weasel	4.8	4.8	4.8	0.0	0.5	0.0[b]	0.0[b]	106	70
Wolf	5.2	6.1	5.2	0.0	0.0	0.0[b]	0.0[b]	25	92
Wolverine	4.8	5.7	4.8	0.0	0.0	0.0[b]	0.0[b]	46	136
Birds	**55.7**	**55.2**	**55.2**	**5.7**	**5.9**	**5.0**	**14.6**	-	**26**
Crane	0.9	0.9	0.9	0.0	0.0	0.1	0.4	23	117
Duck *sp.*	19.5	19.5	19.0	1.8	4.1	1.5	4.4	2,128	63
Goose *sp.*	5.2	5.2	5.2	3.0	0.9	<.05	0.1	29	82
Grouse *sp.*	55.2	54.8	54.8	0.9	4.5	2.4	7.2	5,304	30
Ptarmigan *sp.*	33.4	33.8	32.9	0.9	2.7	0.8	2.5	1,826	27
Swan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Waterfowl eggs	0.5	0.5	0.5	0.0	0.5	<.05	<.05	3 (dozen)	133
Marine invertebrates	**0.0**	**0.5**	**0.5**	**0.0**	**0.0**	<.05	**0.1**	-	**128**
Crabs *sp.*	0.5	0.5	0.5	0.0	0.0	<.05	0.1	24 (pounds)	133
Shrimp	0.5	0.5	0.5	0.0	0.0	<.05	0.1	24 (pounds)	133
Edible plants	**54.1**	**54.1**	**54.1**	**6.6**	**1.4**	**3.3**	**9.8**	-	**55**
Berries	44.1	44.1	44.1	0.9	0.9	2.8	8.3	758 (gallons)	58
Plants	20.7	20.7	20.7	0.9	1.4	0.5	1.5	548 (quarts)	47
Wood	**42.8**	**38.0**	**37.5**	**5.7**	**0.5**	**0.0[b]**	**0.0[b]**	**897.8 (cords)**	
All Resources	**94.1**	**87.7**	**84.2**	**79.7**	**28.8**	**149.2**	**439.6**	-	**19**

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests. N=367 households with 1,081 people.

[b] Resource not eaten.

TABLE 17. LEVELS OF HOUSEHOLD HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, TETLIN, JUNE 1987 - MAY 1988.[a]

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
Salmon	**24.8 %**	**4.8 %**	**4.8 %**	**20.0 %**	**4.8 %**	**2.5**	**9.9**	**-**	**115 %**
Chinook salmon	9.7	0.0	0.0	9.7	0.0	0.0	0.0	0	-
Sockeye salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Chum salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Pink salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Coho salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Landlocked salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Unknown salmon	15.2	4.8	4.8	10.3	4.8	2.5	9.9	70	115
Non-salmon fish	**100.0**	**89.7**	**89.7**	**65.5**	**49.0**	**123.7**	**494.9**	**-**	**29**
Arctic grayling	51.0	51.0	40.7	25.5	20.0	1.3	5.3	219	66
Burbot	29.7	14.5	14.5	15.2	0.0	0.8	3.1	37	67
Dolly Varden	0.0	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	0.0	0 (pounds)	-
Lake trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Longnose sucker	38.6	0.0	38.6	0.0	4.8	2.0	8.2	340	30
Northern pike (lg.)	90.3	69.7	69.7	20.7	9.7	10.9	43.6	451	42
Northern pike (sm.)	44.8	40.0	40.0	4.8	4.8	3.3	13.2	382	63
Rainbow trout	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Sheefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Whitefish *sp.*	100.0	69.0	69.0	51.0	34.5	105.4	421.6	5,822	32
Big game	**89.7**	**59.3**	**34.5**	**84.8**	**34.5**	**65.0**	**259.8**	**-**	**66**
Bison	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Black bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Brown bear	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Caribou	9.7	14.5	4.8	4.8	4.8	1.6	6.3	1	200
Dall sheep	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Deer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Moose	89.7	59.3	34.5	84.8	34.5	63.4	253.5	11	63
Small game and furbearer	**89.7**	**79.3**	**79.3**	**25.5**	**44.1**	**12.6**	**50.5**	**-**	**55**
Beaver	9.7	20.0	9.7	0.0	9.7	1.7	6.9	8	87
Coyote	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Hare	89.7	79.3	79.3	15.2	34.5	6.5	25.9	500	42
Land otter	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-

Table 17 (Tetlin) continued

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
Small game and furbearer (continued)									
Lynx	0.0 %	15.2 %	0.0 %	0.0 %	0.0 %	0.0	0.0	0	-
Marten	14.5	40.0	14.5	0.0	0.0	0.0[b]	0.0[b]	40	89 %
Mink	14.5	14.5	14.5	0.0	0.0	0.0[b]	0.0[b]	9	77
Muskrat	60.0	49.7	49.7	10.3	4.8	4.4	17.4	506	83
Porcupine	15.2	9.7	4.8	10.3	4.8	<.05	0.2	1	200
Red fox	4.8	4.8	4.8	0.0	0.0	0.0[b]	0.0[b]	5	140
Red squirrel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Weasel	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Wolf	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Wolverine	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Birds	**79.3**	**54.5**	**54.5**	**44.8**	**24.8**	**5.8**	**23.0**	-	**47**
Crane	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Duck *sp.*	79.3	49.7	49.7	40.0	24.8	5.1	20.3	810	50
Goose *sp.*	4.8	4.8	4.8	0.0	0.0	<.05	<.05	1	200
Grouse *sp.*	34.5	19.3	19.3	15.2	0.0	0.3	1.2	72	79
Ptarmigan *sp.*	24.8	24.8	24.8	0.0	10.3	0.3	1.3	75	82
Swan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Waterfowl eggs	4.8	14.5	4.8	0.0	0.0	<.05	0.1	1 (dozen)	200
Marine invertebrates	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	-	-
Crab *sp.*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Shrimp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Edible plants	**100.0**	**69.0**	**64.1**	**70.3**	**24.8**	**4.0**	**15.9**	-	**61**
Berries	100.0	64.1	54.5	55.2	9.7	2.5	10.2	73 (gallons)	45
Plants	80.0	44.8	44.8	35.2	10.3	1.4	5.7	166 (quarts)	127
Wood	**79.3**	**59.3**	**59.3**	**30.3**	**4.8**	**0.0[b]**	**0.0[b]**	**64 (cords)**	**48**
All resources	**100.0**	**89.7**	**89.7**	**89.7**	**79.3**	**213.5**	**854.1**	-	**27**

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests. N=29 households with 116 people.

[b] Resource not eaten.

TABLE 18. LEVELS OF HOUSEHOLD HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES, NORTHWAY, JUNE 1987 - MAY 1988.[a]

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
Salmon	**60.0 %**	**24.4 %**	**20.0 %**	**53.3 %**	**6.7 %**	**14.5**	**52.0**	**-**	**56 %**
Chinook salmon	24.4	11.1	8.9	17.8	4.4	2.6	9.2	48	91
Sockeye salmon	40.0	15.6	13.3	35.6	4.4	7.6	27.6	606	66
Chum salmon	4.4	2.2	2.2	2.2	0.0	0.2	0.9	12	141
Pink salmon	2.2	0.0	0.0	2.2	0.0	0.0	0.0	0	-
Coho salmon	11.1	6.7	6.7	8.9	0.0	4.0	14.3	240	85
Landlocked salmon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Unknown salmon	4.4	0.0	0.0	4.4	0.0	0.0	0.0	0	-
Non-salmon fish	**93.3**	**84.4**	**84.4**	**51.1**	**44.4**	**129.2**	**465.3**	**-**	**30**
Arctic grayling	71.1	66.7	62.2	13.3	20.0	5.5	19.6	2,526	35
Burbot	68.9	60.0	57.8	22.2	26.7	7.5	26.9	1,008	33
Dolly Varden	2.2	2.2	2.2	0.0	2.2	<.05	0.1	10	140
Halibut	8.9	2.2	2.2	6.7	2.2	0.3	1.1	100 (pounds)	139
Lake trout	8.9	8.9	8.9	2.2	4.4	0.6	2.3	104	87
Longnose sucker	15.6	17.8	15.6	4.4	4.4	2.6	9.2	1,188	83
Northern pike (lg.)	46.7	42.2	42.2	11.1	13.3	6.7	24.1	776	32
Northern pike (sm.)	22.2	17.8	17.8	6.7	4.4	5.5	19.7	1,770	77
Rainbow trout	11.1	11.1	11.1	0.0	0.0	0.4	1.4	92	72
Sheefish	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Whitefish *sp.*	84.4	66.7	64.4	40.0	35.6	100.2	360.7	15,460	32
Big game	**95.6**	**84.4**	**44.4**	**84.4**	**28.9**	**90.0**	**323.8**	**-**	**43**
Bison	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Black bear	17.8	20.0	8.9	11.1	6.7	2.0	7.4	10	70
Brown bear	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0	-
Caribou	64.4	48.9	20.0	48.9	15.6	12.8	46.2	32	59
Dall sheep	4.4	6.7	2.2	2.2	0.0	0.4	1.4	2	150
Deer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Moose	93.3	82.2	33.3	75.6	20.0	74.6	268.8	38	47
Small game and furbearer	**91.1**	**86.7**	**84.4**	**22.2**	**31.1**	**28.3**	**101.8**	**-**	**37**
Beaver	4.4	0.0	0.0	4.4	0.0	0.0	0.0	0	-
Coyote	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Hare	88.9	86.7	82.2	17.8	22.2	19.0	68.6	4,116	36
Land otter	6.7	6.7	6.7	0.0	0.0	0.0[b]	0.0[b]	12	83

Table 18 (Northway) continued

Resource	Percentage of households which: Used	Attempted harvest	Harvested	Received	Gave	Per capita harvest (pounds)	Mean household harvest (pounds)	Estimated community total (number)	95 percent confidence interval (+/-)
Small game and furbearer (continued)									
Lynx	13.3 %	26.7 %	13.3 %	0.0 %	0.0 %	0.2	0.6	32	71 %
Marten	37.8	37.8	37.8	0.0	0.0	0.0[b]	0.0[b]	676	44
Mink	17.8	17.8	17.8	0.0	0.0	0.0[b]	0.0[b]	160	54
Muskrat	37.8	37.8	37.8	0.0	11.1	8.9	32.0	3,484	54
Porcupine	17.8	22.2	11.1	8.9	6.7	0.2	0.6	12	58
Red fox	22.2	28.9	22.2	0.0	0.0	0.0[b]	0.0[b]	108	57
Red squirrel	2.2	2.2	2.2	0.0	0.0	0.0	0.0	2	150
Weasel	2.2	0.0	0.0	2.2	0.0	0.0[b]	0.0[b]	0	-
Wolf	0.0	2.2	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Wolverine	0.0	0.0	0.0	0.0	0.0	0.0[b]	0.0[b]	0	-
Birds	**91.1**	**84.4**	**84.4**	**22.2**	**28.9**	**9.7**	**34.8**	-	**26**
Crane	2.2	2.2	2.2	0.0	0.0	<.05	0.1	2	150
Duck *sp.*	68.9	60.0	60.0	17.8	22.2	5.9	21.2	2,652	34
Goose *sp.*	20.0	24.4	17.8	6.7	11.1	0.8	2.8	174	71
Grouse *sp.*	80.0	73.3	73.3	13.3	20.0	2.3	8.3	1,502	27
Ptarmigan *sp.*	42.2	37.8	37.8	11.1	15.6	0.6	2.3	412	34
Swan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	-
Waterfowl eggs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (dozen)	-
Marine invertebrates	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	-	-
Crabs *sp.*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Shrimp	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 (pounds)	-
Edible plants	**82.2**	**80.0**	**80.0**	**4.4**	**15.6**	**6.4**	**23.2**	-	**39**
Berries	64.4	64.4	62.2	4.4	15.6	6.0	21.6	485 (gallons)	41
Plants	24.4	24.4	24.4	2.2	2.2	0.5	1.6	148 (quarts)	47
Wood	**55.6**	**53.3**	**53.3**	**2.2**	**2.2**	**0.0[b]**	**0.0[b]**	**378 (cords)**	**28**
All resources	**100.0**	**95.6**	**95.6**	**93.3**	**60.0**	**278.0**	**1,001.0**	-	**30**

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests. N=90 households with 324 people.

[b] Resource not eaten.

Demographic and Employment Characteristics

The average household size in Dot Lake was 3.3 people, slightly above the average of 3.1 in the region. Of the 66 residents, an estimated 38.8 percent were born in the Upper Tanana area, which is lower than Tanacross, Tetlin, or Northway, but is higher than Tok. Dot Lake household heads moving to the Upper Tanana region resided in the region an average of 9.7 years, the lowest found in the five communities, which suggests population shifts in the community have been more recent.

In general, there were few employment opportunities in Dot Lake. Of the 44 adults in Dot Lake, 25 (56.8 percent) held any employment during the study year, and only 15 (57.9 percent) of those were employed for 12 months of the year. Households in Dot Lake averaged $15,225 of earned income from all job sources. Nearly one-half (45 percent) of jobs were in the service sector and most (75.0 percent) of the jobs held were located in Dot Lake (Table 8). Another 20.0 percent were located in other Upper Tanana communities and 5.0 percent were located outside the region. These averages mask important differences among the community households, in that some households had members which generally held stable employment year to year while other households experienced very low employment rates year to year.

Harvest Locations

Maps depicting areas used for fishing, hunting, and trapping by Dot Lake residents between 1946 and 1982 were documented in an earlier subsistence study (Martin 1983). Fishing sites included lakes, rivers, and streams along the Tanana River valley from the Gerstle River to the Robertson River. Residents also traveled to salmon fishing sites in the Copper River drainage from 160 to 250 miles south of Dot Lake, such as the traditional site of Batzulnetas. Moose hunting areas included river, trail, and road-accessible areas between the Gerstle River and Tok. Caribou hunting areas included both the Macomb Plateau and valley bottom between

Gerstle River and Yerrick Creek. Several hunters reported traveling to the Fortymile River drainage via the Taylor Highway for caribou hunting. Mountain areas between the Johnson River and Yerrick Creek were used for sheep hunting. Trapping took place over extensive areas between the Gerstle and Robertson rivers.

Harvest and Use

Dot Lake residents harvested an estimated total of 7,555 edible pounds of wild resources between June 1987 and May 1988 (Table 12). Resource harvest and use characteristics for Dot Lake are presented in Table 14. Estimates of the per capita and per household harvest (in pounds) and of the total harvest (in number) are presented for each resource type, along with the confidence interval of those estimates expressed as a percentage of the estimated total harvest. This table also shows the percentage of Dot Lake households which used, attempted harvest, actually harvested, received, or gave each of the resource types.

Dot Lake households harvested an average of 377.7 edible pounds of wild food per household from June 1987 to May 1988, representing 114.5 pounds per capita. Moose hunting was an important single contributor, comprising 34.2 percent of the total harvest, while fishing resulted in 45.3 percent. Several other harvest activities, contributing smaller proportions of the total output, were an integral part of the overall subsistence harvest pattern. Such activities were important to particular individuals or important at particular times of the year. These activities can also be significant in particular years given fluctuations in resource abundance. Nearly three out of four households in Dot Lake used resources from each resource category (Table 14). Most households attempted to harvest non-salmon fish and pick berries and a majority of households succeeded in harvesting non-salmon fish, birds, and berries. There was considerable sharing between households, with over one-third of all households receiving moose, caribou, chinook salmon, whitefish, and ducks.

The per capita harvest in Dot Lake of 114.5 pounds was about one-third lower than the 182.8 pound average found for the region in general. The composition of the harvest in Dot Lake differed from the general regional pattern in that edible plants made up a greater proportion of the harvest. All categories were used by 80 percent or more households, except small game and furbearers, birds, and marine invertebrates. All households that attempted to harvest succeeded except for moose (43 percent success rate) and caribou (50 percent success rate). Hare accounted for almost all of the small game and furbearers harvest. The greatest degree of sharing was of moose and caribou where almost all of those that harvested those species also gave it to other households.

TANACROSS

Tanacross is located 12 miles northwest of Tok, at the end of a one-mile gravel road north of the Alaska Highway. The population of Tanacross was 117 in 1980 and 96 in 1988 (Alaska Department of Labor 1990). Based on the 1988 subsistence survey, the community of Tanacross was composed of 34 households with an estimated population of 93. Of these people, 97.3 percent were Alaska Native. A random sample of 27 of the 34 households (79.4 percent) identified in Tanacross were interviewed for the 1988 subsistence survey.

Demographic and Employment Characteristics

Tanacross households had an average of 2.7 people, the lowest of the five communities. Of the 93 residents, an estimated 93.2 percent were born in the Upper Tanana area, which, along with Tetlin, was the highest proportion found in the five study communities. All households were headed by an Alaska Native and 97.3 percent of the Tanacross population was Alaska Native.

Tanacross was closely linked to Tok for services, stores, and employment. Of the 69 adults in Tanacross, 37 (53.6 percent) were employed sometime during the study year, and only

five of those were employed for 12 consecutive months of the year (Table 7). Households in Tanacross averaged $14,106 earned income from all job sources. The majority of jobs were in federal government, followed by local government (Table 9). Of the estimated 43 different jobs held, only 38.2 percent were located in Tanacross. An additional 35.3 percent were located in Tok, for a total of 73.5 in what could be considered in the local area (Table 10). Nearly one-quarter of the jobs held were located outside the Upper Tanana area, the highest proportion found among any of the study communities. These non-local jobs generally lasted less six weeks or less in duration and were either fire fighting jobs with the Bureau of Land Management or construction jobs outside the region.

Harvest Locations

Areas used by Tanacross residents for fishing from 1968 to 1988 are shown in Figure 11. Fishing sites included lake, river, and stream sites west to Lake George, east to Gardiner Creek, and south to the Copper River. Most fishing by Tanacross residents took place in the Lake Mansfield area, including the creeks connecting Lake Mansfield, Fish Lake, Wolf Lake, and the Tanana River. The whitefish, pike, and grayling resources in the Mansfield area have supported human populations as far back as people can recall, and archeological evidence at the Dixthada site suggests the dependency extends back to 500 B.C. (Shinkwin 1979). Tanacross residents feel strong cultural ties with these fishing sites and readily speak of the importance of fishing at the former Mansfield village site.

Tanacross moose hunting and sheep hunting areas are shown in Figure 12. Moose hunting took place along the Tanana River, at overland areas from Tanacross north to the historic site of Ketchumstuk, and along many of the area highways. Sheep were hunted in the Alaska Range between the Robertson River and the Tok River. In 1974, this particular area was designated as the Tok Management Area and has been managed to provide opportunity to hunt trophy-size sheep since that time through a random drawing permit system.

Caribou hunting and bear hunting areas used by Tanacross residents are shown in Figure 13. Most caribou hunting took place north of the Tanana River from Lake Mansfield north to the Kechumstuk area, and along the Taylor Highway. Caribou were also taken in the hills south and west of Tanacross. Black and brown bear were taken in the same areas as were used for caribou hunting, but also at areas along the Alaska Highway, the Tok Cutoff, and the Nabesna Road.

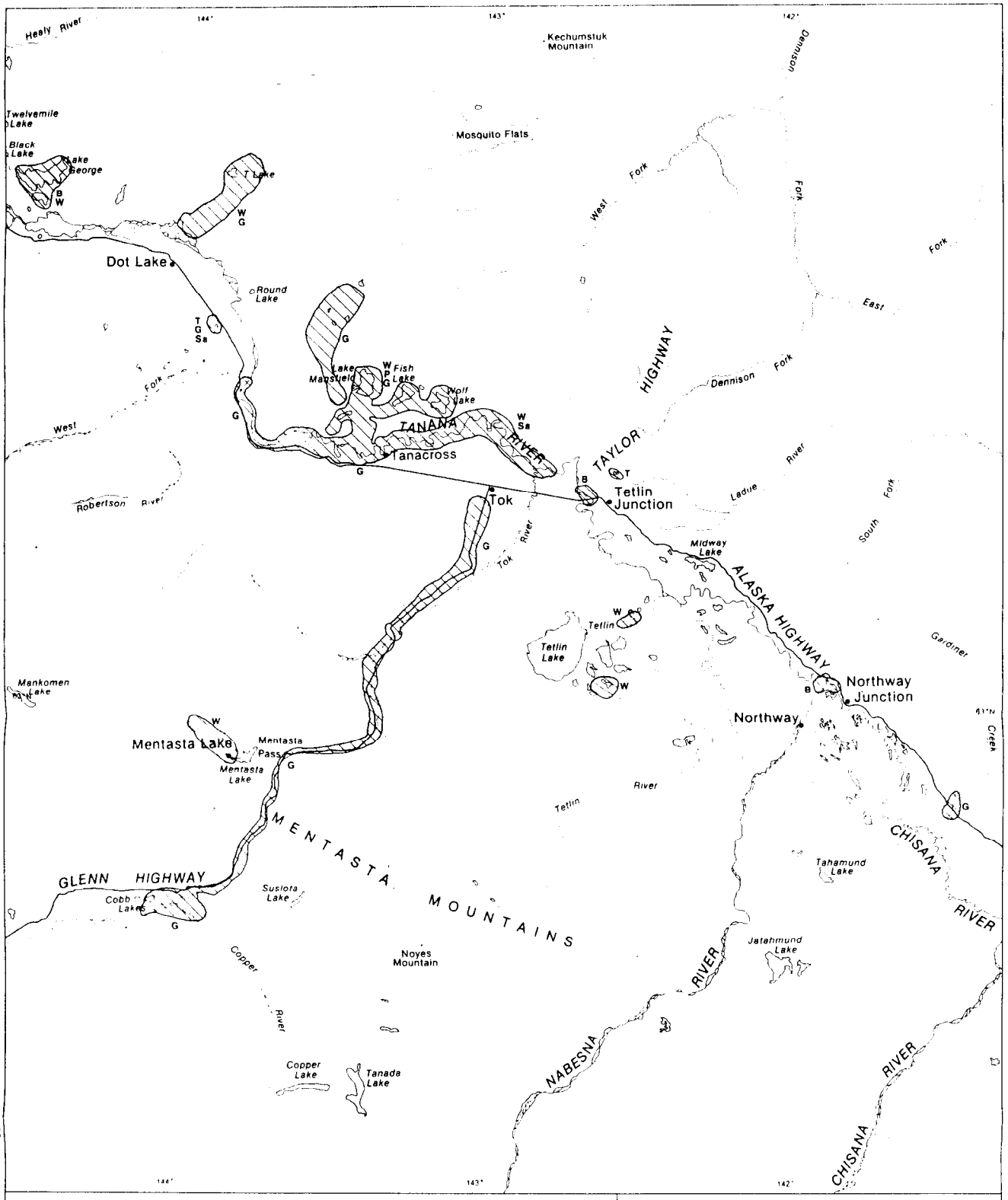
Areas used for hunting small game and waterfowl are shown in Figure 14. Most waterfowl hunting took place along the Tanana River between the Robertson River and the Tetlin River, in the Lake Mansfield area, and the upper Mansfield Creek. Small game were hunted near road or river accessible locations.

Areas used for trapping and berry picking are shown in Figure 15. Trapping took place north to the lower Mosquito Fork near Kechumstuk, west to the Sand Creek drainage north of Dot Lake, and south along the Eagle Trail, Clearwater Creek drainage and the Tok River southwest of Tok. Berries were picked at locations accessible along local rivers and roads.

Harvest and Use

Tanacross residents harvested an estimated 23,287 edible pounds of wild resources between June 1987 and May 1988 (Table 12). Resource harvest and use characteristics for Tanacross are presented in Table 15. Estimates of the per capita and per household harvest (in pounds) and of the total harvest (in number) are presented for each resource type, along with the confidence interval of those estimates expressed as a percentage of the estimated total harvest. This table also shows the percentage of Tanacross households which used, attempted to harvest, actually harvested, received, or gave each of the resource types.

Households in Tanacross harvested an average of 684.9 edible pounds per household or 250.4 pounds per capita of wild food from June 1987 to May 1988. The per capita harvest in Tanacross was higher than the 182.8 pound average for the region in general. The composition



Use areas are based on a key respondent sample of 19 community households [with additions made during a community review].

FISHING

B — BURBOT (ling cod)
G — GRAYLING
P — NORTHERN PIKE
Sa — SALMON (includes landlocked silver)
Sh — SHEEFISH
T — TROUT (lake, rainbow, dolly varden)
W — WHITEFISH

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur; consult with local communities for definitive information.

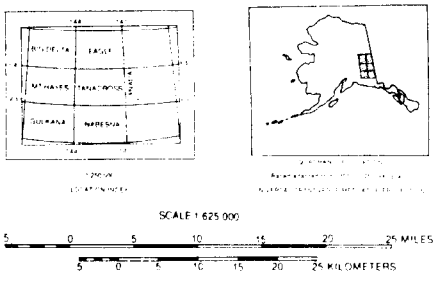
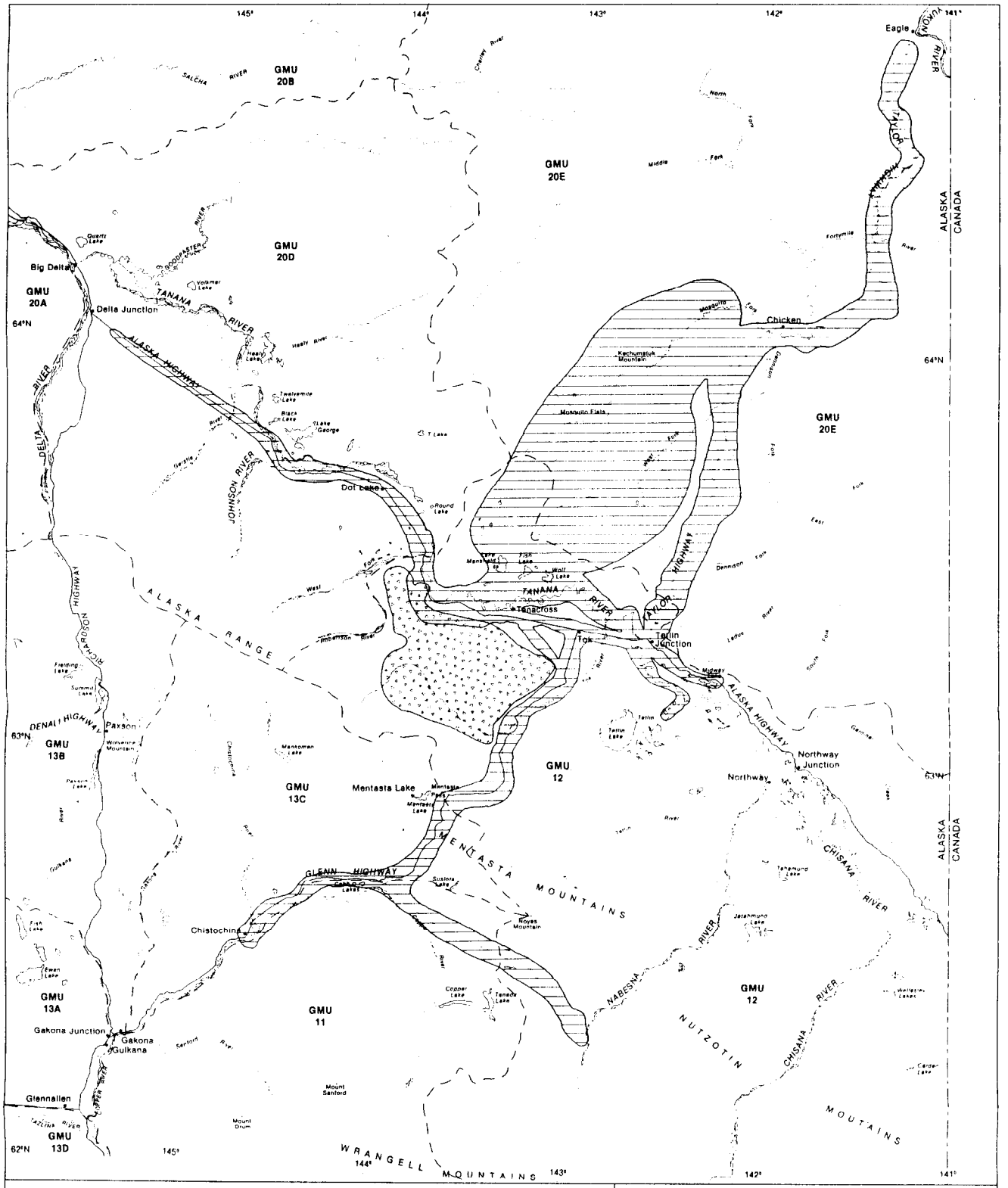


FIGURE 11. TANACROSS FISHING AREAS, 1968-1988



Use areas are based on a key respondent sample of 19 community households [with additions made during a community review.]

MOOSE HUNTING

SHEEP HUNTING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.

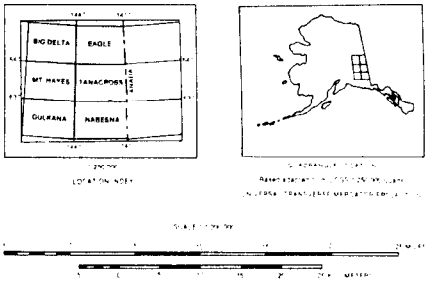
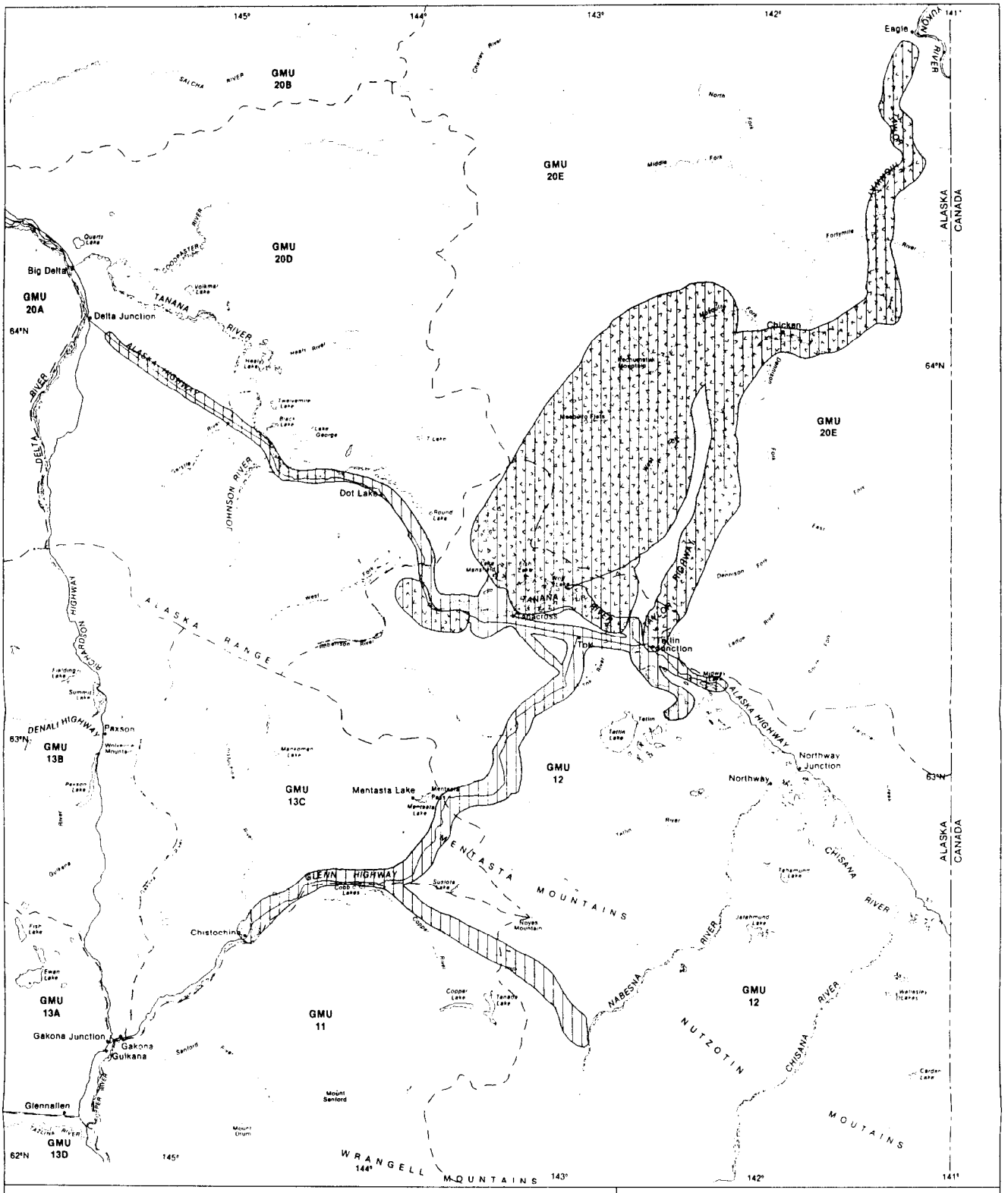


FIGURE 12. TANACROSS MOOSE AND SHEEP HUNTING AREAS, 1968-1988



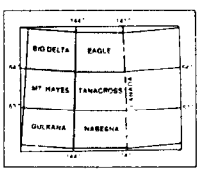
Use areas are based on a key respondent sample of 19 community households [with additions made during a community review.]

BEAR HUNTING

CARIBOU HUNTING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.



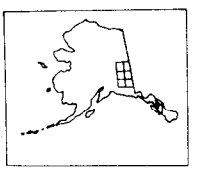
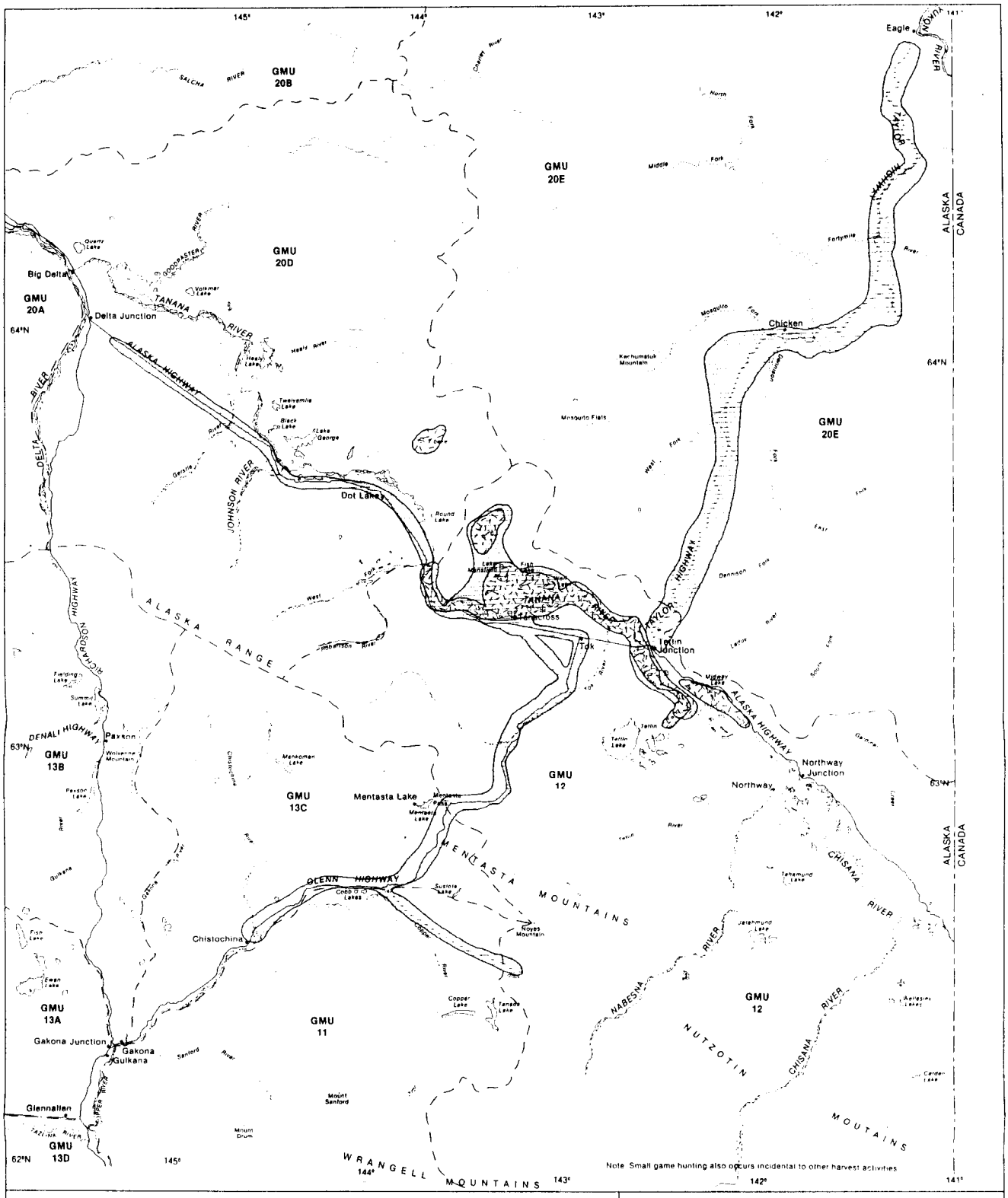


FIGURE 13. TANACROSS BEAR AND CARIBOU HUNTING AREAS, 1968-1988



Note: Small game hunting also occurs incidental to other harvest activities

Use areas are based on a key respondent sample of 19 community households [with additions made during a community review.]

SMALL GAME HUNTING

WATERFOWL HUNTING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.

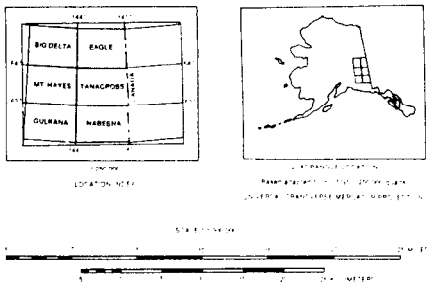
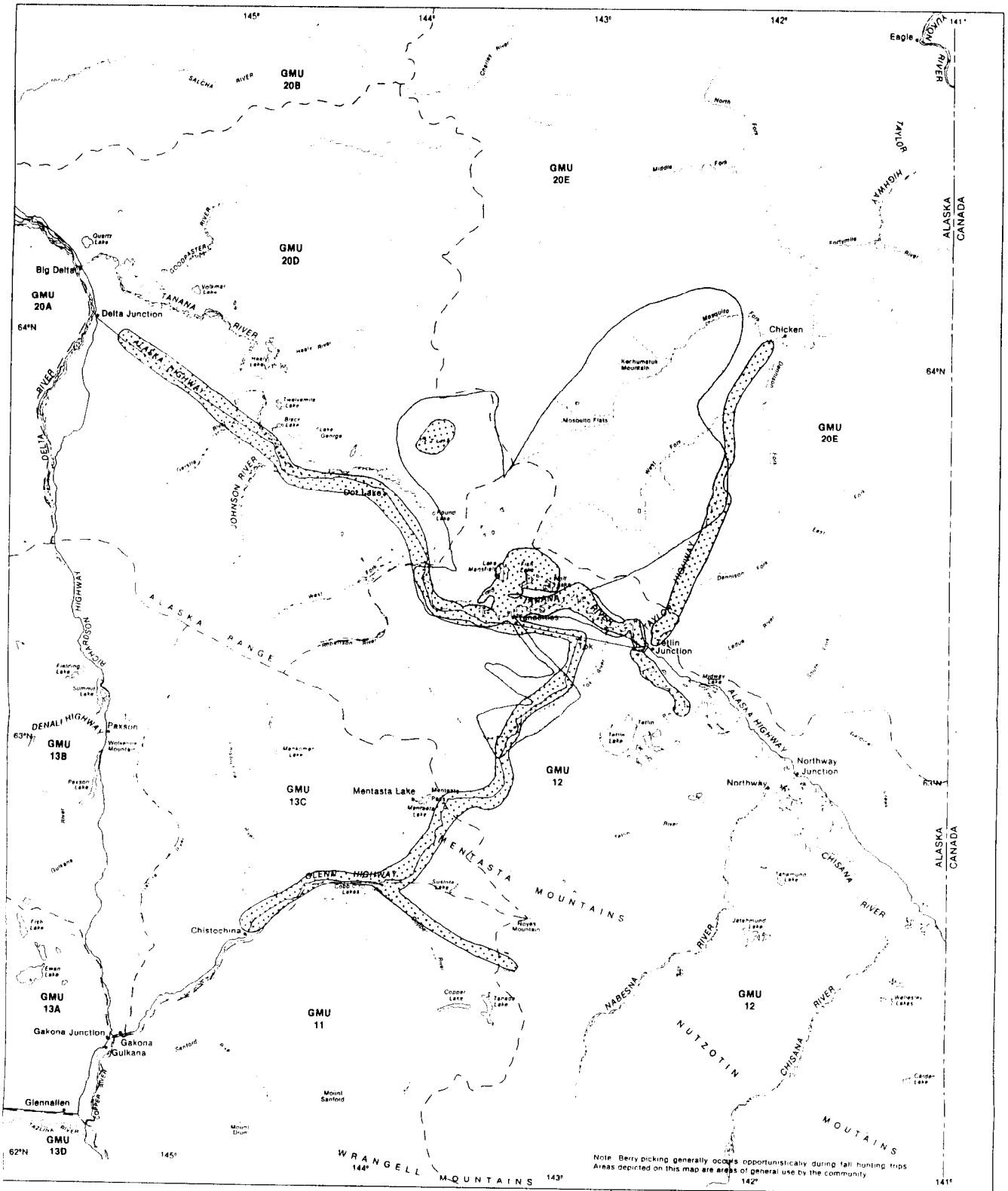


FIGURE 14. TANACROSS SMALL GAME AND WATERFOWL HUNTING AREAS, 1968-1988



Note: Berry picking generally occurs opportunistically during fall hunting trips. Areas depicted on this map are areas of general use by the community.

Use areas are based on a key respondent sample of 19 community households (with additions made during a community review.)

TRAPPING

BERRY PICKING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.

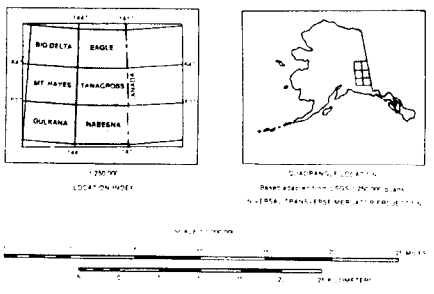


FIGURE 15. TANACROSS TRAPPING AND BERRY PICKING AREAS, 1968-1988

of the overall harvest by Tanacross residents was consistent with the general regional pattern; however, the Tanacross salmon harvest was the highest per capita of the five communities. Moose hunting and whitefish fishing together accounted for 62 percent of the total harvest. Salmon fishing accounted for an additional 15 percent of the annual harvest. Several other harvest activities, although contributing a smaller proportion of the total output, were also important parts of the overall subsistence harvest pattern. These included fishing for Arctic grayling, burbot, and northern pike, hunting caribou, hare, and birds, and picking berries. Such activities were important to particular individuals or in particular times of the year, and have been important in particular years of resource abundance.

Sharing between households resulted in a larger number of households using a resource than were successful in harvest. For example, 81.5 percent of households had at least some moose available for their use, although only 29.6 percent of the households successfully harvested moose.

The pattern of resource harvest by Tanacross residents included several features. Eighty-five percent or more households used resources from each resource category except small game and furbearers, and marine invertebrates (Table 15). Similar to Dot Lake, all households that attempted harvest succeeded, except for moose, caribou, and muskrat hunting. Success rates (the proportion of successful harvesters of those attempting harvest) for these activities were less that those noted at Dot Lake. Hare accounted for almost all of the small game and furbearers harvest. The greatest degree of sharing was of moose and caribou where almost all of those that harvested those species also gave it to other households.

TOK

Tok serves as a regional center for the Upper Tanana area. The community is centered at the junction of the Alaska Highway and the Tok Cutoff which connects to the Glenn Highway. The population of the Tok area was 589 in 1980 and 908 in 1988 (Alaska Department of Labor

1990). Based on the 1988 subsistence survey, there were 367 households with an estimated population of 1,081. Of these people, 11.0 percent were Alaska Native.

The overall sampling fraction used in Tok was 25.3 percent. A stratified sampling procedure was used to yield the most accurate data extrapolations for the given sample size. Twenty-three of the 251 (9.2 percent) "low" harvesting households were sampled and 70 of the 116 (60.3 percent) "high" harvesting households were sampled, resulting in the overall sampling fraction in Tok of 25.3 percent.

Demographic and Employment Characteristics

The average household size in Tok was 2.9 people, the second lowest of the five study communities. Of the 1,081 residents, an estimated 20.1 percent were born in the Upper Tanana area, which was the lowest percentage found in the five study communities. Only 11.0 percent of the Tok population was Alaska Native, lower than the 15.3 percentage found statewide in 1988 (Alaska Department of Labor 1990). Tok household heads who moved to Tok from outside the region have resided in the region an average length of 12.9 years.

As a hub community for the Upper Tanana area, Tok offered the greatest employment opportunities of the five communities. Of the 782 adults in Tok, 547 (70.0 percent) held some employment during the study year, the highest employment rate found in the five communities (Table 6). Of those employed adults, 59.8 percent were employed for 12 consecutive months of the year. Households in Tok averaged $23,537 of earned income from all job sources. The majority of jobs were in the professional, technical, managers occupational category, followed by the service category (Table 8). Several state and federal agencies staffed offices in Tok. Of the 599 jobs held by Tok residents, 86.9 percent were actually located in Tok.

Harvest Locations

Tok residents reported using more extensive and diverse areas for fishing, hunting, and trapping than residents of other Upper Tanana communities who reported using more localized areas. This pattern may be attributed in part to the larger community size, a greater availability of aircraft and motor vehicles for access to resources, and the more recent settlement history of the community without long-term ties to particular areas. In Tok for example, only 7.7 percent of the household heads were born in the Upper Tanana, as compared with about 90 percent found in Tanacross and Tetlin. Consequently, many Tok fishermen, hunters, and trappers have established relatively new family patterns of fishing, hunting, and trapping locations in the region rather than following previously established patterns set by their family members.

Areas used by Tok residents for fishing between 1968 and 1988 are shown on Figures 16 and 17. The species of fish taken are also indicated. Included are sites north of Chicken, east to the Canada border, south to Gulkana, and west to the Gulkana River and Delta. Sockeye salmon and coho salmon were harvested from the Copper River drainage. Whitefish, pike, and burbot were taken commonly along the Tanana River. Grayling were often taken at clearwater fishing sites in the Fortymile River drainage accessible from the Taylor Highway or from small aircraft landing strips. Trout fishing took place at stocked lakes along roads or at more remote lakes in the Wrangell Mountains.

Moose and sheep hunting areas are shown in Figure 18. Moose hunting took place north to the Yukon River, east to the Canada border, south to the Nabesna Road, and west to Delta and the Richardson Highway to Fairbanks. In addition to areas shown in Figure 18, moose hunting also occurred in the Yukon River valley from Eagle downstream to its confluence with the Charley River. These moose hunting areas included portions of Game Management Units 11, 12, 13C, 20D, and 20E. Sheep were taken in the Alaska Range, Mentasta Mountains, Nutzotin Mountains, Wrangell Mountains, and the Tanana-Yukon Uplands. Additional sheep hunting areas not depicted in Figure 18 included higher elevations near Mt. Sorenson, Mt.

Eldridge, Mt. Harper, Glacier Mountain, upper Seventymile River, and Crescent Creek in the Yukon-Tanana Uplands to the north. Additional areas in the Wrangell Mountains to the south included Goat Trail, Blue Lake, White River, Lime Creek, Chitistone River, and Nizina River.

Caribou hunting and bear hunting areas are shown in Figure 19. Caribou hunting occurred in the Fortymile and Ladue River drainages, the upper reaches of the Goodpaster and Healy rivers, the Alaska Range between the Johnson and Tetlin rivers, and the Copper River drainage. Bear hunting for both black and brown bear took place from Eagle to Nabesna.

Small game hunting and waterfowl hunting areas are shown in Figure 20. Most small game hunting occurred near the Taylor Highway, Tok Cutoff, old Valdez-Eagle Trail right-of-way southeast of Tanacross, and the "River Road" northeast of Tok. Other small game hunting took place incidental to other harvest activities such as moose hunting. Waterfowl were taken primarily along the Tanana River and associated wetlands as far west as Lake George and as far east as the lower Chisana River drainage.

Trapping and berry picking areas are shown in Figure 21. Contiguous trapping areas used by Tok residents were located in the Fortymile and Ladue River drainages to the north and east of Tok. Other areas used were along the Tok River and other drainages in the Alaska Range. Several isolated trapping areas in the general region were utilized by means of aircraft access. The trapping sites along the Tetlin River were used by residents of Tok who were formerly Tetlin residents.

Harvest and Use

Tok residents harvested an estimated total of 161,317 edible pounds of wild resources between June 1987 and May 1988 (Table 12). Resource harvest and use characteristics for Tok are presented in Table 16. Estimates of the per capita and per household harvest (in pounds) and of the total harvest (in number) are presented for each resource type, along with the confidence interval of those estimates expressed as a percentage of the estimated total harvest.

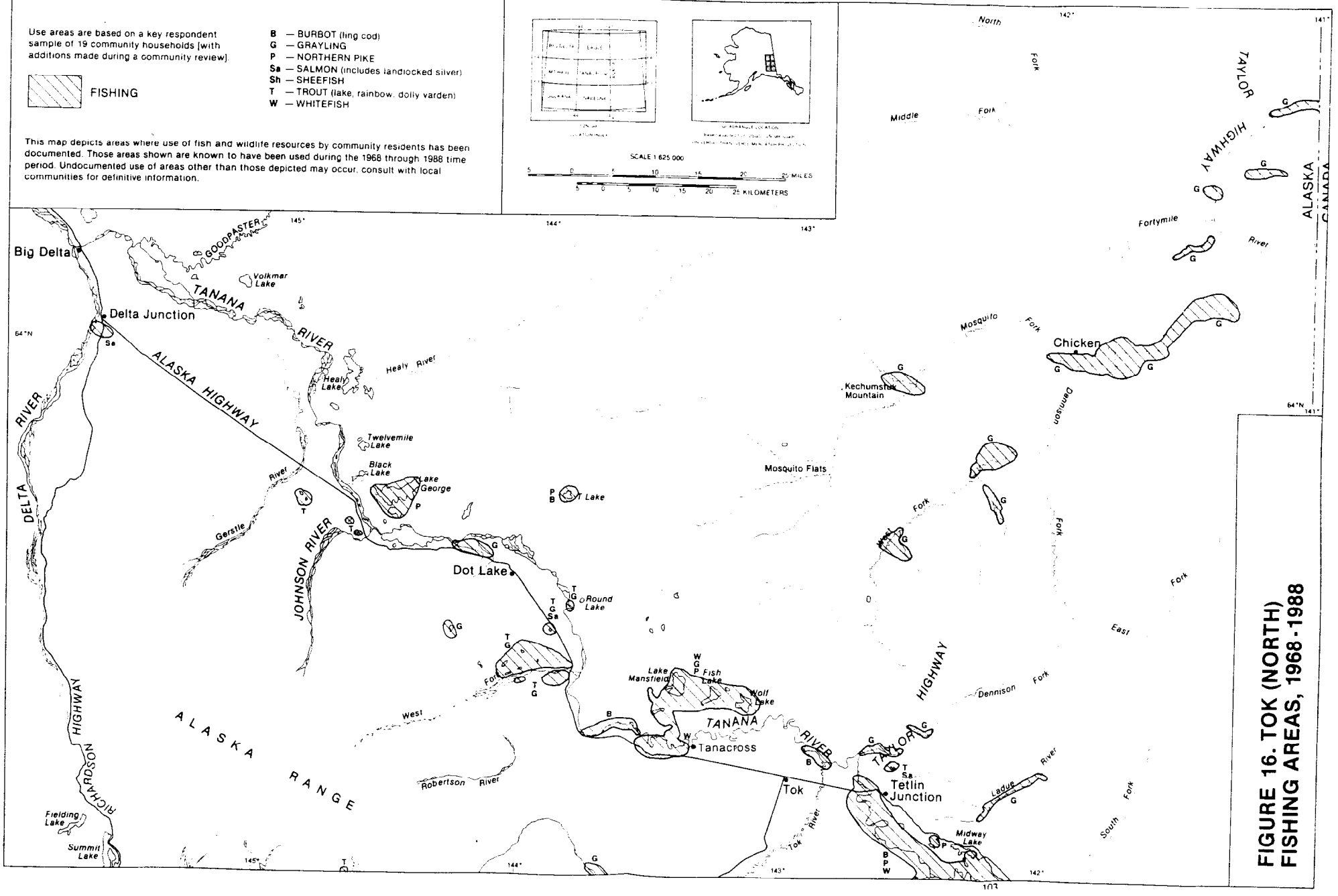
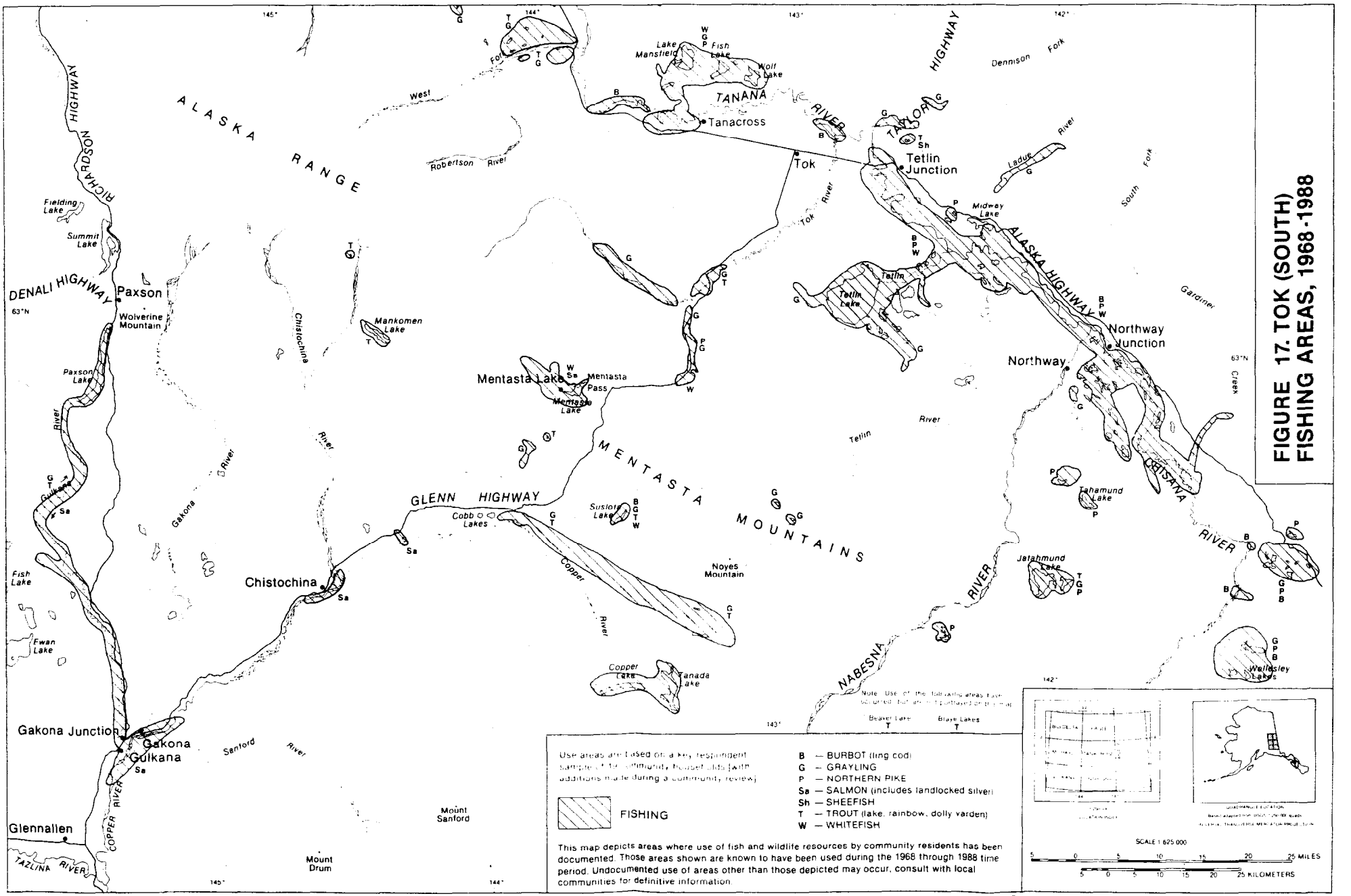
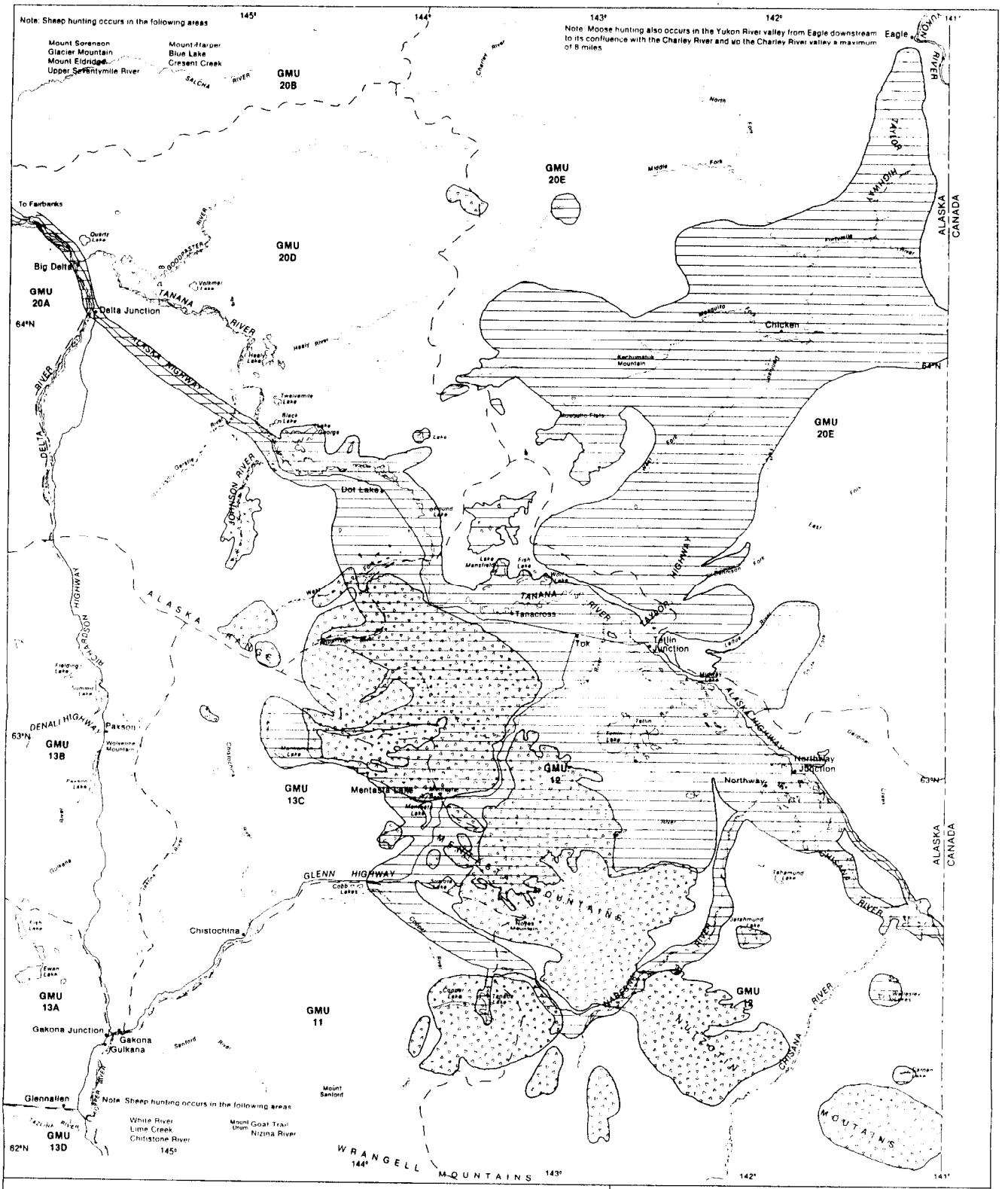


FIGURE 16. TOK (NORTH)
FISHING AREAS, 1968-1988


FIGURE 17. TOK (SOUTH)
FISHING AREAS, 1968-1988
ALASKA RANGE
TANANA
RIVER
Tanacross
Tok
Tetlin Junction
Northway Junction
Northway
ALASKA HIGHWAY
TAYLOR HIGHWAY
RICHARDSON HIGHWAY
DENALI HIGHWAY
GLENN HIGHWAY
MENTASTA MOUNTAINS
Paxson
Chistochina
Gakona Junction
Gakona
Gulkana
Glennallen
Mentasta Lake
Lake Mansfield
Fish Lake
Wolf Lake
Robertson River
Fielding Lake
Summit Lake
Wolverine Mountain
Mankomen Lake
Paxson Lake
Gakona River
Chistochina River
Mentasta Pass
Susiota Lake
Cabb Lakes
Copper River
Noyes Mountain
Copper Lake
Tanada Lake
Fish Lake
Ewan Lake
Sanford River
Mount Sanford
Mount Drum
COPPER RIVER
TAZLINA RIVER
Tok River
Midway Lake
Tetlin
Tetlin Lake
Tetlin River
Dennison Fork
South Fork
Ladue River
Gardiner Creek
CHISANA RIVER
NABESNA RIVER
Tahamund Lake
Jatahmund Lake
Wellesley Lakes
Beaver Lake
Blaze Lakes
Use areas are based on a key respondent sample of the community, Round 1 data (with additions made during a community review)
FISHING
B — BURBOT (ling cod)
G — GRAYLING
P — NORTHERN PIKE
Sa — SALMON (includes landlocked silver)
Sh — SHEEFISH
T — TROUT (lake, rainbow, dolly varden)
W — WHITEFISH
This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.
SCALE 1:625 000
5 0 5 10 15 20 25 MILES
5 0 5 10 15 20 25 KILOMETERS



Use areas are based on a key respondent sample of 19 community households [with additions made during a community review.]

MOOSE HUNTING

SHEEP HUNTING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.

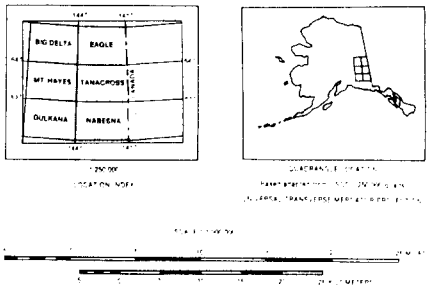
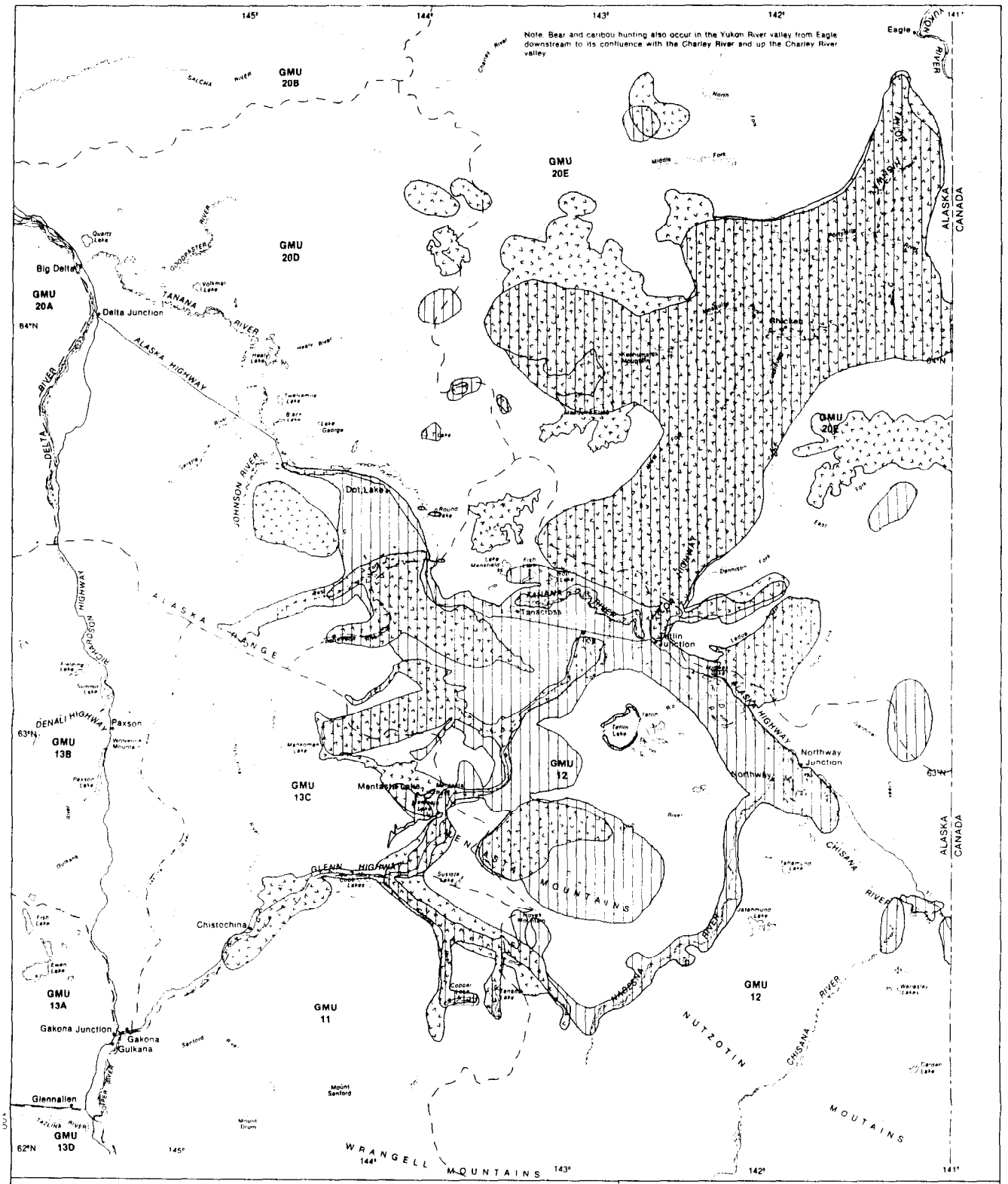


FIGURE 18. TOK MOOSE AND SHEEP HUNTING AREAS, 1968-1988



Use areas are based on a key respondent sample of 19 community households [with additions made during a community review.]

BEAR HUNTING

CARIBOU HUNTING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.

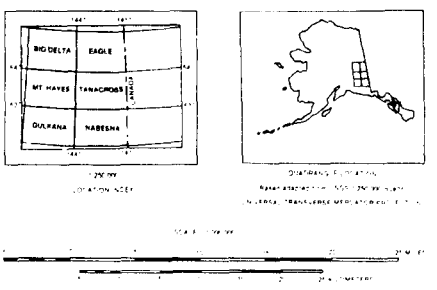
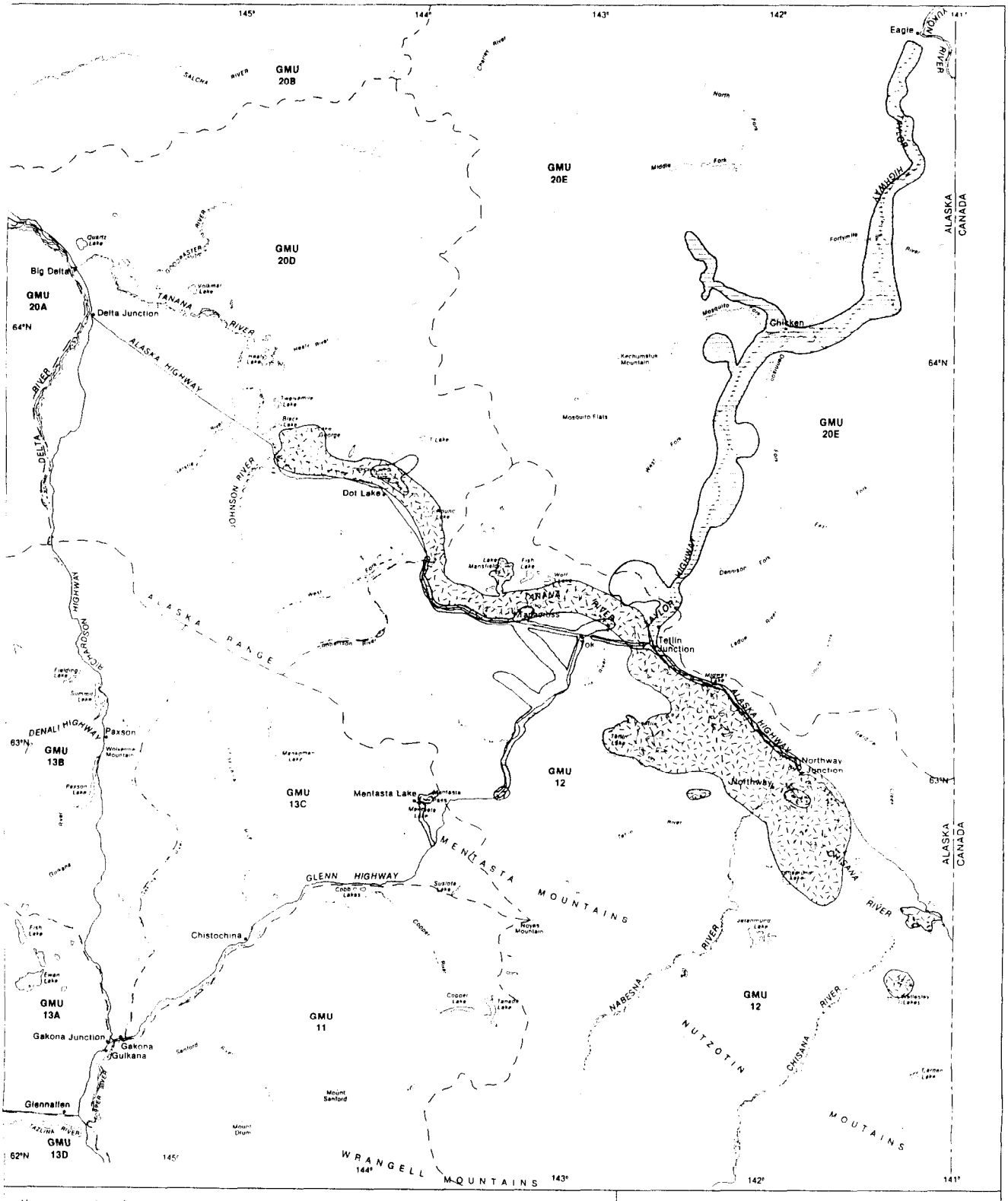


FIGURE 19. TOK BEAR AND CARIBOU HUNTING AREAS, 1968-1988



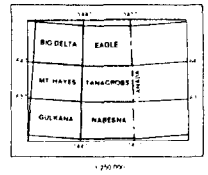
Use areas are based on a key respondent sample of 19 community households [with additions made during a community review.]

SMALL GAME HUNTING

WATERFOWL HUNTING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.



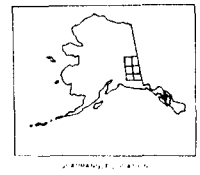
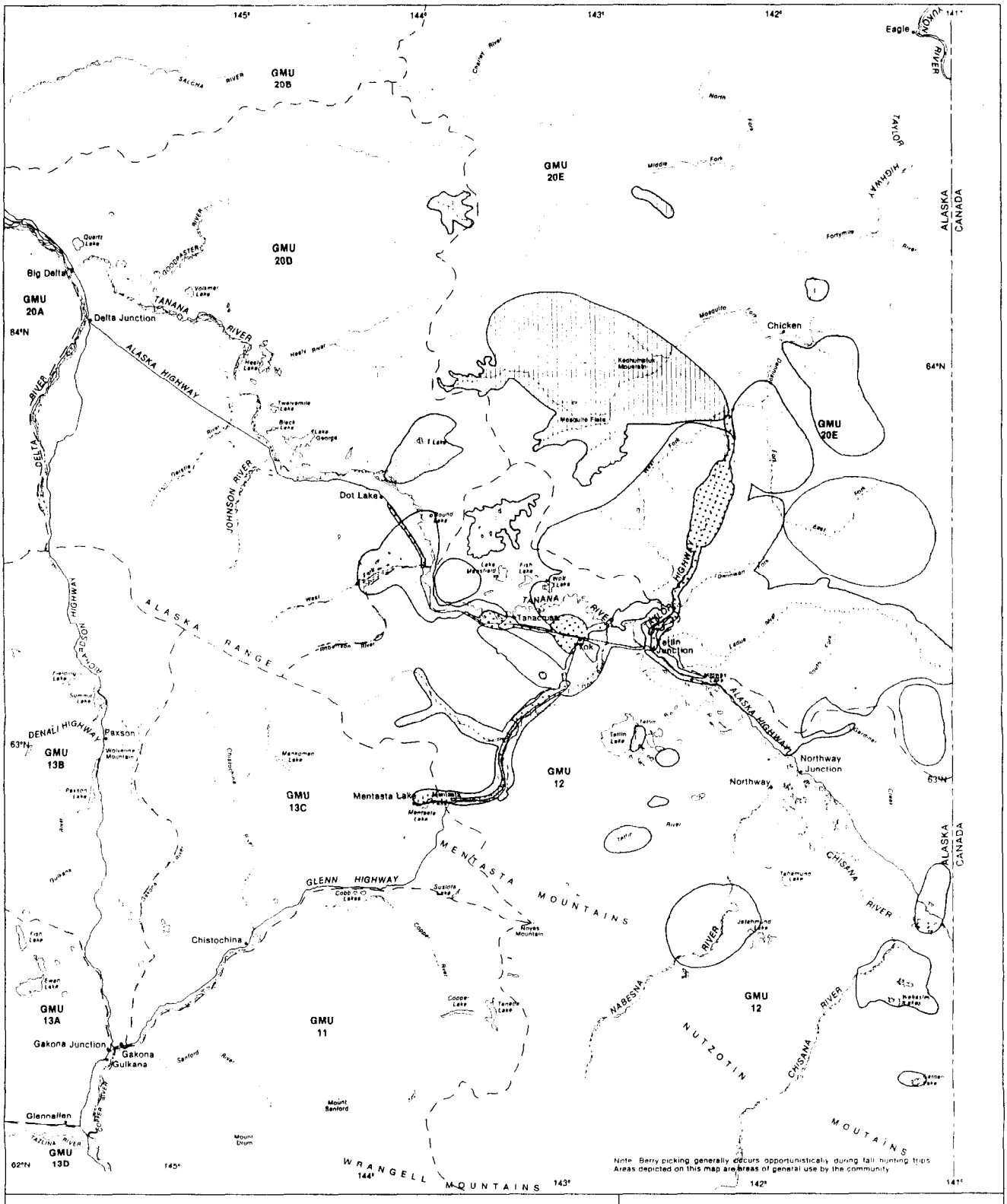


FIGURE 20. TOK SMALL GAME AND WATERFOWL HUNTING AREAS, 1968-1988



Note: Berry picking generally occurs opportunistically during fall hunting trips. Areas depicted on this map are areas of general use by the community.

Use areas are based on a key respondent sample of 19 community households [with additions made during a community review.]

TRAPPING

BERRY PICKING

GAME MANAGEMENT UNITS

This map depicts areas where use of fish and wildlife resources by community residents has been documented. Those areas shown are known to have been used during the 1968 through 1988 time period. Undocumented use of areas other than those depicted may occur, consult with local communities for definitive information.

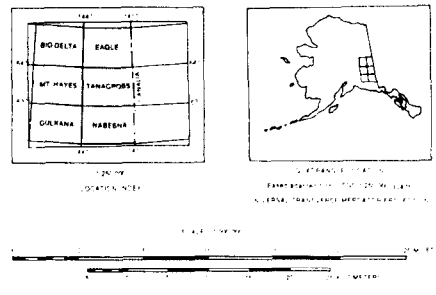


FIGURE 21. TOK TRAPPING AND BERRY PICKING AREAS, 1968-1988

This table also shows the percentage of Tok households which used, attempted to harvest, actually harvested, received, or gave each of the resource types.

Tok households harvested an average of 439.6 edible pounds per household or 149.2 pounds per capita of wild food from June 1987 to May 1988. The per capita harvest in Tok was higher than that reported for Dot Lake, but lower than that for Tanacross, Tetlin, or Northway (Table 16). The overall composition of the harvest by Tok households differed from other regional communities in that a larger proportion of the Tok harvest was made up of salmon and large game while a smaller portion was non-salmon fish species. Moose and sockeye salmon accounted for about 44 percent of the total harvest. Several other harvest activities, such as freshwater fishing or small game and waterfowl hunting, accounted for smaller proportions of the total output, yet remained important parts of the overall community harvest pattern. Different harvest activities were important to particular individuals or in particular times of the year, and have been important in particular years of resource abundance.

Sharing between households resulted in a wider distribution of wild food throughout the community. For example, caribou were successfully harvested by 24.5 percent of households, but another 36.5 percent of households received caribou meat from others, resulting in about 60 percent of households having caribou meat available for their use. Moose was given to other households by a larger percentage of households (15.0 percent) than any other resource; 39.0 percent of households received moose.

Several features of the Tok pattern were found. Households used a narrower range of wild resources than other Upper Tanana communities. Only for non-salmon fish, salmon, and big game categories did about three-fourths of Tok households use wild resources, unlike any of the other Upper Tanana communities (Table 16). Like other Upper Tanana communities, the percentage that attempted to harvest did not equal the percentage successful in harvesting for big game hunting and some furbearer hunting and trapping. Success rates were roughly 50 percent for moose and caribou among the households which attempted to harvest (Table 16). Moose hunting and fishing for sockeye salmon were major contributors the total harvest while fishing for

non-salmon fish contributed a smaller proportion of the total harvest in Tok. An average of 12.4 pounds of whitefish were taken per person in Tok, an amount similar to that taken by Dot Lake residents, but substantially less than that taken by Tanacross, Tetlin, or Northway residents. Grouse and duck hunting made up most of the bird harvest similar to the other communities. The harvest of hare contributed most of the small game and furbearer harvest, but is lowest of any of the five communities. Tok was the only community reporting harvest or use of marine invertebrates, deer, or brown bear during the study year.

TETLIN

Tetlin is a small community located along the Tetlin River 20 miles southeast of Tok. The population of Tetlin was 107 in 1980 and 92 in 1988 (Alaska Department of Labor 1990). Based on the 1988 subsistence survey, the community of Tetlin was composed of 29 households, with an estimated population of 116. Sample estimates suggest that all were Alaska Native.

The overall sampling fraction used in Tetlin was 51.7 percent. A stratified sampling procedure was used to yield the most accurate data extrapolations for the given sample size. Five of the 15 (33.3 percent) "low" harvesting households were surveys and 10 of the 14 (71.4 percent) "high" harvesting households were surveyed.

Demographic and Employment Characteristics

The average household size in Tetlin was 4.0 people, the largest average size found in the region. Tetlin also displayed the largest percentage of males in the population at 64.9 percent, possibly due to a proportionally larger outmigration of women in the 10- to 29-year old age range (Table 6). Of the 116 residents in Tetlin, an estimated 92.7 percent were born in the Upper Tanana area, which, along with Tanacross, was the highest of the five study communities.

All of the Tetlin sample population was Alaska Native and no non-Native households were identified among non-sample households.

In general, wage earning opportunities in Tetlin were relatively limited and the community's lack of road access made travel for employment outside the community difficult. Tetlin households earned an average only $7,191 of income from all job sources. This amount was less than one-third that earned by households in Tok. Of the 72 adults in Tetlin, 38 (52.8 percent) held any paid employment during the study year, and only 13 adults were employed for 12 consecutive months of the year. The majority of jobs were in the service sector (Table 8), with the largest employer being the local government (Table 9). The low rate of employment outside the community was shown by the absence of jobs held outside of Tetlin by the sampled households during the study year. Some residents had worked seasonally in other years on construction projects along the Alaska Highway or at restaurants in Tok. With only river, air, or winter road transportation to and from Tetlin, access to these employment sources was more impaired in comparison with other Upper Tanana communities.

Harvest Locations

Maps depicting areas used by Tetlin residents between 1974 and 1984 for fishing, hunting, and trapping were documented in an earlier subsistence study (Halpin 1987) to which the reader is referred. Most of these harvest areas were on lands set aside by the federal government in 1930 as the 768,000-acre Tetlin Indian Reserve. Fishing sites were documented along the Tetlin River both upstream and downstream from Tetlin Lake, the Kalutna River, the Tanana River, and at Tetlin Lake. Moose hunting areas included river and overland areas near the Tetlin River, the Kalutna River, and the Tanana River, and areas surrounding Tetlin Lake. Caribou hunting areas were located around Tetlin and, since 1950, along the Taylor Highway. Local availability of caribou fluctuates greatly year to year. Sheep hunting activity was limited during the 1974-84 period and specific harvest areas were not identified. Trapping occurred over

extensive areas west to the Tok River, north to the Alaska Highway, east to near the Nabesna River, and south to the upper reaches of the Tetlin River.

Harvest and Use

Tetlin residents harvested an estimated total of 24,767 edible pounds of wild resources between June 1987 and May 1988 (Table 12). Resource harvest and use characteristics for Tetlin are presented in Table 17. Estimates of the per capita and per household harvest (in pounds) and of the total harvest (in number) are presented for each resource type, along with the confidence interval of those estimates expressed as a percentage of the estimated total harvest. This table also shows the percentage of Tetlin households which used, attempted harvest, actually harvested, received, or gave each of the resource types.

Tetlin households harvested an average of 854.1 edible pounds per household or 213.5 pounds per capita of wild food from June 1987 to May 1988. The per capita harvest in Tetlin was lower than that reported for Tanacross or Northway and higher than for Dot Lake or Tok. The difference between the per household and per capita harvest levels is the greatest in Tetlin given that Tetlin had the largest average household size at four people per household. Tetlin residents depended heavily on whitefish. Whitefish fishing accounted for 49.4 percent of the total harvest. This was the greatest single-resource contribution found in the region. Moose hunting contributed 29.7 percent to the total harvest. Residents also used lower amounts of salmon, a resource harvested by many other Upper Tanana households at sites along the Copper River. Also unique to Tetlin was that about one-half of the households harvested muskrat and over one-third harvested small pike. Several other harvest activities comprised smaller portions of the total output, such as pike fishing and hunting for hare and ducks. These activities were important parts of the overall subsistence harvest pattern in Tetlin. Such activities were important to particular individuals or in particular times of the year, and could be significant in particular years given fluctuations in resource abundance.

Sharing was substantial between households. For example, 34.5 percent of households were successful in harvesting moose, 84.8 percent of households received moose meat from others, resulting in 89.7 percent of households using moose meat available the year of the study.

Several special features characterized Tetlin's harvest pattern. Household use of wild resources was high. Non-salmon fish, big game, and small game and furbearers were used by 90 percent or more of the households (Table 17). Tetlin had the lowest proportion of households using salmon of any of the Upper Tanana communities. Per capita and per household harvest of whitefish was the greatest for any of the communities. Most of the small game and furbearer harvest was comprised of hare, muskrat, and porcupine. Ducks accounted for almost all of the bird harvest. The percentage of households using edible plants was high (100.0 percent), similar to other Upper Tanana communities except Tok (54.1 percent).

NORTHWAY

Northway, the second largest community in the study area, is located about 50 miles southeast of Tok. Northway's population resides along the Alaska Highway and along the lower Nabesna and Chisana rivers five miles south of the Alaska Highway. The population of the greater Northway area was 185 in 1980 and 364 in 1988 (Alaska Department of Labor 1990). These population counts included two designated census places: Northway and Northway Village. Northway Village accounted for about 62 percent of these totals.

During the study period, four clusters of population were found in the greater Northway area: the Native village along the Nabesna River at the end of the seven-mile Northway Road, the airport area which includes the Federal Aviation Administration housing, the stretch of the Northway Road between the airport and the Chisana River bridge, and the area between mileposts 1252 and 1264 on the Alaska Highway. The 1988 subsistence survey used the greater Northway area as the sampling area. Accordingly, the community of Northway was composed of

90 households, with an estimated population of 324, of which 76.5 percent were Alaska Native. A random sample of 45 of the 90 households (50.0 percent) identified was interviewed.

Demographic and Employment Characteristics

The average household size in Northway was 3.6 people, somewhat greater than found in Dot Lake, Tanacross, or Tok. Of the 324 residents, an estimated 66.0 percent were born in the Upper Tanana area, less than Tanacross or Tetlin, but greater than Dot Lake or Tok. Northway household heads who moved to the region had resided in the region an average of 12.5 years.

In general, employment opportunities in Northway were relatively limited. Of the 206 adults in Northway, 106 (51.5 percent) held paid employment sometime during the study year, and only 41.5 percent of those were employed for 12 consecutive months of the year. Households in Northway averaged $11,894 of earned income from all job sources, the second lowest found in the five study communities. The majority of jobs held by Northway residents were in the service sector (Table 8), and the largest single employer was the federal government (Table 9). Ninety-three percent of the jobs held were actually located in Northway, with 1.6 percent located in other Upper Tanana communities. The remaining 4.8 percent were located outside the region.

Harvest Locations

Maps depicting areas used for fishing, hunting, and trapping between 1974 and 1984 were included in a previous report (Case 1986). Fishing areas used by Northway residents included lakes, rivers, and sloughs in the Northway Flats, which are the low-lying areas near lower reaches of the Nabesna and Chisana river. Moose hunting took place along water routes near the Tanana, Nabesna, Chisana, and Tetlin rivers, and along road-accessible areas near the Alaska Highway, Taylor Highway, Tok Cutoff, and Nabesna Road. Caribou hunting areas

included the hills north of Northway, the Taylor Highway corridor, and portions of the Nutzotin Mountains. Sheep hunting took place in the Nutzotin Mountains and areas along the Tok Cutoff. Trapping took place up the Nabesna River and Chisana River, over much of the Northway Flats, in the hills north of Northway and east to the Canada border, and along the Taylor Highway.

Harvest and Use

Northway residents harvested an estimated total of 90,091 edible pounds of wild resources between June 1987 and May 1988 (Table 12). Resource harvest and use characteristics for Northway are presented in Table 18. Estimates of the per capita and per household harvest (in pounds) and of the total harvest (in number) are presented for each resource type, along with the confidence interval of those estimates expressed as a percentage of the estimated total harvest. This table also shows the percentage of Northway households which used, attempted to harvest, actually harvested, received, or gave each of the resource types.

Northway households harvested an average of 1,001 edible pounds per household or 278.0 pounds per capita of wild food from June 1987 to May 1988. The per capita harvest in Northway was the highest reported for the five study communities. Whitefish fishing accounted for the largest proportion of the total at 36.0 percent. Northway whitefish harvest per capita (100.2 pounds) was similar to that found in Tetlin (105.4 pounds), and both exceeded that of other Upper Tanana communities nearly two-fold. Northway residents also reported the highest per capita harvest levels of birds, small game, and furbearers, and among the highest per capita harvest levels of big game. Moose hunting was the second largest contributor comprising 26.8 percent of the harvest. Other harvest activities played important roles in the overall subsistence harvest pattern, although they contributed smaller proportions of the total output. These activities, such as fishing for salmon, Arctic grayling, and northern pike, or hunting for caribou, hare, muskrat, ducks, and grouse, were important to particular individuals or important at

particular times of the year. These activities have also been significant in particular years given fluctuations in resource abundance.

Except for edible plants and salmon, over 90 percent of Northway households used locally available wild food resource categories. More than one-third of the households obtained sockeye salmon, whitefish, caribou, and moose through sharing. Over one-half used salmon even though it is not locally available. More than any other activities, households attempted hunting moose and hare (over 80 percent for each), although the success rate for moose hunting (40.5 percent of households who attempted) was the lowest of any activity. Over 60 percent of households harvested grayling, whitefish, hare, ducks, grouse, and berries.

CHAPTER 6. RELATIONSHIP OF HARVEST PATTERNS TO HOUSEHOLD CHARACTERISTICS

Although resource harvest and use patterns can be summarized at a community level, such as presented above in chapter 5, community patterns often mask the considerable variation found between households. For example, one household may harvest a substantial quantity of wild food and depend upon a wide variety of different resource types, while another household may harvest much smaller quantities of wild food or depend upon fewer resource types. As a way of indicating this variation between households in the five Upper Tanana communities, harvest patterns were examined on the basis of four different household characteristics:

1) length of time a household head resided in the local area,
2) ethnicity of a household head,
3) total income of the household, and
4) number of people in the household.

For each household characteristic, differences were examined between households in the total quantity of resources harvested, the breadth of resources harvested, and the portions of the total quantity comprised by eight major resource categories. Comparisons are made at a regional level, that is, household data were examined for all five communities combined. Similarities in the regional resource base and common elements in local harvest patterns provide a basis for the regional approach. However, a regional approach may obscure the variations present between different community patterns. It is also recognized that while each of these dimensions is examined independently, these characteristics could be examined using a multivariate analysis given that some may be interdependent.

DURATION OF HOUSEHOLD RESIDENCY IN REGION

The rationale for examining the relationship between length of residency and harvest patterns lies in the idea that residents who grew up in the region may be more active in hunting

and fishing than residents moving to the region from elsewhere, especially from outside Alaska or from the urban areas of Alaska where harvest levels are typically much lower. Also, it has been hypothesized that for those moving into the region, harvest levels may increase to some extent as the local residency period lengthens. This is because of the time necessary to acquire the necessary equipment for access to and knowledge of local harvest sites before harvest efforts become effective.

A variety of harvest attributes are shown as a function of the duration of household residency in the Upper Tanana Region in Tables 19, 20, and 21. Table 19 shows the total number of pounds of wild food harvested and the breadth of resources that were used, attempted to be harvested, successfully harvested, received, or given away. Table 20 shows the pounds per household comprised by each of eight major resource categories. Table 21 shows the pounds per person comprised by each of eight major resource categories. The length of residency is measured by the residency of either the household head of spouse, whichever was longer. Residency in the region refers to either the Upper Tanana or Copper River basin area.

The analysis shows a strong relationship between place of birth and harvest levels. Households headed by someone born within the region harvested about twice the amount of wild food per household (888.5 pounds) as those that were headed by someone born outside the region (403.0 pounds) (Table 19). For those households moving into the region, the mean pounds harvested per household shows a consistent and positive correlation with length of residency increasing from 265.5 pounds (0-2 years residency) to 500.1 pounds (30-39 years residency). However, when examining per capita harvest, which accounts for differences in household size, this consistent increasing trend disappears. The explanation for this is that the two groups showing the highest per capita harvests (0-2 and 20-29 years residency) are characterized by predominantly single member households.

Households headed by someone born within the region displayed a broader diversity in the number of different resources used (11.5) and harvested (8.5) than those headed by someone born outside the region (8.4 and 6.1) (Table 19). The average number of resources given away

TABLE 19. MEAN HARVEST AND RESOURCE USE BY LENGTH OF RESIDENCY FOR FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Household head length of residency[b]	Number of households	Mean pounds harvested		Mean number of resources[c]				
		Per household	Per capita	Used	Attempted harvest	Harvested	Received	Gave
Those born outside of the region	358	403.0	172.2	8.4	6.9	6.1	2.6	0.7
0-2 years	39	265.5	235.2	7.3	3.7	3.0	4.4	0.6
3-5 years	27	320.0	121.5	11.1	8.6	7.6	3.5	0.5
6-9 years	94	385.9	103.3	9.0	7.6	7.0	2.1	0.5
10-19 years	95	403.1	149.7	6.3	6.0	5.3	1.4	1.0
20-29 years	64	487.4	293.4	9.5	8.8	7.5	2.9	1.0
30-39 years	39	500.1	167.6	9.3	6.7	6.1	3.5	0.8
Those born within the region	179	888.5	309.9	11.5	9.6	8.5	4.0	3.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.
[b] Length of residency of either the household head or the spouse, whichever was longer.
[c] Based on a maximum of 51 resource types.

TABLE 20. MEAN POUNDS HARVESTED PER HOUSEHOLD FOR EACH RESOURCE CATEGORY BY LENGTH OF RESIDENCY FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Household head length of residency[b]	Number of households	Mean pounds harvested per household								
		Salmon	Freshwater fish	Marine fish	Marine Invertebrates	Game	Furbearers	Birds	Edible plants	All resources
Those born outside of the region	358	84.0	84.9	9.9	0.1	196.3	3.1	14.9	9.8	403.0
0-2 Years	39	7.3	13.9	0.0	0.0	240.3	0.0	3.9	0.0	265.5
3-5 Years	27	24.9	57.4	4.9	0.0	209.9	0.0	14.7	8.2	320.0
6-9 Years	94	105.5	82.5	9.4	0.0	160.0	0.1	12.7	15.7	385.9
10-19 Years	95	102.0	61.3	17.4	0.5	191.6	1.1	20.2	8.9	403.1
20-29 Years	64	114.9	149.8	13.6	0.0	170.8	15.7	16.0	6.8	487.4
30-39 Years	39	54.4	131.8	0.0	0.0	284.2	0.0	16.1	13.6	500.1
Those born within the region	179	100.4	376.7	5.6	0.0	342.2	18.2	24.4	21.0	888.5

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

[b] Length of residency of either the household head or the spouse, whichever was longer.

TABLE 21. MEAN POUNDS HARVESTED PER CAPITA FOR EACH RESOURCE CATEGORY BY LENGTH OF RESIDENCY FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Household head length of residency[b]	Number of households	Mean pounds harvested per person								
		Salmon	Freshwater fish	Marine fish	Marine invertebrates	Game	Furbearers	Birds	Edible plants	All resources
Those born outside of the region	358	31.6	41.6	4.1	<.05	83.2	2.9	5.8	3.0	172.2
0-2 Years	39	3.7	3.9	0.0	0.0	226.4	0.0	1.3	0.0	235.2
3-5 Years	27	7.2	34.0	1.8	0.0	67.1	0.0	8.0	3.5	121.5
6-9 Years	94	23.6	31.6	2.5	0.0	38.9	<.05	3.1	3.6	103.3
10-19 Years	95	45.6	23.1	4.5	0.1	65.3	0.4	8.1	2.6	149.7
20-29 Years	64	41.9	109.7	11.6	0.0	103.1	15.7	8.6	2.8	293.4
30-39 Years	39	44.2	42.3	0.0	0.0	70.4	0.0	5.3	5.4	167.6
Those born within the region	179	34.2	134.6	1.1	0.0	117.2	7.1	9.1	6.6	309.9

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

[b] Length of residency of either the household head or the spouse, whichever was longer.

by (3.0) and received by (4.0) locally-born households was greater also (Table 19). The actual harvest diversity for the most recently arrived households (0 to 2 years) was low (3.0 resources), less than one-half of the regional average (6.9), which contrasts to their above-average harvest as measured in pounds per capita noted above. As mentioned, this relates to smaller household size for the group (1.1 people) and not to greater household productivity as measured by mean pounds per household. Harvest effort by most recently arrived households tended to be more focused on moose or caribou (Table 20, Table 21), which may be a secondary reason for the high household per capita harvests (over twice the regional average) but low harvest diversity and low resources given.

For new households residing in the area less than two years, there was a greater reliance on game resources than on salmon, freshwater fish, or birds (Table 20). Households tended to be smaller in size (1.1 people), many containing only one person. Because of these factors, the 0-2 year category displayed a household per capita game harvest (226.4 pounds) over twice the regional average (94.6 pounds) (Table 21). The high game harvests of the recently arrived households (0-2 years of local residency) may be attributable to the generally easier access to large game hunting areas by highway. This contrasts with the pattern where use of major fish species (salmon and whitefish) increases as length of residency increases. The increased levels of salmon and whitefish harvests overtime may be due to the time required to acquire the necessary equipment for access to river and lake fishing sites, fishing gear, and knowledge of the productive fishing sites. Finally, this regional level analysis may mask differences attributable to other factors such as culturally influenced food preferences. The regional level analysis is heavily influenced by Tok which accounted for 64.3 percent of the Upper Tanana population and which displayed the lowest percentage of Native households in the region (10.8 percent) and lowest percentage of population born in the Upper Tanana area (20.1 percent). Tok is not geographically situated to provide direct access to rivers and fish resources, unlike Tanacross, Tetlin, and Northway, however it is situated at the junction of the region's major highways.

ETHNICITY OF HOUSEHOLD

On a statewide basis, "cultural group membership" has a strong relationship with level of subsistence harvest at the community level (Wolfe and Walker 1987). This is due to basic cultural differences in food preferences and customary practices of Alaska Natives compared with non-Native cultural groups. Because of this, it is a reasonable hypothesis that households headed by an Alaska Native may be more active in hunting and fishing than households headed by a non-Native in the Upper Tanana area. Overall, 35.8 percent of the population in the five communities (and 34.2 percent of the households) were Native and were able to trace family use of local resources through many generations.

A variety of harvest attributes are shown for Native and non-Native households in Tables 22, 23, and 24. Table 22 shows the total number of pounds of wild food harvested and the breadth of resources that were used, attempted to be harvested, successfully harvested, received, or given away. Table 23 shows the pounds per household comprised by each of eight major resource categories. Table 24 shows the pounds per person comprised by each of eight major resource categories. Household ethnicity was measured by whether either the household head or spouse was Alaska Native.

Similar to previous studies (Wolfe and Walker 1987), there was a strong relationship between cultural group membership and subsistence harvest levels in the Upper Tanana region. Households headed by an Alaska Native harvested, on average, 2.4 times the amount of wild foods as that harvested by non-Native households (919.6 pounds compared to 386.0 pounds) (Table 22). Per capita harvests by Native-headed households (346.1 pounds) were over twice that of non-Native households (151.9 pounds). Native households displayed a broader diversity in the number of different resources harvested (8.3 resources) as compared with non-Native households (6.2 resources) (Table 22). Diversity in resources used, attempted to harvest, received, and given away was also greater for Native households (Table 22). Per capita harvests by Native households was greater for all local resource categories (Table 24). Non-native

TABLE 22. MEAN HARVEST AND RESOURCE USE BY HOUSEHOLD ETHNICITY FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Household ethnicity	Number of households	Mean pounds harvested		Mean number of resources[c]				
		Per household	Per capita	Used	Attempted harvest	Harvested	Received	Gave
Alaska Native[b]	185	919 6	346.1	11.2	9.4	8.3	4.0	2.9
Non-Native	355	386.0	151.9	8.5	7.0	6.2	2.6	0.8

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.
[b] Household head or spouse is Alaska Native.
[c] Based on a maximum of 51 resource types.

TABLE 23. MEAN POUNDS HARVESTED PER HOUSEHOLD FOR EACH RESOURCE CATEGORY BY HOUSEHOLD ETHNICITY FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Household ethnicity	Number of households	Mean pounds harvested per household								
		Salmon	Freshwater fish	Marine fish	Marine invertebrates	Game	Furbearers	Birds	Edible plants	All resources
Alaska Native[b]	185	101.1	380.5	5.5	0.0	366.7	20.0	24.8	20.9	919.6
Non-Native	355	82.7	81.7	10.0	0.1	184.9	2.0	14.7	9.8	386.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.
[b] Household head or spouse is Alaska Native.

TABLE 24. MEAN POUNDS HARVESTED PER CAPITA FOR EACH RESOURCE CATEGORY BY HOUSEHOLD ETHNICITY FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Household ethnicity	Number of households	Mean pounds harvested per person								
		Salmon	Freshwater fish	Marine fish	Marine invertebrates	Game	Furbearers	Birds	Edible plants	All resources
Alaska Native[b]	185	34.1	148.4	1.1	0.0	135.9	10.8	9.3	6.5	346.1
Non-Native	355	31.3	33.5	4.1	<.05	73.4	0.9	5.7	3.0	151.9

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

[b] Household head or spouse is Alaska Native.

harvests were greater for non-local marine fish and marine invertebrates. The differences were most striking in the freshwater fish, game, and furbearers categories. In freshwater fish, for example, the average Native household harvested about 300 edible pounds more per household than non-Native households. Whitefish species was the principal component of this harvest (Table 23).

HOUSEHOLD INCOME

The relationship between household income and subsistence harvest levels is relatively complex. At the community level, it has been shown that resource harvest levels decrease, on average, when an Alaska community has greater amounts of cash in the local economy (Wolfe and Walker 1987). At the household level within a single community, it has been shown that along the lower Yukon River and the Southwest region, households with higher incomes produce, on average, greater amounts of subsistence foods than households with lower incomes (Wolfe 1984; Wolfe *et al.* 1984). To examine these relationships for the Upper Tanana region, a variety of harvest attributes are shown by total household income in Tables 25, 26, and 27. Table 25 shows the total number of pounds of wild food harvested and the breadth of resources that were used, attempted to be harvested, successfully harvested, received, or given away. Table 26 shows the pounds per household comprised by each of eight major resource categories. Table 27 shows the pounds per person comprised by each of eight major resource categories. Household income was defined as total household income from all sources. Income data were missing for about 20 percent of sample households.

In general, there is an association between income levels and subsistence harvest levels for Upper Tanana households when examined as a single univariate statistical relationship. It is noteworthy that households at all income ranges show considerable harvest of wild resources. It is not the case that cash-poor households harvest more wild resources than those with more cash.

TABLE 25. MEAN HARVEST AND RESOURCE USE BY TOTAL HOUSEHOLD INCOME FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Total household income (U.S. dollars)[b]	Number of households	Mean pounds harvested		Mean number of resources[c]				
		Per household	Per capita	Used	Attempted harvest	Harvested	Received	Gave
$ 1 - 9,999	104	569.5	324.6	7.3	5.2	4.6	3.4	2.0
$ 10,000 - 19,999	116	489.7	188.2	10.5	8.3	7.2	4.1	1.5
$ 20,000 - 29,999	81	480.4	118.9	8.7	7.4	6.6	2.7	1.2
$ 30,000 - 39,999	47	783.3	200.6	10.5	9.8	8.5	2.6	0.9
$ 40,000 - 49,999	50	649.9	200.0	12.9	11.2	10.0	3.5	2.2
$ 50,000 - 59,999	19	973.5	216.8	11.8	10.5	10.4	1.5	2.7
$ 60,000 - 69,000	5	1069.0	213.8	17.3	20.3	16.3	1.0	0.3
Over $ 70,000	8	957.8	267.6	15.0	14.3	14.1	1.4	2.1

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.
[b] Income data are missing for an estimated 110 (20.4 percent) of cases.
[c] Based on a maximum of 51 resource types.

TABLE 26. MEAN POUNDS HARVESTED PER HOUSEHOLD FOR EACH RESOURCE CATEGORY BY TOTAL HOUSEHOLD INCOME FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Total household income (U.S. dollars)[b]	Number of households	Mean pounds harvested per household								
		Salmon	Freshwater fish	Marine fish	Marine invertebrates	Game	Furbearers	Birds	Edible plants	All resources
$ 1 - 9,999	104	40.7	195.2	0.0	0.0	294.4	20.3	12.9	5.9	569.4
$ 10,000 - 19,999	116	53.2	195.6	0.9	0.0	197.9	11.7	15.7	14.7	489.7
$ 20,000 - 29,999	81	97.9	168.6	0.4	0.0	172.4	2.7	20.1	18.4	480.4
$ 30,000 - 39,999	47	155.4	144.8	62.5	1.1	371.0	4.4	14.6	29.5	783.3
$ 40,000 - 49,999	50	139.0	265.6	12.5	0.0	175.7	5.6	37.1	14.4	649.8
$ 50,000 - 59,999	19	147.4	132.5	11.0	0.0	617.5	0.0	51.7	13.5	973.5
$ 60,000 - 69,999	5	498.2	325.2	66.7	0.0	139.7	2.0	24.6	12.7	1,069.0
Over $ 70,000	8	150.1	214.2	7.4	0.0	530.7	0.6	18.2	36.5	957.8

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.
[b] Income data are missing for an estimated 110 (20.4 percent) of cases.

TABLE 27. MEAN POUNDS HARVESTED PER CAPITA FOR EACH RESOURCE CATEGORY BY TOTAL HOUSEHOLD INCOME FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Total household income (U.S. dollars)[b]	Number of households	Mean pounds harvested per person								
		Salmon	Freshwater fish	Marine fish	Marine invertebrates	Game	Furbearers	Birds	Edible plants	All resources
$ 1 - 9,999	104	23.2	111.3	0.0	0.0	167.8	11.6	7.3	3.4	324.6
$ 10,000 - 19,999	116	20.5	75.2	0.3	0.0	76.1	4.5	6.0	5.6	188.2
$ 20,000 - 29,999	81	24.2	41.7	0.1	0.0	42.7	0.7	5.0	4.5	118.9
$ 30,000 - 39,999	47	39.8	37.1	16.0	0.3	95.0	1.1	3.7	7.6	200.6
$ 40,000 - 49,999	50	42.8	81.8	3.8	0.0	54.1	1.7	11.4	4.4	200.0
$ 50,000 - 59,999	19	32.8	29.5	2.4	0.0	137.5	0.0	11.5	3.0	216.8
$ 60,000 - 69,999	5	99.6	65.0	13.3	0.0	27.9	0.4	4.9	2.5	213.8
Over $ 70,000	8	41.9	59.8	2.1	0.0	148.3	0.2	5.1	10.2	267.6

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

[b] Income data are missing for an estimated 110 (20.4 percent) of cases.

In fact, households with cash incomes over $60,000 are among the highest harvesters of all income ranges.

Households in the $1-9,999 income category tended to be small in size, which may account in part for their comparatively higher per capita harvest levels (Table 26) than per household harvest levels (Table 27). These comparisons show that income does not appear to be clearly related to level of harvest activity, because both high and low income households harvest approximately the same quantity of wild food per capita.

On a species basis, there are few unambiguous relationships between income and harvest levels. Household harvest of salmon and freshwater fish appears to be greatest among those in the $60,000-69,999 income category than any other category (Table 26); however, the small number of households in this income range may mean this is simply a statistical artifact. Households in the $50,000-59,999 and over $70,000 categories harvested the largest amounts of game, 617.5 and 530.7 pounds, respectively (Table 26). Households with incomes under $20,000 harvested the greatest amounts of furbearers.

Per capita harvest of salmon was greatest among households in the $60,000-69,999 income category and per capita harvests of furbearers was greatest among households in categories under $20,000 (Table 27). The greatest per capita harvest of freshwater fish was found among households in the $1-9,999 income category. Per capita game harvest was greatest among households in the $1,000-9,999; $50,000-59,999; and over $70,000 income categories (Table 27).

The diversity of resources harvested and used by the household appears to increase with the household income level (Table 25). Access to a variety of harvest sites may be a factor here. The average number of resources received was the greatest (4.1) for households in the $10,000-19,000 income bracket, while the average number of resources received was the lowest (1.0) for households in the $60,000-69,999 income bracket. This suggests that households at the lower income levels tend to receive a greater range of resources.

HOUSEHOLD SIZE

The rationale for examining the relationship between household size and harvest patterns is that larger households may be more active in hunting and fishing than households with fewer people. Larger households would generally have more people to feed and may have a greater supply of labor available for harvest and processing activities. Subsistence activities often take place through cooperation among members of different households. Overall, in the Upper Tanana, households had an average size of 3.1 people. The availability of labor is tied to the age of household members, so that larger older workforces may be more productive than a large number of young household members.

A variety of harvest attributes are shown in relation to the number of people in the household in Tables 28, 29, and 30. Table 28 shows the total number of pounds of wild food harvested and the breadth of resources that were used, attempted to be harvested, successfully harvested, received, or given away. Table 29 shows the pounds per household comprised by each of eight major resource categories. Table 30 shows the pounds per person comprised by each of eight major resource categories.

The pounds of wild food harvested per household generally increased with the number of people in the household (Table 28). However, the per capita harvest was greatest among smaller sized households with one or three members (Table 28). This suggests that larger households were more productive in overall volume of food produced, but that smaller households, on average, were more productive in terms of individual members. For all resource categories, except marine fish and edible plants, one-person households harvested more wild food per capita than larger households (Table 30). Excepting the single-person households, households with three members harvested more game, freshwater fish, birds, and edible plants than others; five-person households more salmon and marine fish; and two-person households more furbearers (Table 30).

TABLE 28. MEAN HARVEST AND RESOURCE USE BY NUMBER OF PEOPLE IN HOUSEHOLD FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Number of people in household	Number of households	Mean pounds harvested		Mean number of resources[b]				
		Per household	Per capita	Used	Attempted harvest	Harvested	Received	Gave
1	128	374.4	374.4	7.8	5.3	4.7	3.5	1.4
2	104	310.6	155.3	9.3	7.3	6.3	3.8	1.1
3	92	628.4	209.5	9.4	8.0	6.9	2.8	1.8
4	82	671.6	167.9	9.5	8.3	7.6	2.2	1.6
5	82	788.0	157.6	10.0	9.4	8.8	1.6	1.1
6 or more	52	949.6	150.4	12.7	11.6	9.9	4.7	2.6

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.
[b] Based on a maximum of 51 resource types.

TABLE 29. MEAN POUNDS HARVESTED PER HOUSEHOLD FOR EACH RESOURCE CATEGORY BY NUMBER OF PEOPLE IN HOUSEHOLD FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Number of people in household	Number of households	Mean pounds harvested per household								
		Salmon	Freshwater fish	Marine fish	Marine invertebrates	Game	Furbearers	Birds	Edible plants	All resources
1	128	47.1	131.8	5.5	0.0	166.3	8.9	11.3	3.5	374.4
2	104	64.8	103.3	3.7	0.0	109.7	10.6	10.0	8.5	310.6
3	92	88.6	201.0	4.5	0.0	277.1	14.2	22.7	20.2	628.4
4	82	60.3	239.4	4.9	0.0	330.2	5.8	22.3	8.8	671.6
5	82	177.5	173.1	28.1	0.6	372.1	1.6	19.8	15.2	788.0
6 or more	52	146.7	375.1	6.1	0.0	339.7	5.0	34.5	42.4	949.6

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

TABLE 30. MEAN POUNDS HARVESTED PER CAPITA FOR EACH RESOURCE CATEGORY BY NUMBER OF PEOPLE IN HOUSEHOLD FOR FIVE UPPER TANANA COMMUNITIES, JUNE 1987 - MAY 1988.[a]

Number of people in household	Number of households	Mean pounds harvested per person								
		Salmon	Freshwater fish	Marine fish	Marine invertebrates	Game	Furbearers	Birds	Edible plants	All resources
1	128	47.1	131.8	5.5	0.0	166.3	8.9	11.3	3.5	374.4
2	104	32.4	51.7	1.9	0.0	54.9	5.3	5.0	4.2	155.3
3	92	29.5	67.0	1.5	0.0	92.4	4.7	7.6	6.7	209.5
4	82	15.1	59.8	1.2	0.0	82.5	1.4	5.6	2.2	167.9
5	82	35.5	34.6	5.6	0.1	74.4	0.3	4.0	3.0	157.6
6 or more	52	22.4	60.5	0.9	0.0	53.5	0.8	5.6	6.6	150.4

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

Larger households tended to use a wider variety of resources in comparison with smaller households (Table 28). One-person and two-person households, along with those with six or more members, received a greater diversity of resources from other households (Table 28). The largest households (six or more persons) gave a wide variety of resources to others.

CHAPTER 7. USE OF WRANGELL-ST. ELIAS NATIONAL PARK AND PRESERVE

One of the research objectives was to assess the historic and contemporary subsistence use of the Wrangell-St. Elias National Park and Preserve by Upper Tanana households. The 8,147,000-acre park was established by Congress in 1980 to maintain the beauty of the physical features in a natural state, to protect habitat for and population of fish and wildlife, and to provide access for recreational activities. Congress further stipulated that "subsistence uses by local residents shall be permitted in the park, where such uses are traditional" (Public Law 98-487, Sec. 201-9). The northern boundary of the park lies 30 to 60 miles south of the five study communities in the Upper Tanana (Figure 2).

HISTORIC USE

Historic use of the Wrangell Mountains area by the Upper Tanana Athabaskan people was described by McKennan (1959). The region occupied by the Upper Tanana during the early 1900s extended south to Skolai Pass and the White River drainage, thus incorporating all of the Nabesna and Chisana River drainages. The time period represented is not explicitly stated, but presumably it was pre-contact and early 1900s, since McKennan indicated that Natives had "suffered no diminution of their territory" as a result of non-Natives entering the area for mining prior to his 1929 visit. McKennan (1959:17) did suggest, however, that the southern reaches of the territory were used less in 1929 than in previous years:

> the White River was practically unvisited by Indians whereas formerly it had been a popular hunting territory. The basins of the Beaver and the Chisana, formerly the best hunting territory in the area, also were much less frequented due to the depletion of game following the Chisana stampede of 1913.

During McKennan's visit in 1929, the Upper Chisana-Upper Nabesna band consisted of 16 people wintering at a camp along the Nabesna River near Cooper Creek. In other years, the band had used a winter camp along the Chisana River near Cross Creek. Both areas lie in what is today Wrangell-St. Elias National Park and Preserve. Members of this band and their

descendents eventually settled near the mouth of the Nabesna River near the current site of Northway.

Reckord (1983a) described Native participation in hunting and fishing for supplying miners during the periods of mining development from 1898 to 1930 in the Chisana and Nabesna River valleys. After the mines closed, Natives moved to Northway or to villages in the Copper River basin. In 1977, when Record (1983a) visited the area, she found that Northway residents were not traveling upriver beyond the "notch" in the Mentasta Mountains to hunt or trap. She added:

> Of all the Native people living along the Alaska Highway, only the Northway people have a great personal interest in the Wrangell area, but because of their long historical separation from the place, their identity with it has become less strong. (Reckord 1983a:162)

Members of the former Chisana band were interviewed during a 1984 Division of Subsistence study in Northway (Case 1986:28). They described a general seasonal harvest pattern for the time period of 1920 to 1960 that included hunting sheep in the mountains during September before deep snowfall: "the Chisana and Upper Nabesna bands moved back into the high Nutzotin drainages and passes from which they hunted sheep" (Case 1986:16). However, many changes took place during that 40-year time span, so the duration of that particular hunting pattern was uncertain. The Nutzotin Mountains fall within the preserve portion of the Wrangell-St. Elias National Park and Preserve.

The 1984 study also included land use mapping in Northway for the period 1974-84 with a sample of 15 households identified as the most active in resource harvesting activities (Case 1986). During the 1974-84 period, one Northway household in the sample accessed sheep hunting areas by traveling up the Nabesna River by boat. Two other households reached sheep hunting areas by way of the Tok Cutoff and the Nabesna Road. Case (1986:64) commented on how hunting regulations affected the level of sheep hunting activity:

> Sheep hunting during the 1974-84 period was done only occasionally by a few Northway residents, as access to the mountains south of Northway is difficult and current regulations involving careful scrutiny of horn curl seemed restrictive.

Moose hunting took place along the highway system north to Eagle, west to Dot Lake, and south along both sides of the Nabesna Road. The Nabesna Road is the boundary between the park and the preserve and moose hunting was indicated in both areas. Case (1986:63) suggested that little of the caribou hunting took place in the Nutzotin or Mentasta mountains due to the distance and difficult access from Northway:

> Unless extensive time afield by snowmachine or foot is invested, efficient access requires expensive air travel, which most households could not afford. In the past more time was spent walking to these areas to hunt.

Trapping areas used by Northway residents between 1974-84 extended up the Nabesna River to a former settlement area by Cooper Creek within the preserve, but not the park.

Customary and traditional salmon fishing at the Copper River Batzulnetas site by Mentasta and Dot Lake residents has been recognized by the Alaska Board of Fisheries. The Batzulnetas site lies within the park boundaries.

At a Wrangell-St. Elias National Park and Preserve Subsistence Resource Commission meeting held in Northway on December 4, 1989, several Northway residents offered personal testimony regarding their use of the Wrangell-St. Elias National Park and Preserve area. One man recounted that, in 1942, when he worked "freighting" between the Cheslina River area and Nabesna, he observed people hunting in the area at that time. Another man said that he had previously lived in the Nabesna area to trap and to hunt caribou, sheep, and moose. Another resident mentioned his experience trapping along both sides of the Nabesna Road when his father had lived in Nabesna. This resident was born at Nabesna Village and his father was born at Batzulnetas, which lies within the park boundaries. Another Northway resident said that in the past he hunted in the Nabesna area by Orange Hill, 13 miles south of Nabesna, and that he used a cabin along Stone Creek. He used to go with his father to the cabin.

Use of the park and preserve area during the 1980s was also described by residents at the same meeting. One trapper used a trapline on the south side of the "Black Hills" (Nutzotin Mountains) for about five years. In 1987-88, he caught 60 marten there. Others also indicated their recent trapping experience in the Nutzotin Mountains area.

One example of hunting in the Wrangell-St. Elias National Park and Preserve area given was when two Northway men were charged with taking "sub-legal" sheep, meaning horn curl size was less than required by regulation, in the Devil's Mountain area in 1980. Both were convicted, forfeited the sheep, and were assessed a fine.

To summarize the data available regarding Upper Tanana residents' use of the Wrangell-St. Elias National Park and Preserve Park and Preserve, there is documentation that aboriginally and during the early part of this century Upper Tanana Natives extensively used the areas which are now within the northern portion of the Wrangell-St. Elias National Park and Preserve. As Native people settled in Upper Tanana settlements during the 1930s and 1940s, the Wrangell Mountain areas were used less extensively. However, a pattern of use continued, particularly near new access points along the Nabesna Road. Restrictive sheep hunting regulations also inhibited traditional sheep hunting during the most recent decades. For further examination of historic use to the Wrangell-St. Elias National Park and Preserve area, additional interviews should be conducted directed specifically at documenting this aspect of their historic use pattern.

SURVEY RESULTS - CONTEMPORARY USE

During the 1988 survey, respondents from sample households were asked about subsistence activities in each of 13 areas identified within the Wrangell-St. Elias National Park and Preserve boundary (Appendix 1). Respondents were referred to a 1:1,027,000-scale map that delineated the 13 park areas. Survey questions (numbers 16 and 17, Appendix 1) were directed at use of the park areas during the preceding year and for years since they first used the area. In addition to the activities listed, interviewers also asked about fishing. For years prior to the study year (1987-88) the response to these questions was made difficult by two factors. First, some respondents had difficultly recounting all the specific activities for other household members who may have participated in the past. The survey respondents generally answered the park use

questions by describing their own first-hand use and not necessarily the use by all members of their household. Thus, data on household use should be considered a lower limit of the actual use pattern. Second, any sample comprised of current community households does not fully represent community households from an earlier time period. Accordingly, the sample does not necessarily reflect a prior community pattern for an earlier point in time, although it can show past use by current residents on an individual level. Finally, the percentage of households using a particular area for trapping is expected to be lower than for other harvest activities, since trappers in this region generally use mutually exclusive traplines.

Overall in the five Upper Tanana study communities, 26.7 percent of households used the Wrangell-St. Elias National Park and Preserve. The highest rate of use was found in Tok where 34.9 percent of households used the park and preserve. This was closely followed by Tanacross where 23.5 percent of households reported using the park and preserve. Fifteen percent of Dot Lake households and 4.4 percent of Northway households reported using the park and preserve. The lowest rate of use was found in Tetlin where 3.4 percent of households said they used the park and preserve. Transportation access to the park and preserve may, in part, be a factor for differential use by area communities. Tok and Tanacross residents have the most direct highway access while Tetlin residents have neither direct highway nor river access to the Wrangell-St. Elias National Park and Preserve.

Respondents were asked about their household's use of 13 different areas within the Wrangell St. Elias National Park and Preserve. The 13 areas are shown in Figure 22 and in Appendix 1. Data on use of 13 park areas for different subsistence activities by the five communities in the Upper Tanana are shown in Table 31. Overall, an estimated 144 of the 540 households (26.7 percent) had used the park and preserve lands at one time or another. Percentages shown in Table 31 are based on the number of households with history of use. For households with a history of use, an estimated 75.3 percent used the park or preserve for fishing. Moose hunting (31.6 percent), sheep hunting (17.9 percent), and caribou hunting (11.9) were also reported by a number of households, while fewer households reported trapping. Specific areas

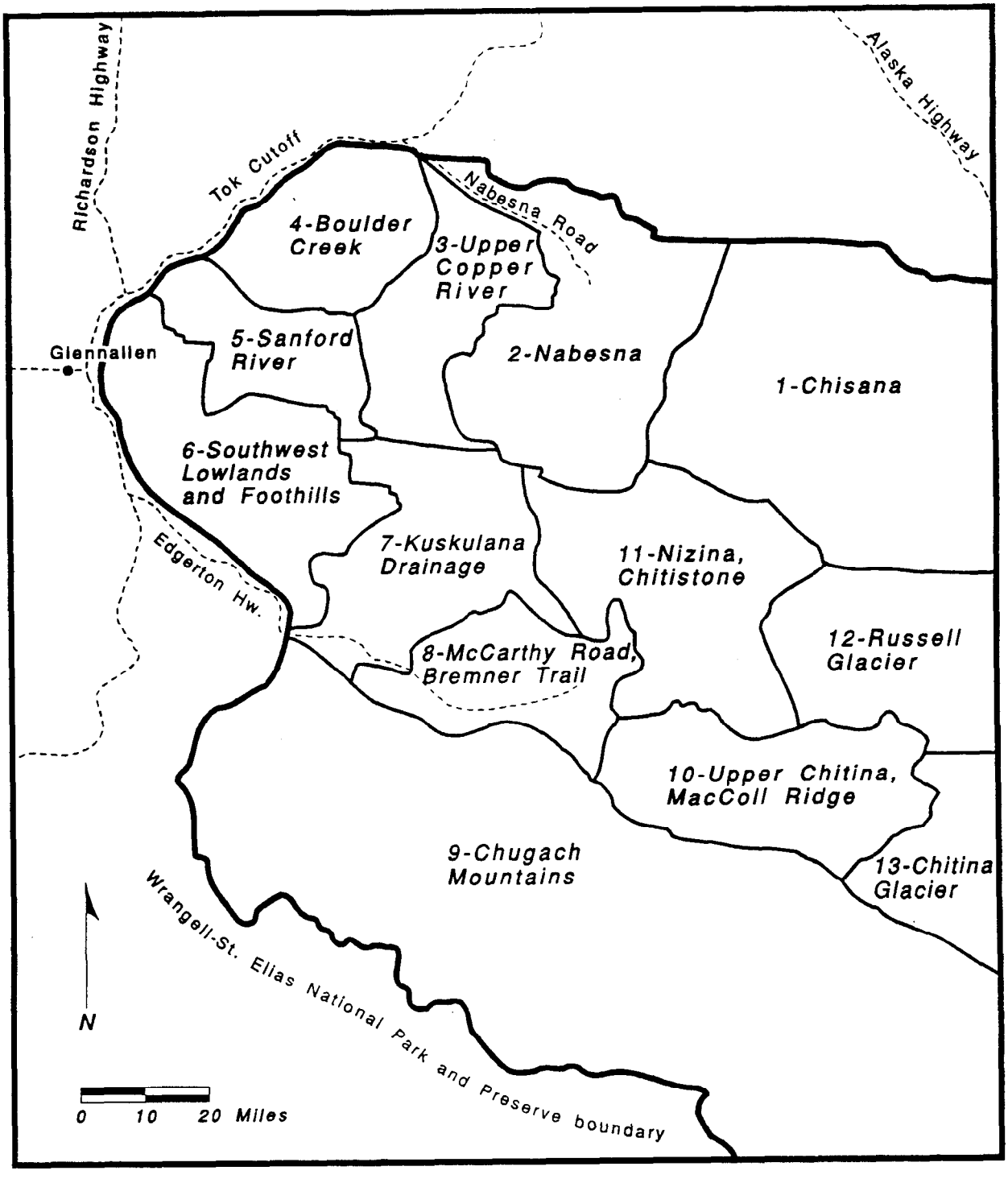


Fig. 22. Areas identified within the Wrangell-St. Elias National Park and Preserve for recording areas used for subsistence fishing, hunting, and trapping.

TABLE 31. PERCENTAGE OF UPPER TANANA HOUSEHOLDS WITH A HISTORY OF PARK OR PRESERVE USE USING AN AREA FOR SPECIFIC HARVESTING ACTIVITIES (Based on n = 144, the estimated number of households having ever used the park or preserve area).[a]

Wrangell-St. Elias park or preserve area	Fishing	Moose hunting	Caribou hunting	Sheep hunting	Furbearer trapping	Firewood gathering	Any harvest activity
1- Chisana	5.8 %	4.6 %	3.5 %	4.6 %	2.5 %	0 %	10.6 %
2- Nabesna	22.5	26.9	7.9	15.8	2.3	0.0	49.2
3- Upper Copper River	51.3	12.2	4.4	9.2	1.2	0.0	60.0
4- Boulder Creek	7.8	5.8	2.9	2.0	0.0	0.0	11.3
5- Sanford River	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6- Southwest Lowlands and Foothills	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7- Kuskulana Drainage	7.6	0.0	0.0	0.0	0.0	0.0	7.6
8- McCarthy Road, Bremner Trail	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9- Chugach Mountains	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10- Upper Chitina, MacColl Ridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11- Nizina, Chitistone	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12- Russell Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13- Chitina Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Any area	75.3	31.6	11.9	17.9	4.8	0.0	100.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

within the park and preserve most commonly reported as being used were the upper Copper River (60.0 percent) and Nabesna River (49.2 percent), both areas at the northern end of the park and preserve which are accessible by road. Other areas at the northern end of the park and preserve such as Chisana and Boulder Creek were also used as well as the Kuskulana Drainage northeast of Chitina. Use of several of the areas in the central and southern portion of the park and preserve (Fig. 22) was not reported by sample households in the five Upper Tanana communities. These areas included Sanford River, Southwest lowlands and foothills, McCarthy Road-Bremner Trail, Chugach Mountains, Upper Chitina-MacColl Ridge, Nizina-Chitistone, Russell Glacier, and Chitina Glacier.

The pattern of park and preserve use is shown for each of the five communities in Tables 32 through 36. Dot Lake subsistence use was solely for fishing in the upper Copper River area (area 3) (Table 32). Both Tanacross and Tok residents used the park and preserve for a variety of subsistence activities (Table 33, 34). Tanacross households with a history of use used the park and preserve primarily for big game hunting (moose hunting 66.7 percent; caribou hunting 33.3 percent; and sheep hunting 33.3 percent) (Table 33). Most of the fishing, moose hunting, and caribou hunting took place in the Boulder Creek area while sheep were taken in both the Boulder Creek and Nabesna areas. Tok households with a history of use used the park and preserve primarily for fishing (79.9 percent), some big game hunting (moose hunting 30.4 percent; caribou hunting 10.3 percent; and sheep hunting 18.1 percent) and some trapping (3.9 percent) (Table 34). Hunting and trapping by Tok households took place in the Chisana, Nabesna, Upper Copper River, and Boulder Creek areas while fishing took place in each of those areas and the Kuskulana Drainage. The sole Tetlin household that used the area did so for moose and caribou hunting in the Nabesna and Upper Copper River areas (Table 35). Northway residents reported using the park and preserve for both fishing (50.0 percent) and furbearer trapping (50.0 percent), but not for hunting (Table 36). Fishing by Northway households took place in the Upper Copper River area and trapping took place in the Chisana area.

TABLE 32. PERCENTAGE OF DOT LAKE HOUSEHOLDS WITH A HISTORY OF PARK OR PRESERVE USE USING AN AREA FOR SPECIFIC HARVESTING ACTIVITIES (Based on n=3, the estimated number of households having ever used the park or preserve area).[a]

Wrangell-St. Elias park or preserve area	Fishing	Moose hunting	Caribou hunting	Sheep hunting	Furbearer trapping	Firewood gathering	Any harvest activity
1- Chisana	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0
2- Nabesna	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3- Upper Copper River	100.0	0.0	0.0	0.0	0.0	0.0	100.0
4- Boulder Creek	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5- Sanford River	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6- Southwest Lowlands and Foothills	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7- Kuskulana Drainage	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8- McCarthy Road, Bremner Trail	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9- Chugach Mountains	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10- Upper Chitina, MacColl Ridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11- Nizina, Chitistone	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12- Russell Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13- Chitina Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Any area	100.0	0.0	0.0	0.0	0.0	0.0	100.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

TABLE 33. PERCENTAGE OF TANACROSS HOUSEHOLDS WITH A HISTORY OF PARK OR PRESERVE USE USING AN AREA FOR SPECIFIC HARVESTING ACTIVITIES (Based on n=8, the estimated number of households having ever used the park or preserve area).[a]

Wrangell-St. Elias park or preserve area	Fishing	Moose hunting	Caribou hunting	Sheep hunting	Furbearer trapping	Firewood Gathering	Any harvest activity
1- Chisana	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
2- Nabesna	0.0	0.0	0.0	16.7	0.0	0.0	16.7
3- Upper Copper River	0.0	16.7	0.0	0.0	0.0	0.0	16.7
4- Boulder Creek	16.7	66.7	33.3	16.7	0.0	0.0	83.3
5- Sanford River	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6- Southwest Lowlands and Foothills	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7- Kuskulana Drainage	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8- McCarthy Road, Bremner Trail	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9- Chugach Mountains	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10- Upper Chitina, MacColl Ridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11- Nizina, Chitistone	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12- Russell Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13- Chitina Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Any area	16.7	66.7	33.3	33.3	0.0	0.0	100.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

TABLE 34. PERCENTAGE OF TOK HOUSEHOLDS WITH A HISTORY OF PARK OR PRESERVE USE USING AN AREA FOR SPECIFIC HARVESTING ACTIVITIES (Based on n = 128, the estimated number of households having ever used the park or preserve area).[a]

Wrangell-St. Elias park or preserve area	Fishing	Moose hunting	Caribou hunting	Sheep hunting	Furbearer trapping	Firewood gathering	Any harvest activity
1- Chisana	6.5 %	5.2 %	3.9 %	5.2 %	1.3 %	0.0 %	10.3 %
2- Nabesna	25.3	29.1	7.7	16.8	2.6	0.0	53.1
3- Upper Copper River	53.9	11.6	3.9	10.3	1.3	0.0	61.6
4- Boulder Creek	7.7	2.6	1.3	1.3	0.0	0.0	7.7
5- Sanford River	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6- Southwest Lowlands and Foothills	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7- Kuskulana Drainage	8.5	0.0	0.0	0.0	0.0	0.0	8.5
8- McCarthy Road, Bremner Trail	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9- Chugach Mountains	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10- Upper Chitina, MacColl Ridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11- Nizina, Chitistone	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12- Russell Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13- Chitina Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Any area	79.9	30.4	10.3	18.1	3.9	0.0	100.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

TABLE 35. PERCENTAGE OF TETLIN HOUSEHOLDS WITH A HISTORY OF PARK OR PRESERVE USE USING AN AREA FOR SPECIFIC HARVESTING ACTIVITIES (Based on n=1, the estimated number of households having ever used the park or preserve area).[a]

Wrangell-St. Elias park or preserve area	Fishing	Moose hunting	Caribou hunting	Sheep hunting	Furbearer trapping	Firewood Gathering	Any harvest activity
1- Chisana	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
2- Nabesna	0.0	100.0	100.0	0.0	0.0	0.0	100.0
3- Upper Copper River	0.0	100.0	100.0	0.0	0.0	0.0	100.0
4- Boulder Creek	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5- Sanford River	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6- Southwest Lowlands and Foothills	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7- Kuskulana Drainage	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8- McCarthy Road, Bremner Trail	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9- Chugach Mountains	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10- Upper Chitina, MacColl Ridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11- Nizina, Chitistone	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12- Russell Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13- Chitina Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Any area	0.0	100.0	100.0	0.0	0.0	0.0	100.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

TABLE 36. PERCENTAGE OF NORTHWAY HOUSEHOLDS WITH A HISTORY OF PARK OR PRESERVE USE USING AN AREA FOR SPECIFIC HARVESTING ACTIVITIES (Based on n = 4, the estimated number of households having ever used the park or preserve area).[a]

Wrangell-St. Elias park or preserve area	Fishing	Moose hunting	Caribou hunting	Sheep hunting	Furbearer trapping	Firewood gathering	Any harvest activity
1- Chisana	0.0 %	0.0 %	0.0 %	0.0 %	50.0 %	0.0 %	50.0 %
2- Nabesna	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3- Upper Copper River	50.0	0.0	0.0	0.0	0.0	0.0	50.0
4- Boulder Creek	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5- Sanford River	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6- Southwest Lowlands and Foothills	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7- Kuskulana Drainage	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8- McCarthy Road, Bremner Trail	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9- Chugach Mountains	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10- Upper Chitina, MacColl Ridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11- Nizina, Chitistone	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12- Russell Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13- Chitina Glacier	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Any area	50.0	0.0	0.0	0.0	50.0	0.0	100.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

CHAPTER 8. USE OF PROPOSED OVER-THE-HORIZON BACKSCATTER RADAR RECEIVER SITES

One study objective was to assess the levels of resource harvest effort at and near the proposed Over-the-Horizon Backscatter radar receiver sites. The two proposed receiver antenna sites were in the vicinity of Tok (Appendix 1). One site, labeled "northwest receiver" by the Air Force, was centered two miles northeast of Tok north of the Alaska Highway and south of the Tanana River. The second site, labeled "southwest receiver," was centered six miles southeast of Tok and two miles south of the Alaska Highway. The southwest site is on land owned by the Tetlin Village Corporation.

During the 1988 survey, respondents were asked about use of each of the two radar receiver sites. A 1:63,360 scale map depicting zones of one- and five-mile radius was used as a reference for the survey questions. The proposed Over-the-Horizon Backscatter transmitter site north of Gakona is outside areas regularly used by Upper Tanana community residents. However, information on use of the Gakona radar zone by residents in the Copper River basin is presented in a report by Fall, Stratton, and Walker (forthcoming).

The percentage of households having ever used the one-mile and five-mile zones around the receiver sites are presented in Tables 37 and 38. These tables show the use by activity and by community. The survey respondents generally answered the area use questions by describing their own first-hand use and not necessarily the use by all members of their household. Thus, the data on household use should be considered a lower limit of the actual use pattern. Note that the percentage of households using a particular area for trapping is expected to be lower than for other harvest activities, since trappers generally use mutually exclusive traplines.

The five-mile radius around the northwest receiver site was used by an estimated 77.8 percent of Tanacross households, including use for fishing, hunting, trapping, and gathering (Table 37). Although the percentage of Tok households using the northwest receiver site was lower than that found for Tanacross, 43.4 percent, the absolute number of households was greater given the larger community size of Tok. A smaller proportion of Northway households

TABLE 37. PERCENTAGE OF HOUSEHOLDS HAVING EVER USED NORTHWEST RECEIVER SITE FOR HARVESTING ACTIVITIES FOR FIVE UPPER TANANA COMMUNITIES.[a]

Community	Number of households	One-mile radius					Five-mile radius				
		Fishing	Hunting	Trapping	Gathering	Any activity	Fishing	Hunting	Trapping	Gathering	Any activity
Dot Lake	20	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Tanacross	34	11.1	48.1	14.8	18.5	48.1	25.9	77.8	29.6	29.6	77.8
Tok	367	5.2	21.3	4.8	6.6	23.6	8.4	38.2	11.4	10.2	43.4
Tetlin	29	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northway	90	0.0	0.0	0.0	0.0	0.0	0.0	4.4	0.0	6.7	8.9

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

TABLE 38. PERCENTAGE OF HOUSEHOLDS HAVING EVER USED SOUTHWEST RECEIVER SITE FOR HARVESTING ACTIVITIES FOR FIVE UPPER TANANA COMMUNITIES.[a]

Community	Number of households	One-mile radius					Five-mile radius				
		Fishing	Hunting	Trapping	Gathering	Any activity	Fishing	Hunting	Trapping	Gathering	Any activity
Dot Lake	20	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %	0.0 %
Tanacross	34	3.7	14.8	3.7	3.7	14.8	22.2	51.9	25.9	18.5	51.9
Tok	367	3.9	5.4	0.5	1.4	8.4	9.6	30.9	3.2	6.1	36.2
Tetlin	29	0.0	44.1	20.0	49.7	74.5	0.0	100.0	29.7	80.0	100.0
Northway	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[a] Source: Division of Subsistence, ADF&G, household survey 1988. Harvests reported by sample households were expanded on a household basis to estimate total community harvests.

(8.9 percent) used the area for hunting or gathering activities. Tok residents also used the northwest receiver site for fishing, hunting, trapping, and gathering. This receiver area includes a portion of the Tanana River which was commonly used for whitefish and burbot fishing and that adjacent area which was used for moose hunting. Also included was an easily accessible small game hunting area along a dirt road leading northeast of Tok towards the Tanana River. The road was once part of the original Alaska Highway right-of-way. No use of the northwest receiver site was reported by Dot Lake households.

The five-mile radius around the southwest receiver site was used by all Tetlin households, 51.9 percent of Tanacross households, and 36.2 percent of Tok households (Table 38). Activities included fishing, hunting, trapping, and gathering. Use of the one-mile radius by a large proportion of Tetlin households can be explained by the Tetlin Native Corporation land ownership and the Tetlin winter road running along the eastern portion of the one-mile zone. Sample households in both Dot Lake and Northway did not report any use of the southwest receiver site while living in the region.

Land use maps showing harvest areas used by Upper Tanana community residents can also be used to understand the patterns of use of the proposed backscatter receiver sites. Maps depicting land use areas for the period 1968-88 for Tanacross and Tok were included in this report (chapter 5, Figs. 11 through 21). Recent Division of Subsistence technical papers include maps depicting Dot Lake use areas for 1946-82 (Martin 1983), Tetlin for 1974-84 (Halpin 1987), and Northway for 1974-84 (Case 1986).

The mapped information for these five communities is generally consistent with the pattern indicated by the survey data (Tables 37 and 38), particularly for the northwest receiver site. For the southwest receiver site, there were instances where the mapped information did not depict use, but the survey data indicated particular harvesting activities. These included use in the one-mile radius by Tanacross households, use by Tok residents for fishing and gathering, and use by Tetlin residents. In the case of Tanacross and Tok, mapping was conducted with a more limited sample size than the survey questionnaire, which may account for the lack of map

documentation of harvest use of the one-mile radius area. The one-mile radius area was not included in the base map that was used during the earlier 1984 mapping study in Tetlin. The one other deviation was that Northway survey respondents did not report use of the southwest five-mile radius, although mapped information from 1974-84 shows moose hunting along that section of the Alaska Highway.

In addition to the survey data from the backscatter radar site use questions, several survey respondents offered their comments on the proposed development. No comments were offered by Dot Lake residents. Two comments by Tanacross respondents were that the receiver sites were located in hunting areas for which there should be compensation, and that security guards should be hired locally. A Tok respondent expressed concern that the development would have impacts on the community, but that there would not be help for schools or local job training. Tetlin respondents expressed the concern that some Tetlin households trap and hunt in the area of the southwest receiver site, and that there was interest of local people getting jobs resulting from construction and later phases of operation. The indirect or secondary impacts, such as habitat disturbance or increased hunter competition, were discussed in the series of planning meetings held by a backscatter planning committee and local representatives. In conclusion, one or both of the proposed backscatter radar sites were used by Tanacross, Tok, Tetlin, and Northway residents for a variety of subsistence activities since those residents lived in the region.

CHAPTER 9. SUMMARY AND CONCLUSIONS

Nearly 1,700 people lived in 540 households in the Upper Tanana communities of Dot Lake, Tanacross, Tok, Tetlin, and Northway in 1988. Over 95 percent of these households used wild fish and wildlife resources. This report described the patterns of wild resource harvest and use and presented quantitative data for the period between June 1987 and May 1988. Interviews were conducted with 195 (36.1 percent) of the households in the five communities regarding the household's use of wild resources. Households were selected at random, using a simple random sample for Dot Lake, Tanacross, and Northway and a stratified random sample in Tok and Tetlin. The sampling fractions used in each community ranged from 25.3 percent in Tok to 79.4 percent in Tanacross. Land use areas were mapped for Tanacross and Tok for hunting, fishing, and trapping activities to add to similar baseline information previously collected for Dot Lake, Tetlin, and Northway.

Tok was the largest of the five communities with an estimated population of 1,081, accounting for nearly two-thirds of the region's inhabitants. Northway was the second largest community with an estimated population of 324. Estimated Tetlin, Tanacross, and Dot Lake populations were much smaller in number, with 116, 93, and 66 people respectively. Household size ranged from 2.7 people per household in Tanacross to 4.0 people per household in Tetlin. Males outnumbered females in all five communities. Tetlin displayed the highest proportion males in the population (64.9 percent) while Dot Lake had the lowest (53.1 percent). Communities differed in percentage of population that was Alaska Native. The lowest percentage was found in Tok where only 11 percent of the population was Alaska Native, somewhat lower than the 1988 statewide average (15 percent). High percentages of Alaska Natives were found in Tetlin (100 percent), Tanacross (97.3 percent), and Northway (76.5 percent). Dot Lake was 40.8 percent Native. Despite the low percentage of Alaska Natives in the Tok population, Tok still had an estimated 119 Native residents living there in about 40 Native households, a larger number of Native households than found in either Dot Lake,

Tanacross, or Tetlin. Differences in the settlement histories of the communities were reflected in the percentage of population born outside the state which ranged from 1.2 percent in Tetlin to 69.8 percent in Tok.

There were an estimated 752 of 1,173 adults (64.1 percent) that held employment during at least a portion of the preceding year. The highest employment rate was found in Tok where 547 of the 782 adults (70 percent) were employed during part of the year, and lowest employment rates were found in the other four communities where the percentage of adults employed during the year ranged between 51.5 and 56.8 percent. Overall, adults that did have jobs during the study year worked an average of 8.9 out of 12 months. An estimated 630 adults (53.7 percent) held employment for the preceding 12 consecutive months. Year-round employment was highest in Tok and Dot Lake and lowest in Tanacross. Most jobs held were either in the "professional, technical, managers" category or the "service workers" category. Overall, 85.8 percent of jobs were located in the resident's home community with an additional 5.2 percent held in other Upper Tanana area communities, and 7.2 percent held outside the region. In Tetlin, none of the sample respondents held employment outside the community during the study year. Average earned income levels also varied between communities, with the highest average in Tok ($23,537) and the lowest in Tetlin ($7,191). Average earned income levels in Dot Lake, Tanacross, and Northway were $15,225, $14,106, and $11,894 respectively.

Resource harvest and use characteristics presented included the percentage of households which used, attempted to harvest, actually harvested, received, and gave wild resources; the diversity of resources used; and the average quantity of harvest as measured in edible pounds per household and pounds per person. Overall in the region, households harvested an average of 568.6 edible pounds per household, representing a per capita harvest of 182.8 pounds per person. As a result of either harvesting by household members or receiving wild food from other households, a total of 95.7 percent of Upper Tanana households used wild food.

Moose hunting and whitefish fishing accounted for the greatest harvest quantities. Taken together, these two activities comprised over one-half the total harvest. The lack of a local salmon fishery, as compared with most other interior Alaska communities, resulted in a comparatively smaller role of salmon fishing, with 28.6 pounds per capita, or 15.6 percent of the total. This contrasts with other interior Alaska communities where salmon fishing yields over one-half of the total subsistence harvest such as Minto (67.0 percent), Tanana (74.6 percent), Galena (69.3 percent), and Fort Yukon (60.8 percent) (Alaska Department of Fish and Game 1991).

The five individual communities displayed somewhat different harvest patterns between June 1987 and May 1988, possibly related to differences in local resource abundance, ease of access to harvest sites, or cultural traditions. Dot Lake residents harvested an estimated total of 7,555 edible pounds of wild resources between June 1987 and May 1988, for an average household harvest of 377.7 pounds per household or a per capita harvest of 114.5 pounds per person. Moose hunting was an important single contributor to the Dot Lake total comprising 34.2 percent, while fishing for all species of fish resulted in 45.3 percent of the total output. Tanacross residents harvested an estimated total of 23,287 edible pounds of wild resources, for an average household harvest of 684.9 pounds per household and per capita harvest of 250.4 pounds per person. Moose hunting and whitefish fishing together accounted for 62 percent of the total harvest in Tanacross and salmon fishing accounted for an additional 15 percent of the annual harvest. Tok residents harvested an estimated total of 161,321 edible pounds of wild resources, for an average household harvest of 439.6 pounds per household and per capita harvest of 149.2 pounds per person. Moose hunting and sockeye salmon fishing accounted for about 44 percent of the total harvest by Tok residents. Tetlin residents harvested an estimated total of 24,769 edible pounds of wild resources, for an average household harvest of 854.1 pounds per household or a per capita rate of 213.5 pounds per person. The difference between the per household and per capita harvest levels was greatest in Tetlin because of the large average household size. Fishing for whitefish accounted for 49.4 percent of the total harvest in Tetlin,

which was the greatest proportional contribution of any single resource found in the region. Moose hunting added another 29.7 percent of the total harvest which resulted in a total of 79.1 percent of the total Tetlin harvest coming from only two resources. Northway residents harvested an estimated total of 90,090 edible pounds of wild resources, for an average household harvest of 1,001 pounds per household and per capita harvest of 278.0 pounds per capita. Whitefish fishing accounted for the largest portion of the Northway total at 36.0 percent. Moose hunting was the second largest contributor comprising 26.8 percent. The 278.0 pounds per capita harvest reported in Northway was the highest for the five study communities.

Variation between household harvests was also documented and compared on the basis of four different household characteristics: length of time a household head resided in the local area, ethnicity of a household head, total income of the household, and number of people in the household. These comparisons were made at a regional level here, although they could also be examined on a community level.

The relationship between length of residency and harvest patterns showed that households headed by someone born within the region harvested about twice the amount of wild food as those households that were headed by someone born outside the region. Household harvest levels showed a consistent positive association with length of residency. When examining household per capita harvests the two highest groups were the new arrivals (0-2 years residency) due to high moose and caribou harvests, and those who have resided in the area 20-29 years ago.

Households headed by someone born within the region displayed a broader diversity in the number of different resources used and harvested than those headed by someone born outside the region. The number of resources given away by these households tended to be greater also. The actual harvest diversity for the most recently arrived households (0-2 years residency) was low, less than one-half of the regional average, which contrasts to their above average harvest as measured in pounds per capita. Harvest effort by these households was more focused on certain large game species such as moose or caribou and comparatively smaller in reliance on salmon, freshwater fish, or birds. The newest households tended to be smaller in size

or contain a single person. Higher levels of salmon and whitefish use by households was correlated with a greater length of residency. The increased levels of salmon and whitefish harvests overtime may be due to the time required to acquire the necessary equipment for access to river and lake fishing sites, fishing gear, and knowledge of the productive fishing sites. Also, culturally influenced food preferences of the long-term Native households may account for some of the correlation between length of residency and harvest composition.

Households headed by an Alaska Native harvested, on average, 2.4 times the amount of wild food as that harvested by non-Native households. This is due to cultural differences in resource patterns between Native and non-Native households. Native households also displayed a broader diversity in the number of different resources harvested, used, gave, or received. Native households averaged larger harvests in all resource categories, as compared with non-Native households, with the exception of marine fish and invertebrates taken by a few residents traveling to coastal harvest sites. The differences between Native and non-Native households were most striking in the freshwater fish, game, and furbearers categories. In the freshwater fish category, for example, the average Native household harvested about 300 edible pounds more per household than non-Native households. Whitefish species were the principal component of this harvest.

Household income levels showed no clear relationship with household's harvest levels. In general, households at all income levels displayed substantial harvests of wild food. No income group displayed a per capita harvest much lower than the 182.8 pound regional average. The diversity of resources harvested and used by the household appeared to increase with the household's income level. The greatest diversity of resources received by households through sharing was found in households in the lower income brackets.

Households with a greater number of people tended to use a wider variety of resources. The total pounds of wild food harvested per household generally increased with the number of people in the household. By contrast, the highest per capita harvests were found among single-person households. The largest households gave a wider variety of resources to others.

The use of the Wrangell-St. Elias National Park and Preserve was documented in all communities. Overall in the five Upper Tanana study communities, 26.7 percent of households used the Wrangell-St. Elias National Park and Preserve. An estimated 144 of the 540 households had used the park and preserve lands at one time or another. The highest proportion of use was found in Tok where 34.9 percent of households used the park and preserve. This was closely followed by Tanacross where 23.5 percent of households used the park and preserve. The lowest proportion of use was found in Tetlin where 3.4 percent of households used the park and preserve. Transportation access to the park and preserve appeared to be one factor accounting for the differences since Tok and Tanacross residents had the most direct access, while Tetlin residents had neither direct highway or river access to the Wrangell-St. Elias National Park and Preserve. Use of the park and preserve areas for households with a history of use included fishing (75.3 percent of households), moose hunting (31.6 percent), sheep hunting (17.9 percent), caribou hunting (11.9 percent), and trapping (4.8 percent). Specific areas within the park and preserve used most commonly by Upper Tanana residents were the Upper Copper River (area 3) and Nabesna River (area 2) areas, both areas at the northern end of the park and preserve and areas accessible by highway. Other areas at the northern end of the park and preserve such as Chisana (area 1) and Boulder Creek (area 4) were also used, as well as the Kuskulana Drainage (area 7) northeast of Chitina. Use of some areas in the central and southern portion of the park and preserve by Upper Tanana sample households was not reported. Dot Lake subsistence use of the park and preserve was primarily for fishing in the Upper Copper River (area 3) area while both Tanacross and Tok residents used the park and preserve for a variety of subsistence activities such as fishing, big game hunting, and trapping. Tetlin residents used the park and preserve solely for moose hunting and caribou hunting, and Northway residents used the area for both fishing and furbearer trapping.

The initial purpose of the study was to update resource harvest and use, demographic, and economic data for Dot Lake, Tetlin, and Northway, and to collect baseline information for Tanacross and Tok in order to provide a basis for evaluating impacts on local communities which

may result from construction and operation of a backscatter radar facility near Tok. In addition to documenting general community patterns, specific attention was given to the two proposed receiver antenna sites in the vicinity of Tok. The percentage of households having ever used the one-mile and five-mile zones around the proposed receiver sites were presented by subsistence activity for each community.

The five-mile radius around the northwest receiver site was used for fishing, hunting, trapping, and gathering by an estimated 77.8 percent of Tanacross households and 43.4 percent of Tok households. However the greatest number of users were from Tok. A smaller proportion of Northway households (8.9 percent) used the area for hunting or gathering activities. This northwest receiver area included a portion of the Tanana River which was commonly used for whitefish and burbot fishing and for moose hunting. Also included was an easily accessible small game hunting area along a dirt road leading northeast of Tok towards the Tanana River. All Tetlin households, 51.9 percent of Tanacross households, and 36.2 percent of Tok households used the five-mile radius around the southwest receiver site for fishing, hunting, trapping, or gathering. Dot Lake residents did not report using either receiver site.

This summary of quantitative harvest data on hunting, fishing, and trapping will creates a baseline expected to be useful in addressing land development and resource use issues in the Upper Tanana area. Data derived from this study have already contributed to allocation issues addressed by the Alaska Boards of Fisheries and Game, particularly regarding moose and caribou hunting in the Upper Tanana, sheep hunting in the Upper Tanana and Copper River basin areas, and salmon fishing in the Copper River basin. It has also provided information for reviewing applications for permits for commercial and subsistence freshwater fishing in the Upper Tanana. It is expected that this baseline information will continue to be useful in addressing wildlife use issues in the Upper Tanana region.

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UPPER TANANA AREA/COPPER RIVER BASIN RESOURCE USE STUDY

Community _____ HOUSEHOLD ID# _____

Highway _____ Date _____

Milepost _____ Interviewer _____

The purpose of this survey is to gather information about the fish and game resource activities of your household from June 1987 through May 1988. When we ask "Did you use a resource?" we mean did your family eat it, serve it, or otherwise use it in your home.

1. HOUSEHOLD INFORMATION (* = Respondent)

ID #	M/F	BIRTH DATE	RESIDENCE OF PARENT WHEN YOU WERE BORN	MOVED TO THIS COMMUNITY		ETHNICITY
				YEAR	FROM WHERE	
1 HEAD						
2 SPOUSE						
3						
4						
5						
6						
7						
8						
9						
10						

2. Using Person's I.D. #'s from the table above, indicate which household members participated in harvesting activities during 1987-1988.

Hunting ____ ____ ____ ____ ____ Fishing (include clams, etc) ____ ____ ____ ____ ____

Edible Plant Gathering ____ ____ ____ ____ ____ Trapping ____ ____ ____ ____

3. NON-COMMERCIAL FISHING

Did your household have a subsistence salmon fishing permit in 1987? YES _____ NO _____

4. Did your household try to harvest or use salmon in 1987? YES _____ NO _____

If YES, please complete the following table:

SPECIES	USED		TRIED TO HARVEST		NUMBER HARVESTED BY GEAR TYPE				RECEIVED		GAVE AWAY		LOCATION OF HARVEST (drainage)
	YES	NO	YES	NO	FISH WHEEL	DIP NET	ROD & REEL	OTHER	YES	NO	YES	NO	
KING (1)													
RED (2)													
CHUM (3)													
PINK (4)													
SILVER (5)													
LANDLOCKED(6)													
SALMON(unk)(7)													

5. Did your household try to harvest or use any other fish in 1987-88? YES ____ NO ____

If YES, please complete the following table:

SPECIES	USED		TRIED TO HARVEST		NUMBER HARVESTED BY GEAR TYPE					RECEIVED		GAVE AWAY	
	YES	NO	YES	NO	SUBS. NET	DIP NET	ICE FISH	ROD & REEL	OTHER	YES	NO	YES	NO
GRAYLING (9)													
LAKE TROUT(10)													
RAINBOW (11)													
STEELHEAD (12)													
WHITEFISH (13)													

5. FISHING (cont.)

SPECIES	USED		TRIED TO HARVEST		NUMBER HARVESTED BY GEAR TYPE				RECEIVED		GAVE AWAY	
	YES	NO	YES	NO	SUBS. NET	ICE FISH	ROD & REEL	OTHER	YES	NO	YES	NO
DOLLY VARDEN(14)												
BURBOT (15)												
PIKE (16)												
"PICKLE" (17)												
SUCKERS (18)												
HALIBUT (19)					XXXX	XXXX	lbs					
OTHER												

6. HUNTING

Did your household try to harvest or use game in 1987-1988? YES _____ NO _____

If YES, please complete the following table:

SPECIES	USED		TRIED TO HARVEST		NUMBER HARVESTED		RECEIVED		GAVE AWAY		LOCATION OF HARVEST (specify area/drainage)
	YES	NO	YES	NO			YES	NO	YES	NO	
CARIBOU (22)											
MOOSE (23)											
BLACK BEAR(24)					#	lbs					XXXXXXXXXXXXXX
BROWN BEAR(25)					#	lbs					XXXXXXXXXXXXXX
DALL SHEEP(26)											
GOAT (27)											
BISON (28)											XXXXXXXXXXXXXX
RABBIT/HARE(29)											XXXXXXXXXXXXXX

6. (cont)

SPECIES	USED		TRIED TO HARVEST		NUMBER HARVESTED	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO		YES	NO	YES	NO
PORCUPINE (30)									
OTHER									

7. Did anyone in your household harvest an animal for potlatch purposes? yes ____ no ____
If YES, what kind of animal? _____ Has this been included in the harvest reported above?

8. Did your household receive any meat from roadkill animals? yes ____ no ____.
If YES, what kind of animal? _____ About how many pounds did you receive? _____
Has this been included in the report above of resources received?

9. TRAPPING
Did anyone in your household try to harvest or use furbearers during 1987-1988? YES _____ NO _____
If YES, please complete the following table:

SPECIES	USED		TRIED TO HARVEST		TOTAL # HARV.	NUMBER USED FOR		RECEIVED			GAVE AWAY			SOLD	
								YES		NO	YES		NO		
	YES	NO	YES	NO		FOOD	FUR	FOOD	FUR		FOOD	FUR		#	Ave Price
BEAVER (34)															
COYOTE (35)						xx		xx			xx				
LYNX (36)															
MARTEN (37)						xx		xx			xx				
MINK (38)						xx		xx			xx				
MUSKRAT (39)															
RED FOX (40)						xx		xx			xx				
RIVER OTTER(41)						xx		xx			xx				
WEASEL (42)						xx		xx			xx				

9. TRAPPING (Cont.)

SPECIES	USED		TRIED TO HARVEST		TOTAL # HARV.	NUMBER USED FOR		RECEIVED			GAVE AWAY			SOLD	
	YES	NO	YES	NO		FOOD	FUR	YES FOOD	YES FUR	NO	YES FOOD	YES FUR	NO	#	Ave Price
WOLF (37)						xx		xx			xx				
WOLVERINE(38)						xx		xx			xx				
OTHER															

10. BIRD HUNTING

Did your household try to harvest or use birds during 1987-19887 YES ____ NO ____
If YES, please complete the table below:

SPECIES	USED		TRIED TO HARVEST		NUMBER HARVESTED	RECEIVED		GAVE AWAY	
	YES	NO	YES	NO		YES	NO	YES	NO
PTARMIGAN (46)									
GROUSE (47)									
GEESE, CANADIAN (48)									
GEESE(Spec) (49)									
GEESE(Spec) (50)									
MALLARD (51)									
PINTAILS (52)									
WIGEON (53)									
TEAL (54)									
SHOVELER (55)									

10. BIRD HUNTING (CONT)

SPECIES	USED YES	USED NO	TRIED TO HARVEST YES	TRIED TO HARVEST NO	NUMBER HARVESTED	RECEIVED YES	RECEIVED NO	GAVE AWAY YES	GAVE AWAY NO
BUFFLEHEAD (56)									
GOLDENEYE (57)									
SCAUP (58)									
CRANES (59)									
SWANS (60)									
OTHER									
EGGS (spec) (61)					doz				

11. PLANT GATHERING

Did your household harvest or use wild plants in 1987-1988? YES ____ NO ____

If YES, please complete the table below:

	USED YES	USED NO	TRIED TO HARVEST YES	TRIED TO HARVEST NO	AMOUNT HARVESTED	RECEIVED YES	RECEIVED NO	GAVE AWAY YES	GAVE AWAY NO
BERRIES (65)					gal.				
PLANTS (66)					qts.				
WOOD (67)					cords				

What kinds of berries and plants did members of your household gather? _____

_____

_____

12. Number of dogs owned by household: _____

How do you use your dogs?:

_____ Hauling

_____ Racing

_____ Trapping

_____ General Use (pets, hunting, etc)

13. List the kind and amount of fish and game you used to feed dogs (make sure these were included in the household harvest report):

SPECIES: _____ SPECIES: _____ SPECIES: _____ SPECIES: _____
AMOUNT: _____ AMOUNT: _____ AMOUNT: _____ AMOUNT: _____

14. Please look at the map of the area where the radar site will be.

SITE A: NORTHWEST RECEIVER

ZONE 1 ONE MILE RADIUS	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		SPECIFY RESOURCES HARVESTED IN THE ZONE
	YES	NO	REGULARLY ev. 1,2,-3 yr	SELDOM once/twice	YES	NO	
HUNTING							
FISHING							
TRAPPING							
GATHERING							
ZONE 2 FIVE MILE RADIUS							
HUNTING							
FISHING							
TRAPPING							
GATHERING							

SITE B SOUTHWEST RECEIVER

ZONE 1 ONE MILE RADIUS	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		SPECIFY RESOURCES HARVESTED IN THE ZONE
	YES	NO	REGULARLY ev. 1,2,-3 yr	SELDOM once/twice	YES	NO	
HUNTING							
FISHING							
TRAPPING							
GATHERING							
ZONE 2 FIVE MILE RADIUS							
HUNTING							
FISHING							
TRAPPING							
GATHERING							

SITE C: GULKANA TRANSMITTER

ZONE 1 ONE MILE RADIUS	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		SPECIFY RESOURCES HARVESTED IN THE ZONE
	YES	NO	REGULARLY ev. 1,2,-3 yr	SELDOM once/twice	YES	NO	
HUNTING							
FISHING							
TRAPPING							
GATHERING							

ZONE 2 FIVE MILE RADIUS	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		SPECIFY RESOURCES HARVESTED IN THE ZONE
	YES	NO	REGULARLY ev. 1,2,-3 yr	SELDOM once/twice	YES	NO	
HUNTING							
FISHING							
TRAPPING							
GATHERING							

15. Do any of the sites hold particular importance to you, your family, or your community? Explain:

16. Have you ever hunted/fished in Wrangell-St. Elias National Park or Preserve? yes ____ no ____
If YES, please complete section 17, Use Area Questions.

17. WRANGELL-ST. ELIAS PARK/PRESERVE USE AREA QUESTIONS

AREA 1 CHISANA	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		WHAT TRANSPORTATION WAS USED TO ACCESS THE P/P WHILE LIVING IN THE AREA?	FIREWOOD ONLY: LAND STATUS[a]
	YES (1st year)	NO	REGULARLY every 1,2, or 3 years	SELDOM once or twice	YES	NO		
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								

[a]Federal (F), State (S), or Private (P)

AREA 2 NABESNA	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		WHAT TRANSPORTATION WAS USED TO ACCESS THE P/P WHILE LIVING IN THE AREA?	FIREWOOD ONLY: LAND STATUS[a]
	YES (1st year)	NO	REGULARLY every 1,2, or 3 years	SELDOM once or twice	YES	NO		
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 3 UPPER COPPER RIVER								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 4 BOULDER CREEK								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								

[a]Federal (F), State (S), or Private (P)

AREA 5 SANFORD RIVER	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		WHAT TRANSPORTATION WAS USED TO ACCESS THE P/P WHILE LIVING IN THE AREA?	FIREWOOD ONLY: LAND STATUS[a]
	YES (1st year)	NO	REGULARLY every 1,2, or 3 years	SELDOM once or twice	YES	NO		
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 6 SOUTHWEST LOWLANDS & FOOTHILLS								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 7 KUSKULANA DRAINAGE								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								

[a]Federal (F), State (S), or Private (P)

AREA 8 MCCARTHY RD/ BREMNER TRAIL	EVER USED WHILE LIVING IN THIS COMMUNITY		FREQUENCY OF USE		USED IN 1987-1988		WHAT TRANSPORTATION WAS USED TO ACCESS THE P/P WHILE LIVING IN THE AREA?	FIREWOOD ONLY: LAND STATUS[a]
	YES (1st year)	NO	REGULARLY every 1,2, or 3 years	SELDOM once or twice	YES	NO		
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 9 CHUGACH MOUNTAINS								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 10 UPPER CHITINA MACCOLL RIDGE								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								

[a]Federal (F), State (S), or Private (P)

AREA 11 NIZINA/ CHITISTONE	EVER USED WHILE LIVING IN THIS COMMUNITY YES (1st year)	NO	FREQUENCY OF USE REGULARLY every 1,2, or 3 years	SELDOM once or twice	USED IN 1987-1988 YES	NO	WHAT TRANSPORTATION WAS USED TO ACCESS THE P/P WHILE LIVING IN THE AREA?	FIREWOOD ONLY: LAND STATUS[a]
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 12 RUSSELL GLACIER								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								
AREA 13 CHITINA GLACIER								
MOOSE								XXXXXXXX
CARIBOU								XXXXXXXX
SHEEP								XXXXXXXX
FURBEARERS								XXXXXXXX
FIREWOOD								

[a]Federal (F), State (S), or Private (P)

18. EMPLOYMENT HISTORY

Please complete information for each adult (18 yrs or older), and for all jobs held by the employed household members listed in question 1 between June 1987 & May 1988. Include commerical fishing activities.

ID # FROM QUESTION 1	JOB TITLE	DISPOSITION[a]	EMPLOYER	LOCATION OF JOB	# OF MONTHS WORKED P/YEAR	HOURS WORKED PER WEEK	AMOUNT EARNED
					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		

[a] Includes Retired, Unemployed, Disabled, Student, Homemaker.

19. Other Income Sources (Check all that apply and indicate amount)

Social Security Income	$_____	Pension	$_____	Longevity Bonus	$_____
Adult Public Assistance	$_____	Disability	$_____	Energy Assistance	$_____
Aid Families Dep. Children	$_____	Food Stamps	$_____	Perm Fund Dividend	$_____
Corp. Dividend	$_____	Other (Specify	$_____		

20. Please estimate your monthly expenses:

_____	Heating fuel	_____	Transportation fuel	_____	Water	_____	Housing
_____	Food	_____	Electricity	_____	Phone	_____	Propane

21. Do you have any questions or comments? (continue on back of page)

_____

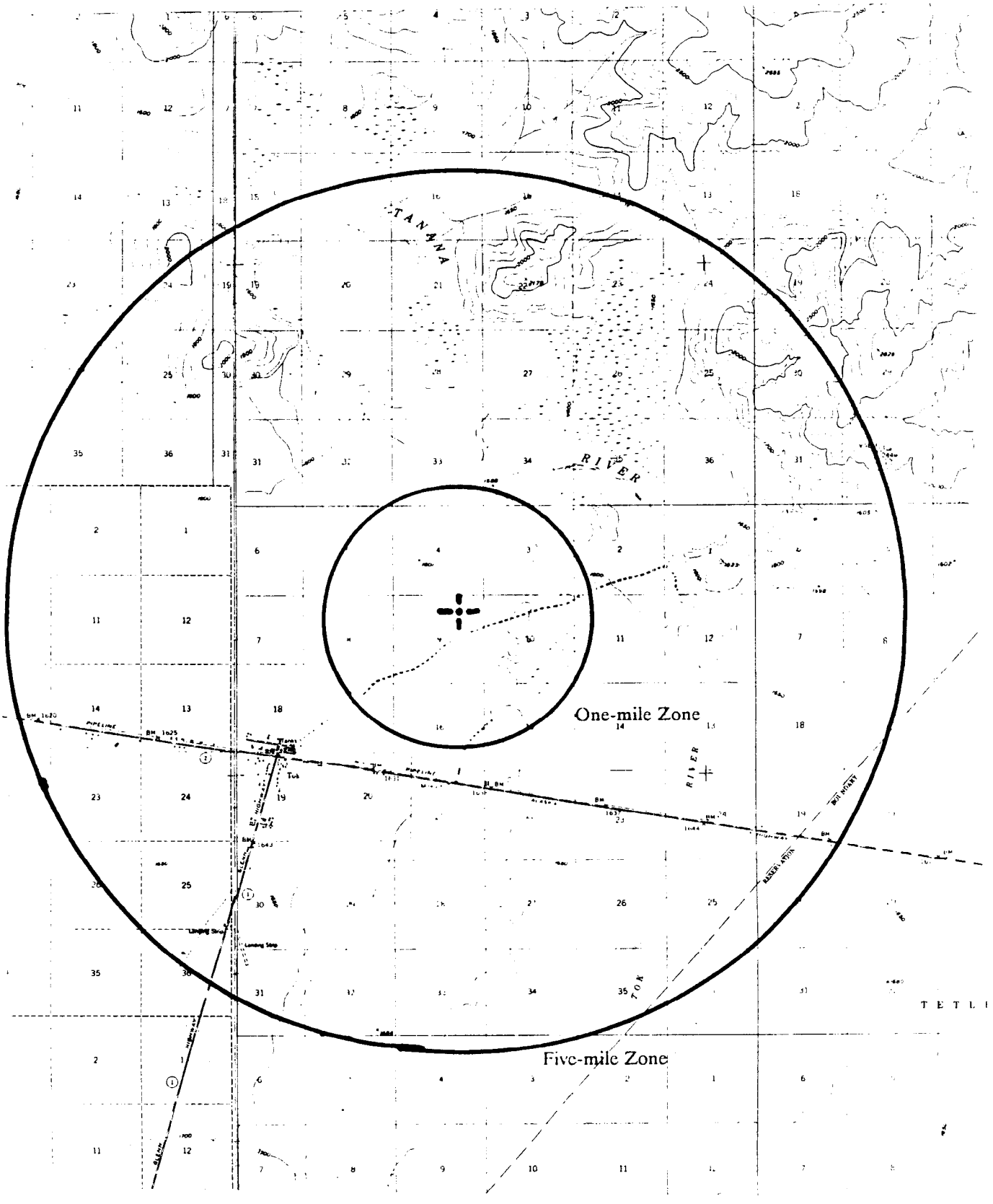
_____

HH ID # _____ (page will be detached from survey)

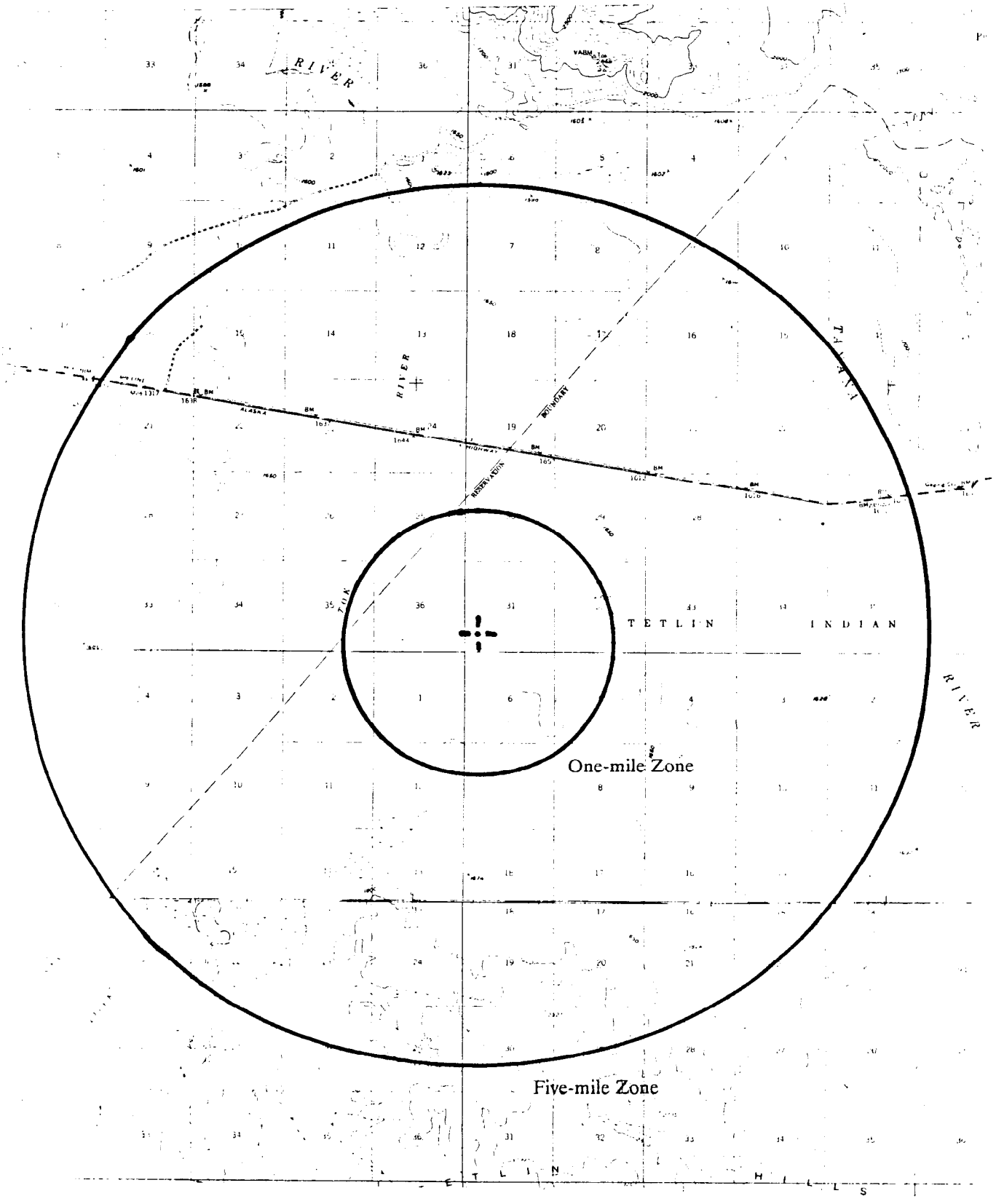
22. Interviewer: Please take a few minutes and jot down a thumbnail sketch of the household and the interview:


Dot Lake
Tanacross
Tok
Tetlin
Paxton
Northway
Mentasta
TETLIN LOWLANDS
TETLIN NATIONAL
WILDLIFE REFUGE
NATIONAL
PRESERVE
4
NATIONAL PRESERVE
1
NATIONAL
PRESERVE
6
NATIONAL
PRESERVE
1
NATIONAL PARK

Radar Zone Map - Northwest Receiver



Radar Zone Map - Souhwest Receiver



APPENDIX 2.

COMMON AND SCIENTIFIC NAMES OF MAJOR RESOURCES USED BY UPPER TANANA RESIDENTS

COMMON NAME	SCIENTIFIC NAME
Chinook salmon	*Oncorhynchus tshawytscha*
Sockeye salmon	*Oncorhynchus nerka*
Chum salmon	*Oncorhynchus keta*
Pink salmon	*Oncorhynchus gorbuscha*
Coho salmon	*Oncorhynchus kisutch*
Arctic grayling	*Thymallus arcticus*
Broad whitefish	*Coregonus nasus*
Burbot	*Lota lota*
Dolly Varden	*Salvelinus malma*
Halibut	*Hippoglossus stenolepis*
Humpback whitefish	*Coregonus pidschian*
Lake trout	*Salvelinus namaycush*
Least cisco	*Coregonus sardinella*
Longnose sucker	*Catostomus catostomus*
Northern pike	*Esox lucius*
Rainbow trout	*Salmo gairdneri*
Round whitefish	*Prosopium cylindraceum*
Sheefish	*Stenodus leucichthys*
Black bear	*Ursus americanus*
Brown bear	*Ursus arctos*
Caribou	*Rangifer tarandus*
Dall sheep	*Ovis dalli*
Deer	*Odocoileus hemionus sitkensis*
Moose	*Alces alces*
Beaver	*Castor canadensis*
Ermine (short-tailed weasel)	*Mustela erminea*
Hare	*Lepus americanus*
Land otter	*Lutra canadensis*
Lynx	*Felis canadensis*
Marten	*Martes americanus*
Mink	*Mustela vison*
Muskrat	*Ondatra zibethicus*
Porcupine	*Erethizon dorsatum*
Red fox	*Vulpes vulpes*
Red squirrel	*Tamiasciurus hudsonius*
Weasel	*Mustela nivalis*
Wolf	*Canis lupus*
Wolverine	*Gulo gulo*

APPENDIX 2. Continued

COMMON NAME	SCIENTIFIC NAME
American widgeon	*Anas americana*
Bufflehead	*Bucephala albeola*
Canada goose	*Branta canadensis*
Canvasback	*Aythya valisineria*
Common goldeneye	*Bucephala clangula*
Greater scaup	*Aythya marila*
Greater white-fronted goose	*Anser albifrons*
Green-winged teal	*Anas crecca*
Lesser scaup	*Aythya affinis*
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
Oldsquaw	*Clangula hyemalis*
Ruffed grouse	*Bonasa umbellus*
Sandhill crane	*Grus canadensis*
Sharp-tailed grouse	*Tympanuchus phasianellus*
Snow goose	*Chen caerulescens*
Spruce grouse	*Dendragapus canadensis*
Surf scoter	*Melanitta perspicillata*
White-winged scoter	*Melanitta fusca*
Willow ptarmigan	*Lagopus lagopus*
Alpine berry	*Arctostaphylos alpina*
Bog blueberry	*Vaccinium uliginosum*
Bog (lowbush) cranberry	*Vaccinium vitis-idaea*
Crowberry or blackberry	*Empetrum nigrum*
Highbush cranberry	*Viburnum edule*
Labrador or Hudson Bay tea	*Ledum groenlandicum*
Nagoonberry	*Rubus arcticus*
Pea-vine root	*Hedysarum alpinum*
Raspberry	*Rubus idaeus*
Roschips	*Rosa acicularis*
Salmonberry or cloudberry	*Rubus chamaemorus*
Wild rhubarb	*Polyganum alaskanum*
Paper birch	*Betula papyrifera*
Balsam popular	*Populus balsamifera*
White spruce	*Picea glauca*
Willow (*sp.*)	*Salix (sp.)*

APPENDIX 3.

EDIBLE WEIGHTS OF SELECTED RESOURCES

Resource	Live weight (pounds)	Conversion factor	Edible weight (pounds)
Chinook salmon	23.1	.75	17.3
Sockeye salmon	5.5	.75	4.1
Chum salmon	9.5	.75	7.1
Pink salmon	3.9	.75	2.9
Coho salmon	7.1	.75	5.4
Landlocked salmon	1.9	.75	1.4
Unknown salmon	5.5	.75	4.1
Arctic grayling	0.9	.75	0.7
Burbot	3.2	.75	2.4
Dolly Varden	1.2	.75	0.9
Lake trout	2.7	.75	2.0
Longnose sucker	0.9	.75	0.7
Northern pike (lg.)	3.7	.75	2.8
Northern pike (sm.)	1.3	.75	1.0
Rainbow trout	1.9	.75	1.4
Sheefish	4.9	.75	3.7
Whitefish *sp.*	2.8	.75	2.1
Black bear	97.0	.6	58.0
Brown bear	235.0	.6	141.0
Caribou	217.0	.6	130.0
Dall sheep	108.0	.6	65.0
Deer	71.0	.6	42.5
Moose	1,075.0	.6	645.0
Beaver	40.0	.6	24.0
Hare	2.5	.6	1.5
Lynx	6.7	.6	4.0
Muskrat	1.7	.6	1.0
Porcupine	7.5	.6	4.5
Red squirrel	0.8	.6	0.5
Crane	10.0	.6	6.0
Duck *sp.*	1.2	.6	0.7
Goose *sp.*	2.4	.6	1.8
Grouse *sp.*	.8	.6	0.5
Ptarmigan *sp.*	.8	.6	0.5
Waterfowl eggs			1.8 /dozen
Berries			4.0 /gallon
Plants			1.0 /quart

APPENDIX 4.

DEFINITION OF OCCUPATIONAL CATEGORIES

1. Professional, technical, and managers (teachers, engineers, accountants, lawyers, medical and dental technicians, and airplane pilots)

2. Clerical workers and sales persons (bookkeepers, secretaries, shipping and receiving clerks, telephone operators, and clothing sales people)

3. Service workers (hospital, hotel, restaurant workers, private household workers, police officers, and firefighters)

4. Agriculture, fishery- and forestry-related workers (loggers, commercial fishers, trappers, farmers, and landscapers)

5. Processing (food, metal processing, and ore refining)

6. Machine trades (machinists, mechanics, printers, and cabinetmakers)

7. Benchwork (fabricators, assemblers and repairers of metal, jewelry, photo equipment and textiles, tailors, and sewing machine operators)

8. Structural (welders, electrical workers, carpenters, and painters)

9. Armed forces

10. Recreation-based occupations (guiding and mountain-climbing)

11. Motor freight and transportation (truck drivers, air transportation, railroad, and parking lot)

12. Packing and materials handling (packagers, movers, and stevedores)

13. Mining (borers, drillers, cutters, and blasting specialists)

14. Miscellaneous (electric utility, water and water treatment, and graphic arts workers)

Source: United States Department of Labor (1986)

APPENDIX 5.

DEFINITION OF INDUSTRY-EMPLOYER CATEGORIES

1. Agriculture, forestry, and commercial fishing (loggers, farm implement and fertilizer sales, farmers and agricultural laborers, and trappers)

2. Mining (metal mining, oil and gas extraction, nonmetallic minerals)

3. Construction (carpenters, bricklayers, electricians, and plumbers)

4. Manufacturing (forest and wood products, seafood processors, chemical and allied products, and paper products)

5. Transportation; communications; utilities, excluding government utilities (telephone company, air transportation, electric, gas, and sanitary services, and trucking and warehousing)

6. Wholesale trade (establishments that sell goods to retail outlets and not directly to consumers such as distributors of furniture, alcoholic beverages, automotive parts, construction machinery)

7. Retail trade (establishments that sell goods directly to consumers such as clothing, hardware, and food stores, gasoline stations, eating and drinking establishments, automotive dealers)

8. Finance, insurance, and real estate (banks, realty offices, insurance companies, credit agencies, and investment companies)

9. Services, other than wholesale and retail trade (hotels, legal services, auto repair shops, and business services)

10. Federal government

11. State government (including education)

12. Local government (including education and utilities)

Source: Office of Management and Budget (1987)