PATTERNS OF FISH AND WILDLIFE USE FOR SUBSISTENCE IN FORT YUKON, ALASKA

by

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ABSTRACT

Fort Yukon, located along the Yukon River in northeastern interior Alaska, is the largest Athabaskan community in the state with an estimated population of 584 residents comprising 212 households in 1987. This study was undertaken to gather quantitative information on subsistence harvest and use of fish and wildlife resources by Fort Yukon residents. These data, along with updated land use maps and socioeconomic information, were intended to complement a previous description of Fort Yukon subsistence activities published by the Division of Subsistence in 1983. Data collection took place from August 1987 through October 1988 using a household survey administered to a stratified sample of 72 (34 percent) of Fort Yukon households.

Serving as the hub for administration and services in the Yukon Flats region and surrounding communities, 65 percent of the wage employment opportunities in Fort Yukon were in the federal, state, and local government sector. Jobs were predominantly seasonal or part-time in nature with only about 25 percent of jobs offering permanent, full-time employment. The median annual household income from all sources in 1987 was estimated to be $17,856. Among all households, the Alaska permanent fund dividend was the largest single source of non-wage income, averaging almost $1,529 per household. Among the estimated 43 trapping households, trapping was the largest source of non-wage income, contributing an average of $5,149 per trapping household.

Fort Yukon residents displayed a high degree of involvement in the harvest, use, and sharing of fish and wildlife resources. All households used some wild resources during the survey year and an estimated 91.5 percent of all households made direct attempts at harvesting resources. Examining the use of major resource groups, mammals (excluding furbearers) were used by 100 percent of the households, salmon by 97.2 percent, birds by 90.4 percent, non-salmon fish by 89.2 percent, furbearers by 43.8 percent, and plants by 37.6 percent.

The estimated total edible weight of resources harvested by Fort Yukon residents during the survey year was 625,725 pounds. This provided an average household harvest of 2,951 pounds and an average per capita harvest of 1,071 pounds. Almost two thirds (61 percent) of the total harvest

consisted of salmon. Differences between the percentage of households harvesting and using specific resources point to patterns of resource sharing that remain an important aspect of contemporary subsistence production.

Land use data showed that Fort Yukon residents utilized a large geographic area of the surrounding Yukon Flats to support subsistence activities. While some activities such as salmon fishing were found to be concentrated within 10 or 20 miles of Fort Yukon, the overall community use area encompassed a 150 mile stretch of the Yukon River and tributary streams between the communities of Beaver and Circle, as well as the Alaska portion of the Porcupine River drainage and its tributaries.

Dogs continued to play an important role in supporting subsistence activities during the study year, especially as a mode of winter transportation for trappers. This study also found that more than one third of the total harvest, composed largely of chum salmon, was utilized as dog food. The per capita harvest of wild resources in Fort Yukon was estimated to be 679.0 pounds when resources fed to dogs were excluded. These data indicate that subsistence harvest and use of local resources for human consumption and as food for dogs was an integral part of the mixed economy of Fort Yukon during the study period.

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CHAPTER 1

INTRODUCTION

Fort Yukon is a rural community located at the confluence of the Yukon and Porcupine rivers at the center of the Yukon Flats in northeastern interior Alaska (Fig. 1). In 1987, it was the largest Athabaskan community in interior Alaska and the entire state, with a population of 584 people (Alaska Department of Labor 1987). Populations of neighboring villages in the Yukon Flats and upper Yukon River region ranged in size from about 32 to 230 people. As one of the oldest permanent settlement locations in interior Alaska, Fort Yukon has long been and continued to be an administrative and service center for the Yukon Flats region offering greater wage employment opportunities and a more diverse population than the smaller communities in the region.

Fort Yukon and surrounding communities have been the subject of numerous ethnographic, historical, and economic studies as well as a few literary works. The rich history of Fort Yukon will not be recounted here. Autobiographical works of life in the area during the first quarter of this century have been written by the Episcopal Archdeacon Hudson Stuck (1914, 1917) and pioneer trapper James Carroll (1957). A study on human ecology and the local economy was conducted in 1949 by Shimkin (1951, 1955). McKennan (1965) and Hadleigh-West (1963) conducted ethnographic studies of the Neets'aii Gwich'in of Arctic Village, a community approximately 110 miles north of Fort Yukon. Nelson (1973) provided detailed descriptions of subsistence activities in Chalkyitsik, while Schneider (1976) documented the historical development of the nearby multi-ethnic community of Beaver and land use patterns of residents there. In 1977, the Institute of Social and Economic Research (1978) conducted a regional planning study for the United States Department of Agriculture Forest Service (U.S. Forest Service) that provided socioeconomic profiles and natural resource inventories of the Yukon Flats region and assessed potential development strategies. Darbyshire and Associates (1979) evaluated the potential for establishing a regional government.

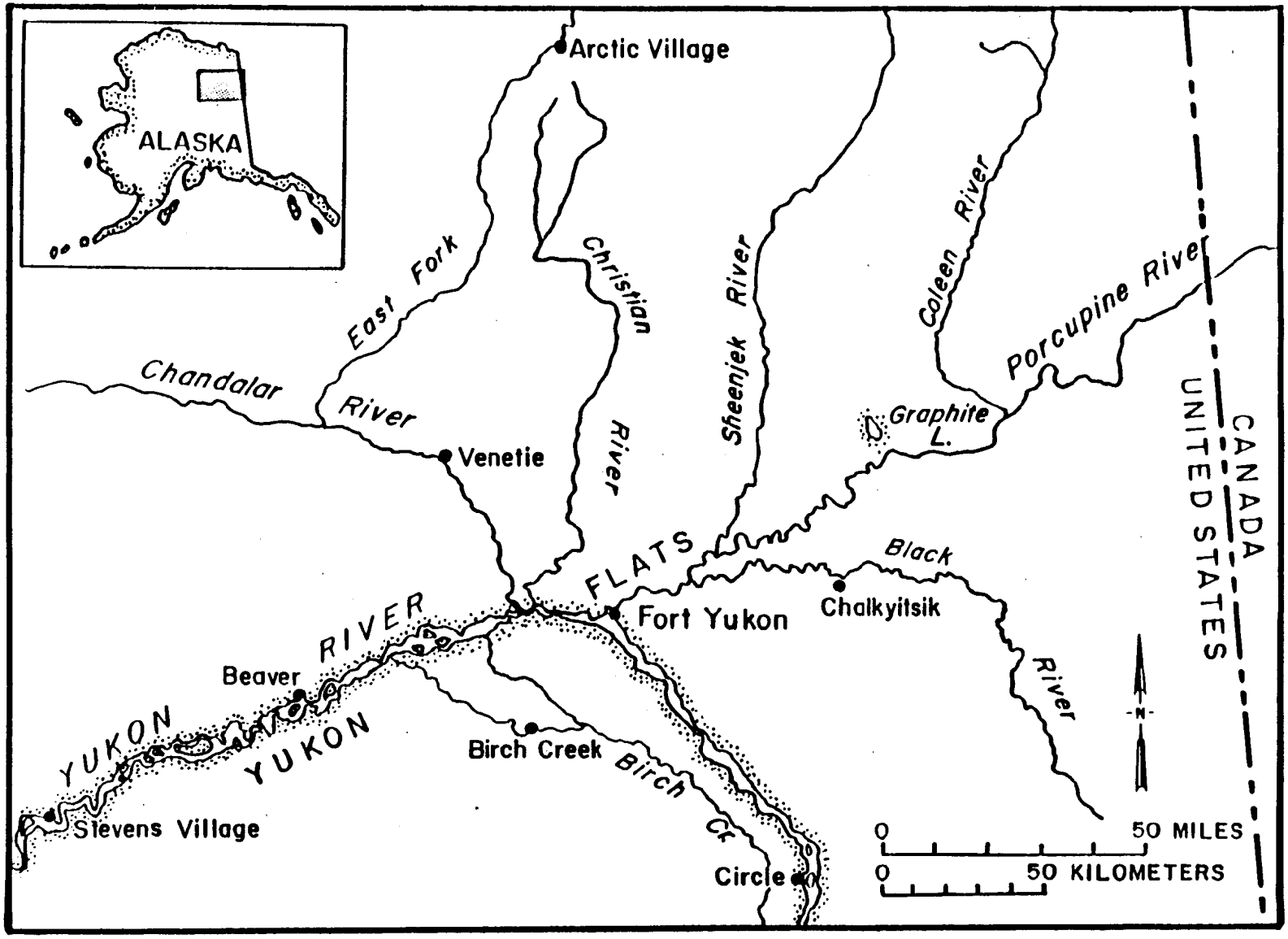


Fig. 1. Location of Fort Yukon in east central Alaska.

The Alaska Department of Fish and Game, Division of Subsistence, has conducted a number of more recent studies in the area. Caulfield (1983) provided information on regional history and the contemporary sociopolitical and economic setting; documented the fish, wildlife, and plant species used in the area; described harvest methods and the seasonal round of subsistence activities; and mapped the areas used for a variety of subsistence activities for five upper Yukon and Porcupine River area communities including Fort Yukon. Gwich'in Athabaskan place-names for this region were documented by Caulfield, Peter, and Alexander (1983). Moose hunting activities in several Yukon Flats communities were discussed in Sumida and Alexander (1985). Additional subsistence studies have been conducted in the neighboring communities of Stevens Village and Beaver (Sumida 1988, 1989). In 1988, the Division undertook a harvest study which documented subsistence salmon harvests along the entire Yukon River drainage in Alaska, including Fort Yukon, in an attempt to obtain more accurate harvest estimates (Walker, Andrews, Andersen, and Shishido 1989). These works provided the context for the present study.

Although the cash sector of the economy has been more developed in Fort Yukon than in the smaller, neighboring communities in the Yukon Flats, several studies have documented the continuing importance of subsistence to the local economy (Patterson 1974; Institute for Social and Economic Research 1978; Caulfield 1983; United States Department of the Interior 1987). Patterson (1974) estimated that Fort Yukon residents harvested approximately 611,425 pounds of wild resources, averaging over 1,000 pounds per capita annually. In another study, 42 percent of the Native households interviewed reported that one-half or more of their food was obtained from hunting, fishing, and gathering activities (Institute for Social and Economic Research 1978). Another 27 percent responded that a portion of their food, although less than one-half, was obtained in this way. These studies presented a general baseline for comparison of the current role of subsistence in the contemporary community.

PURPOSE AND OBJECTIVES OF THE STUDY

Information on the subsistence use of resources is relevant to the judicious management of lands and resources in the area. Application of findings from this study can be made to the management policies of the U.S. Fish and Wildlife Service (USFWS) regarding activities affecting the Yukon Flats and the Arctic National Wildlife refuges and the development of proposed regulations for spring and summer waterfowl hunting. These data may also assist the Alaska Department of Fish and Game in the regional management of moose, salmon, furbearers, and other resources used for subsistence. Finally, other state and federal agencies with interests and land holdings in the Yukon Flats region have a need for subsistence information for a variety of area planning purposes, such as the formulation of fire management policies and economic development plans.

Descriptions of subsistence activities undertaken by Fort Yukon residents were included in Caulfield's work (1983). That report documented the types of fish, wildlife, and plant species utilized; seasonality of harvest; harvest and processing methods; and the geographic areas used for various subsistence activities. The present study was initiated primarily to examine aspects of the Fort Yukon subsistence and wage economy that were not addressed in the Caulfield study. Thus, the quantitative data on subsistence harvest and use of resources by residents of Fort Yukon collected during this study, along with updated land use maps and information on household wage and employment characteristics, should be considered complementary to the descriptive information in previous studies providing an additional perspective on the importance of fish and wildlife to the community. These quantitative data are relevant in characterizing the economy of Fort Yukon and allow for meaningful comparisons with other communities in the state for which similar data have been collected.

Seven specific research objectives were identified in the design for this project:

(1) to describe the seasonal round of harvest for fish, wildlife, and plant species utilized by Fort Yukon residents;

(2) to document estimated quantities of fish, wildlife, and plant resources harvested and the level of participation in resource harvest and use based on a sample of Fort Yukon households for a 12-month period;

(3) to describe demographic data including age, ethnicity, birthplace, former place of residence, and length of residency in Fort Yukon of household members;

(4) to describe the cash sector of the economy including employment opportunities, an estimation of the cost-of-living, and other economic characteristics of surveyed households, such as extent of participation in wage employment, sources of cash, and gross income and an analysis of the relationship of these to harvest activities;

(5) to describe resource distribution and exchange, including the kinds of resources most frequently exchanged; the distribution of wildlife harvests between Fort Yukon and surrounding communities; and the extent of involvement of sampled households in distribution networks;

(6) to identify subpopulations within Fort Yukon and to examine whether they had different patterns of resource use and socioeconomic characteristics; and

(7) to update maps of fish and wildlife harvest areas.

METHODOLOGY

A research design describing the intent and objectives of the study and outlining data collection methods was presented to the council of the Native Village of Fort Yukon in June 1987. Upon their approval, research began in August 1987. Research was conducted by a Subsistence Resource Specialist II based in Fairbanks and a local Fish and Wildlife Technician III in Fort Yukon. Methods of data collection included a review of the relevant literature and standard anthropological research techniques such as systematic interviews using a survey instrument, informal interviews, individual mapping sessions, and, to a limited extent, participant observation.

Data collection took place periodically from August 1987 through October 1988. The timing and duration of field work sessions was determined largely by funding constraints and commitments to other projects during this period. The preliminary work of conducting a community census, stratifying households, and selecting a sample took place during August and October 1987. Surveys were conducted between November 1987 and February 1988. Mapping sessions occurred during May, June, and September 1988.

Sample Stratification

Because of the relatively large size of the community, it was necessary to sample community households and a stratified random sampling design was used. Prior to sampling households in the community, a census of households compiled by the City of Fort Yukon in April 1987 was updated and expanded to include names of household members and, when possible, birthdates. This was accomplished by working with knowledgeable local residents and obtaining enrollment records from the Native Village office. New households established after August 1, 1987 were not considered in census lists and subsequent household stratification. For the purposes of the study the total number of households was 212. A housing project in 1988 added about 15 new housing units to the community which were not part of this study.

Research findings from a number of other Division of Subsistence studies have shown that there is often wide variation in household harvest production within a community (Wolfe 1987). Based on those findings, it was assumed that Fort Yukon may have a similar pattern of harvest level diversity. In order to maximize the reliability and accuracy of the information collected on harvest quantities, households were stratified based upon their estimated harvest production. Criteria for three strata (high, medium, and low harvesters) were based on patterns observed in other interior Alaska communities thought to be similar (Andrews 1988; Sumida 1988). Harvest records of subsistence salmon catches, sealing and sales records for furbearers, the number of dogs a household had, equipment ownership, and demographic characteristics were used to categorize households.

The criteria outlined below were used as indicators of household-subsistence productivity. High-harvest households were considered those that had:

(1) an annual harvest of 1,000 or more chum salmon or 400 or more king salmon during any one of the past three years; or 2) teams of 11 or more dogs; or

(3) sales of 30 or more marten and/or 5 or more lynx during the previous year.

Medium-harvest households were those with:

(1) an annual harvest of 50 or more salmon (combined species) during any one of the previous three years; or
(2) 5 to 10 dogs; or
(3) the sale of between 10 to 29 marten and/or 1 to 4 lynx during the previous year; or
(4) ownership of a snowmachine or riverboat.

Low-harvest households were those with:

(1) an annual total salmon harvest of less than 50 fish (combined species); and
(2) less than 5 dogs, no record of trapping, and no snowmachine or riverboat.

For households where no information was available and where the low-harvest criteria could not be determined from records or local respondents, a household was categorized as low if they fit the following demographic profile:

(1) single, unmarried individual; or
(2) elderly without children in the household; or
(3) single woman with children; or
(4) young, newly-married couple, both less than 30 years of age

If the household did not meet any of these demographic criteria they were placed in the medium-harvest category.

Of the 212 households in Fort Yukon, the stratification resulted in 29 categorized as high-harvest households, 63 categorized as medium-harvest households, and 120 categorized as low-harvest households. A sampling goal of 75 households (35 percent) was established based on constraints of staffing and time. Division data management staff then computed optimal sampling fractions for each stratum that would maximize the accuracy of the data collected for the community as a whole. This determination was based on confidence intervals of hypothetical mean household harvests. The optimal sampling fractions were 100 percent of those categorized as high-harvest households

(29 households), 52 percent of medium-harvest households (33 households), and 11 percent of the low-harvest households (13 households).

At the time, this method of stratifying households was just beginning to be utilized within the Division of Subsistence, and it was not known whether households could be accurately categorized with the criteria used or if the resulting data would more reliably reflect the community's harvest. For these reasons, sampling fractions were adjusted to include a minimum of 20 households in each stratum. Households within each category were randomly selected for interviewing and 72 interviews were successfully completed. The actual sampling fractions achieved for each strata were; 26 of 29 high-harvest households, 26 of 63 medium-harvest households, and 20 of the 120 low-harvest households.

Survey Instrument

The survey instrument (Appendix A) used during interviews was designed to gather information on various aspects of a household's involvement in subsistence activities as well as their participation in the cash sector of the economy during the 12-month period October 1986 through September 1987. The survey instrument inquired about the use and harvest of 49 locally available resources or resource groups. A list of the common and scientific names of fish, wildlife, and plant species used by Fort Yukon residents appears in Appendix B. Households were asked whether they had attempted to harvest a particular resource, if they had been successful, quantities harvested, and whether or not they received or gave away any wild resources. Questions on the distribution of resources and the use of local fish and wildlife resources for dog food were also included. In addition, demographic characteristics of household members such as age, birthplace, length of residency, and previous residence were also collected along with information on household involvement in the cash economy as determined by employment, income, equipment ownership, and cost-of-living questions.

The total number of households surveyed in Fort Yukon was 72 (34 percent). Three households in the high-harvest stratum were not interviewed. Two of these chose not to participate in the study and one household was unavailable during the period of data collection. Households in the

other two strata that were unavailable or did not want to participate were replaced by alternate households from the same category.

Survey data were processed by division data management staff and analyzed using the Statistical Package for the Social Sciences (SPSS). Estimates of the average usable weight of edible species were made and used to convert harvest quantities into pounds edible weight (Appendix C). Determinations of edible weight were based on a variety of sources. These included division "standards" which have evolved from similar research in more than 100 Alaskan communities, and discussions with biologists familiar with resources in the upper Yukon River region who provided reasonable estimates of average live weights to which standard conversion factors could be applied. Data from each stratum were weighted based on the estimated percentage of the population which they represented and survey data were expanded to obtain estimates for the entire community. Confidence intervals were computed and included with the harvest estimates.

Mapping

Mapped information on resource use areas which had been previously collected in the early 1980s by Caulfield from a small sample of Fort Yukon households was also updated in this study. Use areas have been shown to change over time. The primary aim in updating the previous work was to ensure coverage of the geographic extent of harvest activities of Fort Yukon residents. Mapping focused on documenting trapping areas as these involved the greatest areal extent of land use and because many other types of harvesting activities take place within the boundaries of trapping areas. Information was also solicited on additional areas used for hunting activities. Mapping was conducted with 26 trappers by C. Alexander, a researcher whose personal knowledge of local trapping patterns facilitated collection of this information. As with the previous research by Caulfield (1983), respondents were asked to indicate areas used for hunting and trapping during their lifetime. Although the historic record points to many centuries of land use by local inhabitants, from the ages of respondents, it is estimated that these maps represent land use during the period circa 1925 to 1987.

Salmon fishing sites were also mapped. The locations of salmon fishing camps, fish nets, and fishwheel sites used during summer 1987 were documented by direct observation.

Limitations

Perhaps the major limitation of this study was the limited time depth of the survey data, especially with regard to harvest information. Other studies such as Burch (1985), Coffing and Pedersen (1985), and Walker *et al.* (1989) have shown that harvest quantities for individuals and communities can vary widely over time. Harvests are known to be affected by a number of conditions such as changes in migration patterns of animals; natural cycles of abundance and decline of species; weather and environmental conditions; and socioeconomic factors such as employment opportunities, equipment and cash availability; and other personal circumstances of individual harvesters. Thus, given a single year of harvest data, it is difficult to determine what the "average" range of subsistence production might be for the community or whether the harvest estimates documented in this study fall within such an "average" range. However, one primary purpose of this study was to collect baseline harvest data, against which subsequent data can be evaluated.

CHAPTER 2

DEMOGRAPHIC AND ECONOMIC OVERVIEW

This chapter describes contemporary socioeconomic characteristics of Fort Yukon. Much of the quantitative information on the current population, employment, income, and equipment ownership are estimates derived from survey data. For additional information on employment, community facilities, infrastructure, and services, readers are referred to the community profile by Fison (1987) prepared for the Alaska Department of Community and Regional Affairs.

DEMOGRAPHICS

The earliest determination of the Native population in the region surrounding Fort Yukon was the 1858 Hudson's Bay Company census which enumerated 842 people in a broad area of the upper Yukon and Porcupine rivers inhabited by 6 tribes (Osgood 1970:15). Males comprised 56.3 percent of the population and females comprised 43.7 percent. By 1879 the area population was reduced by disease following Euroamerican contact to approximately 230 people (Shimkin 1955:223). Table 1 presents Fort Yukon population data for the period 1880 through 1987. United States census data report a population 109 for the settlement of Fort Yukon in 1880, increasing to more than 300 in the 1920s and 1930s (Table 1). A 1949 study conducted in Fort Yukon estimated the population to be 470 residing in 87 Native and 20 non-Native households (Shimkin 1955:224, 227). At that time, single-person households comprised 24.7 percent of the total and the Native population was comprised of 56.7 percent males and 43.3 percent females (Shimkin 1955:226). A review of birth and mortality records revealed that one-third of the increase in population between 1940 and 1949 was due largely to in-migration (Shimkin 1955:224). The increase in population during the 1950s is attributed to a significant in-migration of families formerly occupying seasonal camps and isolated homesites in the Yukon Flats and to the construction and staffing of an Air Force communications site in Fort Yukon.

TABLE 1. FORT YUKON POPULATION, 1880-1987

Year	Population	Year	Population
1880[a]	109	1960[a]	701
1900[a]	156	1970[a]	448
1910[a]	321	1980[c]	619
1920[a]	319	1984[d]	655
1930[a]	304	1985[d]	678
1940[a]	274	1986[e]	616
1949[b]	470	1987[f]	584
1950[a]	446		

[a]Rollins (1978).
[b]Shimkin (1955).
[c]United States Department of Commerce (1980).
[d]Alaska Department of Labor (1987).
[e]City of Fort Yukon (1986).
[f]This study.

A noticeable decline in population of 36.1 percent occurred between 1960 and 1970. In the 1980s the Fort Yukon population has been somewhat more stable, but still subject to small fluctuations. A slight population decline of 5.2 percent occurred between a city census conducted in 1986 and this study's estimate of 584 in 1987.

According to the 1987 census conducted for this study, the Fort Yukon population of 584 resided in 212 households. Households ranged in size from one to eight members and average household size was 2.75 persons. Males comprised about 54 percent of the population while females made up the remaining 46 percent, a ratio similar to that reported at the time of contact by Hudson's Bay Company records (Osgood 1970:15) and by Shimkin (1955:226) for 1949. An estimated 93 percent of the households had at least one adult male (18 years or older) in residence, while 72 percent had one or more adult females resident. Frequency of household sizes are shown in Table 2. The largest percentage (27 percent) were single person households and two-thirds had three members or less. Approximately 76 percent (442 individuals) of all Fort Yukon residents were under 40 years of age, indicating a relatively young community population (Fig. 2). The greatest number were either 10 to 19 or 30 to 39 years of age. Children under 18 years of age were present in 53 percent of the households.

TABLE 2. FREQUENCY OF HOUSEHOLD SIZES IN FORT YUKON, 1986-87

Household size	Number of households	Percentage of households	Cumulative percentage
1	57	26.9	26.9
2	43	20.3	47.2
3	46	21.7	68.9
4	38	17.9	86.8
5	20	9.4	96.2
6	6	2.8	99.0
7	1	0.5	99.5
8	1	0.5	100.0
Total	212	100.0	

Fort Yukon households were commonly composed of Native Alaskans who were born and raised in the region. An estimated 83 percent of the community's households included at least one Native head of household. Survey data showed that 57.5 percent of households heads were born and raised in Fort Yukon and another 15.6 percent were from outlying camps or communities in the upper Yukon River region including Arctic Village, Beaver, Birch Creek, Chalkyitsik, Circle, Old Rampart, Venetie, and Old Crow (Yukon Territory). Only 3.2 percent of household heads were from other parts of Alaska, while 23.7 percent originated from outside of Alaska. The estimated average length of Fort Yukon residency reported by household heads was 32.0 years.

WAGE EMPLOYMENT

In 1987, a large proportion of wage employment in Fort Yukon was provided by federal, state, or local government positions. Table 3 lists major employment categories and the estimated percentages of jobs and of people employed in each. An estimated 65 percent of wage paying jobs held in the community during the study year fell into the government services categories and included positions with the Yukon Flats School District; Tanana Chiefs Conference Inc., Yukon Flats Subregion;

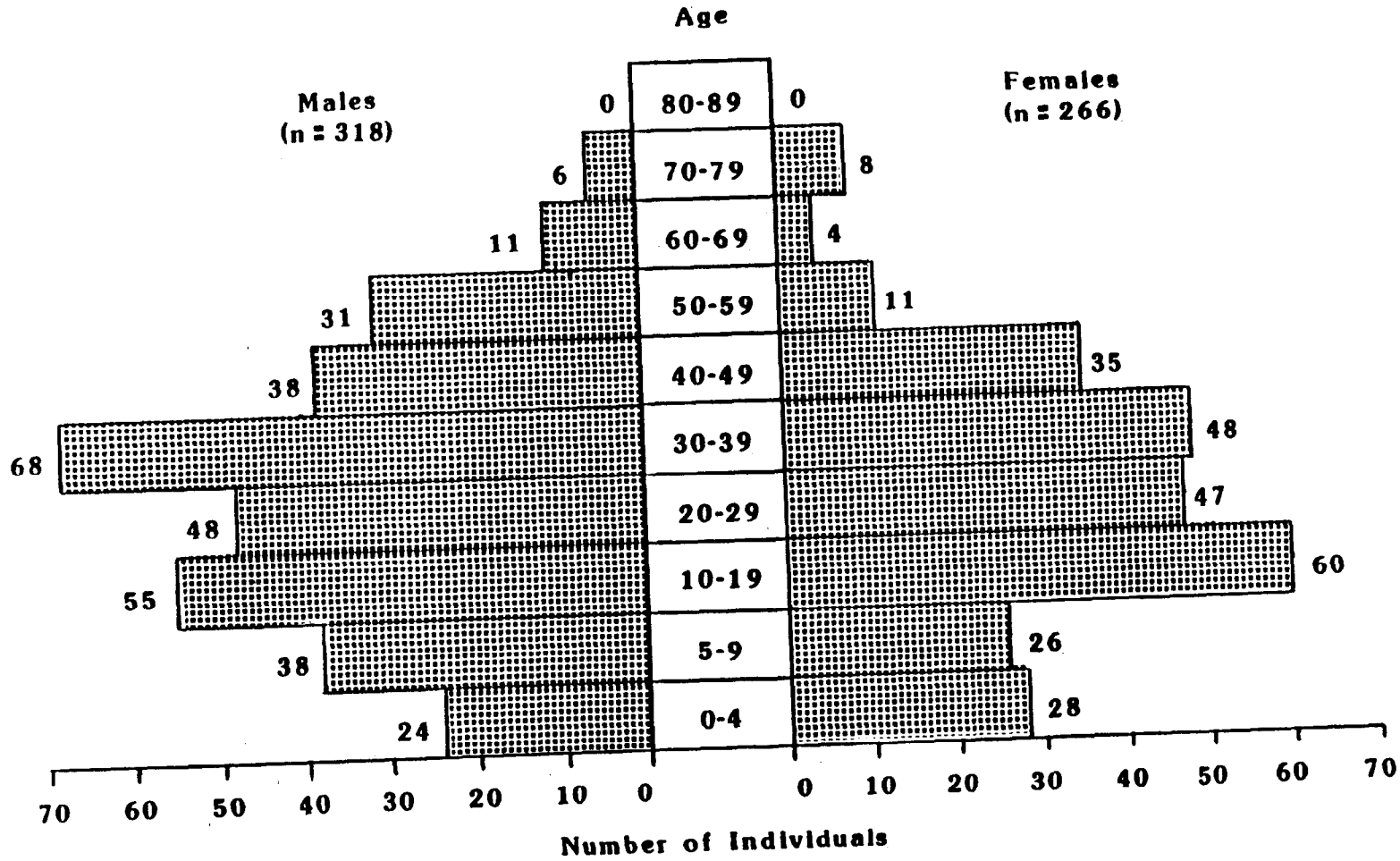


Fig. 2. Age and sex characteristics of the Fort Yukon population, 1987 (N=584).

TABLE 3. ESTIMATED PERCENTAGE OF FORT YUKON JOBS BY CATEGORY, 1986-87

Employer	Percentage of jobs in category	Percentage of employed persons in category
Local Government	47.4	56.0
Services	17.6	23.6
Federal Government	13.1	18.2
Transportation/ Communication/Utilities	9.2	12.8
State Government	4.4	6.1
Trade	3.1	4.4
Construction	3.1	4.3
Other	2.2	3.0
Total	100.0	128.4[a]

[a]Total exceeds 100 percent because a person can have more than one wage-paying job.

U.S. Public Health Service; City of Fort Yukon; Native Village of Fort Yukon; and state agencies including the Departments of Public Safety, Health and Social Services, and Fish and Game. Seasonal firefighting positions were obtained through the U. S. Department of Interior, Bureau of Land Management. In addition, government-funded capital improvement project grants provided temporary employment in the construction trades. Other government employment included positions with the National Guard, U.S. Customs Service, U.S. Postal Service, National Weather Service, and the University of Alaska. Employment in the Fort Yukon private sector included positions with several local stores, air taxi operators, lodges, coffee shops, utility companies, and the Native village corporation.

An estimated 273 individuals in 190 households with an employed member held 380 jobs during the survey year. This represented 70 percent of all residents 18 years and older, and 89.6 percent of all households. However, only 25.0 percent of the jobs were both full-time (30 or more hours per week) and year-round (48 or more weeks per year). Over one-half (55 percent) of all jobs were seasonal positions (Table 4). While 70.8 percent of employed individuals held only one job, more

TABLE 4. ESTIMATED PERCENTAGE OF JOBS BY DURATION OF JOBS IN FORT YUKON, 1986-87

Duration of jobs	Part-time (less than 30 hours/week)	Full-time (30 or more hours/week)	Total
Seasonal (0 - 35 weeks)	7.9	47.4	55.3
Semi-year-round (36 - 47 weeks)	0.0	15.3	15.3
Year-round (48 - 52 weeks)	4.4	25.0	29.4
Total	12.3	87.7	100.0

NOTE: Information on hours worked per week and seasonality could not be calculated for an estimated 44.6 percent of the jobs.

than one-half (52.3 percent) of all households derived wage income from two or more jobs (Table 5). Perhaps most significantly, 10.4 percent of all Fort Yukon households reported no income from wage employment sources at all.

Using survey data, the number of weeks of wage employment during the survey year were estimated for 166 of the 190 households that had wage employment. These data are presented in Table 6. More than one-quarter (27.2 percent) of the households with an employed member had 16 weeks or less of employment during the period October 1986 through September 1987. As noted above, few positions in Fort Yukon offered employment that was both full-time and year-round. Thus, 52 weeks or 12 months of reported employment was more commonly the result of multiple part-time or seasonal jobs, or the employment of more than one household member. Despite this pattern of multiple jobs and workers in a household, almost one-half (48.7 percent) of the households with an employed member reported less than 52 weeks of wage employment during the survey year (Table 6).

TABLE 5. NUMBER OF JOBS HELD BY EMPLOYED PERSONS AND ALL HOUSEHOLDS IN FORT YUKON, 1986-87

Number of jobs	Percentage of employed persons (n=273)	Percentage of all households (N=212)
0	0.0	10.4
1	70.8	36.3
2	21.4	29.7
3	5.7	12.3
4	2.2	8.5
5	0.0	0.9
6	0.0	0.9
Total	100.1[a]	99.0[a]

[a]Rounding error causes percentages to total more or less than 100.

TABLE 6. ESTIMATED NUMBER OF WEEKS WORKED BY EMPLOYED HOUSEHOLDS IN FORT YUKON, 1986-87.

Number of weeks worked	Percentage of employed households[a]	Cumulative percentage	Number of weeks worked	Percentage of employed households[a]	Cumulative percentage
2.0	0.7	0.7	36.0	5.1	40.2
3.0	0.7	1.3	37.0	0.7	40.8
3.5	1.5	2.8	40.0	4.3	45.1
4.0	8.7	11.5	43.0	3.6	48.7
5.0	1.3	12.9	52.0	26.6	75.4
6.0	1.5	14.3	54.0	6.5	81.9
7.5	1.3	15.7	56.0	0.7	82.6
8.0	2.1	17.8	60.0	7.2	89.9
10.0	1.5	19.3	84.0	0.7	90.5
12.0	0.7	19.9	88.0	3.6	94.2
13.0	1.5	21.4	104.0	2.9	97.1
15.0	0.7	22.1	140.0	1.5	98.5
16.0	5.1	27.2	150.0	1.5	100.0
17.5	3.6	30.8			
30.0	0.7	31.5	Total	100.0	
34.0	3.6	35.1			

[a]Based on 166 households with members reporting wage employment where the number of weeks worked could be estimated.

INCOME, EXPENDITURES, AND EQUIPMENT OWNERSHIP

All Fort Yukon households reported some level of cash income. Estimates based on survey data indicate that total household incomes (wage plus non-wage) ranged from $1,762 to $120,024 with a median of $17,856 and a mean of $28,010 (Table 7). The significant discrepancy between mean and median income is indicative of an uneven distribution of household incomes. Data presented in Table 7 show that 55 percent of households had incomes of less than $20,000, and that 41.5 percent had incomes less than $15,000. More households had an income between $10,000 and $14,999 than any other income range. The relatively few households that held one or more of the few higher paying, full-time, year-round positions available in Fort Yukon tended to raise the mean household income for the community to a level higher than "the average" household was actually able to reach. It is noteworthy that 62.8 percent of Fort Yukon households failed to attain the estimated mean income level of just over $28,000. Cumulative income reported in Figure 3 shows that about eight percent of the households accounted for one-quarter of the total community income and that one-half of the total income for the community of Fort Yukon was earned by only 27 percent of the households.

TABLE 7. ESTIMATED TOTAL HOUSEHOLD INCOMES (EARNED PLUS UNEARNED) IN FORT YUKON, 1986-87

Total income range	Percentage of households	Cumulative percentage	Total income range	Percentage of households	Cumulative percentage
$1 - 4,999	5.6	5.6	55,000 - 59,999	4.0	89.8
$5,000 - 9,999	12.3	18.0	60,000 - 64,999	0.0	89.8
10,000 - 14,999	23.6	41.5	65,000 - 69,999	2.8	92.6
15,000 - 19,999	13.4	54.9	70,000 - 74,999	0.0	92.6
20,000 - 24,999	5.0	60.0	75,000 +	7.4	100.0
25,000 - 29,999	4.0	63.9			
30,000 - 34,999	3.3	67.3	Total	100.0	
35,000 - 39,999	9.5	76.8			
40,000 - 44,999	3.4	80.1	Median = $17,856		
45,000 - 49,999	2.8	83.0	Mean = $28, 010		
50,000 - 54,999	2.8	85.8			

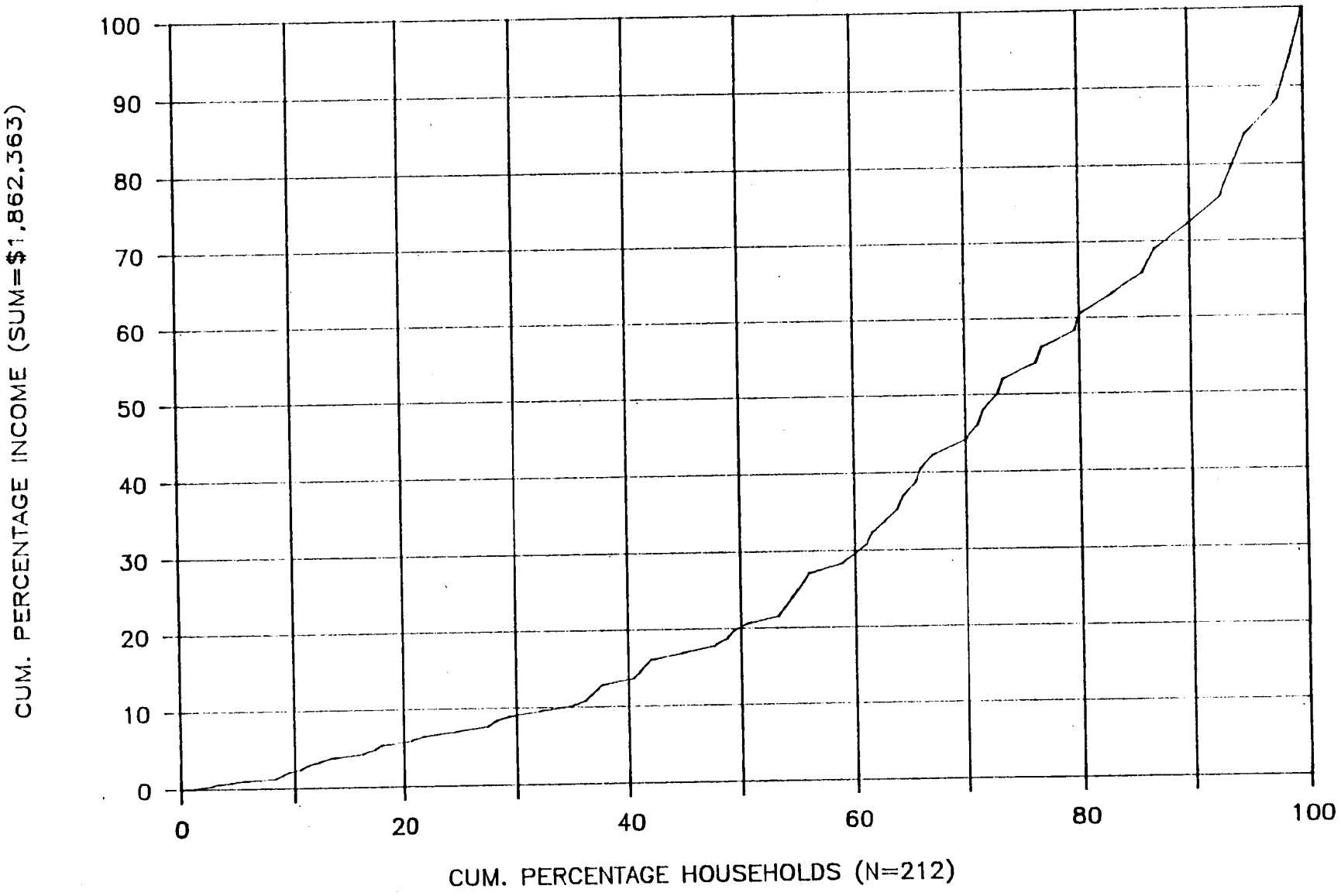


Fig. 3. Fort Yukon income distribution (cumulative percentage of households by cumulative percentage of income), 1986-87.

Household incomes were derived from wage employment activities such as a full or part-time jobs described above and non-wage sources such as trapping, retirement payments, social security, and transfer payment programs. An estimated 89.6 percent of Fort Yukon households reported income from wage employment during 1987. In the 190 households where there was wage employment, incomes ranged from $1,132 to $118,912 per household with a median of $16,068 and a mean of $25,910. By comparison, estimated amounts of non-wage income ranged from $556 to $23,868 per household with a median of $2,780 and a mean of $4,836. On average, the Alaska permanent fund dividend and trapping provided the greatest amount of non-wage income in the community, followed by social security and retirement payments (Table 8). The average taxable income per return filed for Fort Yukon was $14,251 in 1983, $15,688 in 1984, and $13,571 in 1985 (Alaska Department of Revenue 1988). Department of Revenue data are not aggregated at the household level.

Using household size data and the 1987 federal poverty income guidelines for Alaska, an estimated 21.3 percent of all Fort Yukon households fell below the poverty level (*Federal Register*

TABLE 8. SOURCES OF INCOME IN FORT YUKON, 1986-87

Income source	Percentage of households	Average household income (N = 212)
Wage employment	89.6	$23,174
Alaska Permanent Fund Dividend	100.0	1,529
Trapping	20.2	1,044
Social Security	17.5	733
Retirement	6.8	493
Food Stamps	7.9	277
Longevity Bonus Program	9.0	224
Pension	5.7	170
Unemployment	3.4	59
Aid to Families With Dependents	1.1	46
Disability	1.1	35
Adult Public Assistance	4.0	27
Energy Assistance	6.7	27
Handicrafts	4.5	23
Dog races	0.5	21
Commercial fishing	0.5	13
Native corporation dividend	3.4	2

1987). As these guidelines are not corrected for the higher cost of living in rural Alaskan communities, it is likely that the actual percentage of households falling below the poverty level during the study year was even higher than 21.3 percent. In 1980 the cost of feeding a family of four in Fort Yukon with purchased food was 215 percent of the average calculated for the nation as a whole (Caulfield 1983:49). As part of this study, a comparison of food costs in Fort Yukon and Fairbanks in June, 1989 confirmed the relative high cost of store-bought goods in Fort Yukon. The cost of feeding a family of four in Fort Yukon with store-bought food was estimated to be $187 per week, an amount nearly double (195 percent) those calculated for Fairbanks and Anchorage. Table 9 presents survey data on estimated monthly expenditures of households in Fort Yukon and shows that the greatest single household expense reported was for purchased foods.

Fort Yukon households owned a variety of equipment necessary for subsistence activities. Table 10 lists the estimated numbers of different types of equipment, the percentage of households owning such equipment, and the mean number for all community households. Freezers, snowmachines, and fish nets were the most prevalent equipment in terms of numbers. Freezers, snowmachines and trapping equipment were held by the greatest percentage of households.

TABLE 9. ESTIMATED BASIC MONTHLY EXPENDITURES OF FORT YUKON HOUSEHOLDS, 1986-87

Item	Average household expense
Rent	$93
Electricity	43
Stove oil	30
Propane	23
Groceries	321
Water utility	26
Phone	48
Gasoline (for outboards and snowmachines)	45
Total	$629

TABLE 10. ESTIMATED SUBSISTENCE EQUIPMENT HOLDINGS OF FORT YUKON HOUSEHOLDS, 1986-87

Equipment or item	Estimated community total (number)	Percentage of households owning	Average number per household
Freezer	182	69.2	0.9
Snowmachine	162	67.3	0.8
Traps and Snares	--[a]	53.1	--[a]
Riverboat	128	51.1	0.6
Outboard Motor	154	50.0	0.7
Fish Net	204	46.9	1.0
Smokehouse	112	45.0	0.5
Fish Racks	135	41.9	0.6
Cache	115	39.7	0.5
Car or Truck	105	39.9	0.5
Hunting/Trapping Cabin	141	35.6	0.7
3 or 4-Wheeler	78	33.0	0.4
Fish Camp	78	31.5	0.4
Sled/Toboggan	90	31.1	0.4
Airplane	17	8.7	0.1
Dog Pack	7	1.7	<0.1

[a]Data were not solicited in the survey.

CHAPTER 3

OVERVIEW OF SUBSISTENCE ACTIVITIES

The following section summarizes the seasonal round of subsistence activities undertaken by Fort Yukon residents in 1987. This is followed by more detailed descriptions of the harvest and use of specific resources including seasons, methods and means of harvest, descriptions of use areas, and related information. Scientific and Gwich'in Athabaskan names for species used are shown in Appendix B.

THE CONTEMPORARY SEASONAL ROUND

The seasonal round of subsistence activities undertaken by Fort Yukon residents in 1987 did not differ substantially from that reported for the period 1970 to 1982 described by Caulfield (1983:153-157). This general seasonal round has evolved in response to a number of factors including the relative abundance of specific resources at certain times of the year, the migration patterns of some resources, the prevailing environmental conditions during various seasons which affect travel and access to resource use areas, preferences for certain qualities found in resources at certain times of the year, and regulatory constraints. A graphic depiction of this seasonal round is presented in Figure 4.

The subsistence cycle in Fort Yukon may be thought of as beginning in April or May with the breakup of river and lake ice. This period is filled with a variety of activities including setting nets for whitefish, trapping and hunting of muskrat, and the harvest of geese, ducks, and cranes.

By June the focus of subsistence activity shifts to fishing. Fish nets are set for whitefish, cisco, pike, and other fish species near tributary streams. The usual period of high water following breakup is sometimes used for transporting house logs to the community from upriver cutting locations. By late June or early July, king salmon begin to arrive and are harvested using set gill nets and fishwheels.

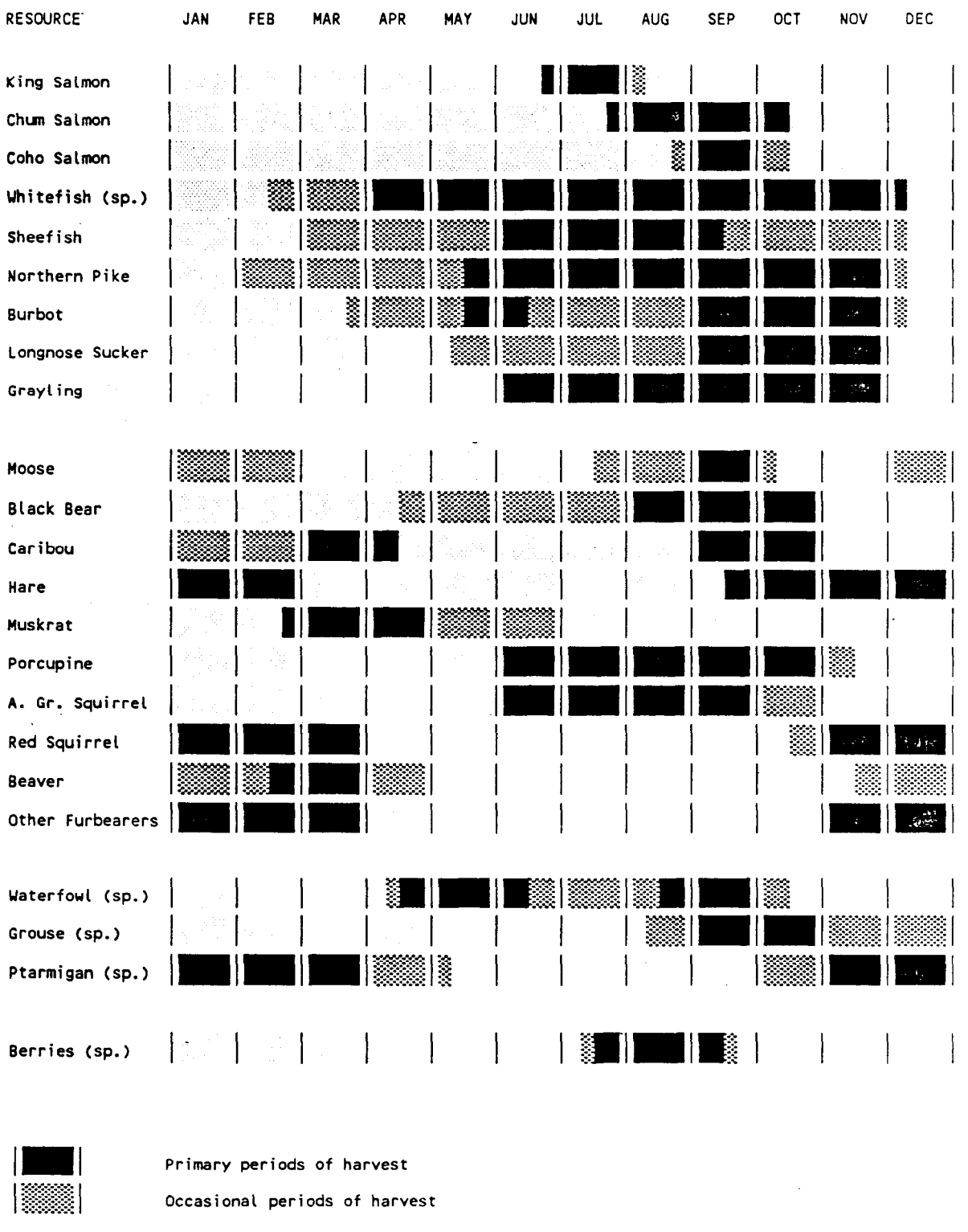


Fig. 4. Seasonal round of subsistence activities in Fort Yukon, ca. 1987.

Throughout July and August, fishing is the activity that predominates (Fig. 4). The king salmon run usually ends by late July, followed by the chum salmon run in mid-August. Throughout the summer, pike and grayling are caught with rod and reel and sheefish are often caught in fishwheels and nets incidental to salmon fishing. On occasion, waterfowl continue to be taken during summer months and black bear are sometimes harvested when encountered. Small game, such as porcupine and arctic ground squirrel, are taken incidental to other summer outdoor activities. August is the primary month for gathering plants and berries. Summer is also an important time for securing seasonal wage employment such as firefighting or construction work.

Late-running chum and coho salmon continue to be harvested by some households into September. The transition into fall, however, is marked by a general shift from salmon fishing to hunting. In September, moose hunting is one of the primary subsistence activities. In September and October, black bear are also pursued and some residents travel up the Porcupine River to caribou hunting areas. Nets or traps are again set for whitefish, pike, burbot, and other fish. Some waterfowl hunting is conducted and initial wood cutting also takes place at this time. Small game species such as grouse, hare, porcupine, and squirrel are also harvested in conjunction with the many outdoor activities taking place during this time.

Small streams and ponds begin to freeze in October, but the Yukon River sometimes remains open into November or even December, restricting travel until it is frozen solid. Fishing for whitefish, sheefish, pike and other fish with gill nets continues up to and even following freeze-up in late October or November. Nets may be set under the ice for whitefish and other species, and jigging for pike, burbot, sheefish, and grayling occurs until the cold and darkness of mid-winter precludes fishing activities.

Following freeze-up, many residents are also engaged in trapping. A variety of furbearing species such as marten, lynx, red fox, wolverine, and wolf are targeted by local trappers beginning in November and continuing into March. Trappers often hunt small game such as ptarmigan and snowshoe hare while out on their traplines and may also harvest moose when encountered. During winter months, elderly residents and children who are not involved in serious furbearer trapping on

formal traplines may set snares or traps for snowshoe hares and squirrels in areas within walking distance of the community. Ptarmigan and grouse are also hunted in the vicinity of town during the winter months. Moose hunting is undertaken during late winter if meat is needed.

With the increased daylight of spring in late February and March, snaring and trapping of beaver takes place. Muskrat are hunted and trapped and caribou are again sought. Jigging through the ice is resumed for a variety of fish species and nets are again set to take advantage of the spring movements of freshwater fish into and out of small streams and sloughs prompted by the rising water and breakup of ice. Eventually, the first geese are spotted and the subsistence cycle begins again.

SALMON FISHING

Salmon fishing is a significant part of the seasonal subsistence activities undertaken by Fort Yukon residents. Three species of salmon occur in the upper Yukon River: king, chum, and coho salmon. King salmon generally appear in the area between late June and mid-July and continue running through July. After the king salmon run, a brief lull in the salmon migration occurs, but by mid-August chum salmon start to arrive. Local residents distinguish two types of chum salmon, "silvers" and "dog salmon." The "silvers" appear first around mid-August and tend to run along the south side of the Yukon River. These fish are richer and in better condition than "dog salmon" which run along the north side of the river bound for spawning streams in the Porcupine River drainage. Coho salmon, called "chinooks" by many Fort Yukon residents, accompany "dog salmon" during this time of year. "Dog salmon" continue running late into fall (October) when ice begins to form and precludes salmon fishing activities. The local names for salmon used by many Fort Yukon residents have evolved in response to differences in run timing and the perceived destinations of fish as they pass through this area of the Yukon River drainage, and differ slightly from the terminology used even in the neighboring communities of Beaver and Stevens Village.

During summer 1987, salmon fishing was commonly conducted by households working cooperatively to harvest and process fish. These households were often related through kinship

representing extended families residing in multiple households. A pilot study conducted in 1988 by the Division of Subsistence aimed at improving the accuracy of subsistence salmon harvest data collected for the Yukon River drainage identified 76 Fort Yukon households that "usually" fished for salmon. For many households, salmon fishing and processing activities were based out of a fish camp, while others maintained a community base of operations. In 1987 there were 12 fish camps occupied by Fort Yukon residents and additional set gill net and fishwheel sites (Fig. 5).

Set gill nets and fishwheels were the only types of gear utilized in the area for the harvest of salmon. Fort Yukon families tend to utilize the same general fishing areas from year to year, but actual net, fishwheel, and camp locations vary due to bank erosion, water levels, and the constantly changing locations of channels, bars, and eddies along the river.

During the survey year, salmon fishing by Fort Yukon residents was generally concentrated along a 35-mile stretch of the Yukon River between the mouth of the Chandalar River, 20 miles below Fort Yukon, to a point on the Yukon River about 15 miles above the community. Figure 5 shows the locations of fish camps, fishwheels, and set nets used for salmon in 1987. Although most salmon fishing took place along the main Yukon River and major sloughs, there was a concentration of fish camps and fishwheels in the lower Christian River near its confluence with the Yukon and Chandalar rivers.

Salmon were processed in a variety of ways for preservation. Traditional methods of cutting salmon for drying are described in Osgood (1970:37). Processing methods used by Fort Yukon residents were similar to those described for Stevens Village (Sumida 1988:104), although variations in techniques occur from community to community. The cutting, smoking, and drying of king salmon was still commonly done at fish camps. Kings were also frozen and canned. Chum and coho salmon were often split and dried or frozen whole for later use as dog food.

OTHER FRESHWATER FISHING

Several types of non-salmon fish were utilized by Fort Yukon residents including several whitefish species, cisco (locally known as "herring"), sheefish, northern pike ("jackfish"), burbot ("lush"

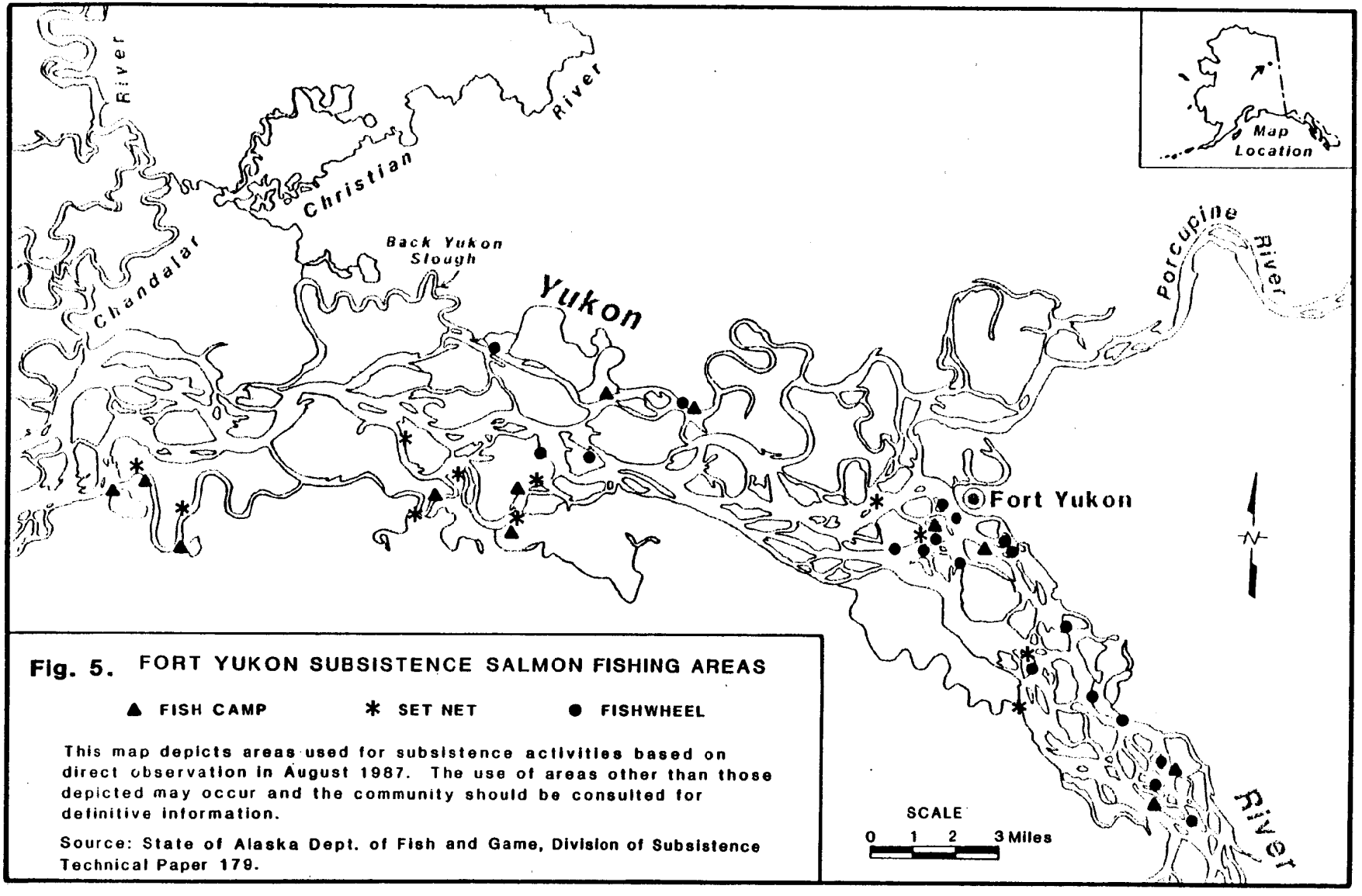


Fig. 5. FORT YUKON SUBSISTENCE SALMON FISHING AREAS

▲ FISH CAMP * SET NET ● FISHWHEEL

This map depicts areas used for subsistence activities based on direct observation in August 1987. The use of areas other than those depicted may occur and the community should be consulted for definitive information.

Source: State of Alaska Dept. of Fish and Game, Division of Subsistence Technical Paper 179.

or "loche"), longnose sucker, and arctic grayling. On occasion, arctic lamprey or arctic char are caught, but these species are not common in the area. Traditional harvest methods used by the Gwich'in Athabaskans included fish weirs and basket traps, gill nets, dip nets of spruce root or babiche, hook and line, and spears (Slobodin 1981:516; Osgood 1970:35). Fish weirs were used only during open water conditions whereas the other techniques were also used through the ice (Slobodin 1981:516). Illustrations and descriptions of basket traps used by Gwich'in in the Peel and Crow River areas are provided in Osgood (1970:68-69; 72-73). Contemporary fishing methods included the use of set gill nets of various mesh size, fishwheels, hook and line (including the use of rod and reel by some residents), and fish traps. An excellent description of the use of set gill nets, including setting nets under the ice, by residents of a neighboring community Yukon Flats community is included in Nelson (1973:59-66).

Fishing takes place during all but the very coldest and dark weeks of mid-winter. During spring breakup, resident species of fish move from the Yukon River into smaller tributary creeks to avoid the movement of the ice. Whitefish, pike, and sucker were taken at this time in gill nets (ca. 3 inch mesh) set at the mouths of creeks. Pike were also taken at this time using hook and line with rod and reel. By mid-June the fish return from small creeks to the main river and are abundant once again. Prior to the arrival of king salmon, least cisco were harvested using small-mesh gill nets. During the king salmon run, cisco were harvested incidentally, occasionally in nets and more commonly in fishwheels. Cisco appear again following the run of coho salmon in September. Sheefish, several species of whitefish, and suckers were occasionally caught in nets and fishwheels incidental to summer salmon fishing activities. Pike and sheefish were also harvested using hook and line. In September and October, gill nets were again set for whitefish and pike. Sheefish continued to be taken through late fall in fishwheels and in gill nets set for chum and coho salmon. Grayling were caught using hook and line in open water before freeze-up and later through holes in the ice. Following freeze-up in November, nets were set under the ice for whitefish. Jigging through the ice for pike, burbot, sheefish and grayling continued all winter, halted briefly by the dark and cold of late December and January, but resumed again as spring approached.

Non-salmon fish were usually eaten fresh or frozen for later use. Some households also harvested these fish to feed dogs and for trapping bait. Fish caught in fall were sometimes split and dried to feed dogs during winter months. When colder temperatures allowed fish to be frozen naturally, they were preserved in that way. Some households reported eating the liver from burbot, which were caught for dog food. Fish used for trapping bait were sometimes allowed to decompose slightly for increased effectiveness.

HUNTING OF MAMMALS

Residents of Fort Yukon utilized a variety of mammals including moose, caribou, brown bear, black bear, sheep, snowshoe hare, porcupine, and squirrel. The harvest and use of furbearers are discussed in a subsequent section of this chapter. During the survey year a few Fort Yukon households also reported harvest of deer and sheep from other parts of the state.

Traditionally, the hunting of large mammals provided the Gwich'in with considerable quantities of food as well as raw materials for clothing, tools, weapons, ornaments, and ritual objects and this activity had great sociocultural and ideological importance (Slobodin 1981:516-517). The significance of small mammals such as snowshoe hare, beaver, muskrat, squirrel, and porcupine was also reflected in the reliance on these resources as a source of food (Slobodin 1981:516). Shimkin (1955:222-223) reported that in 1948-49 moose provided approximately 80,000 pounds or about 50 percent of the meat and fish consumption by weight. At that time, muskrats contributed between 15 and 20 percent of the total resource harvest.

In the past, snares were used to harvest both large and small mammals including moose, caribou, bear, and snowshoe hare (Osgood 1970:36; McKennan 1959:48). The Gwich'in developed complex tracking and stalking techniques for the hunting of moose throughout the year (Osgood 1970:26-27; Nelson 1973:84-114). Caribou fences or surrounds were used for the harvest of this migratory species and den hunting of bears was commonly undertaken in the late fall. Descriptions of

the contemporary harvest methods used by Fort Yukon residents can be found in Caulfield (1983:51-73) and Nelson (1973).

Areas that have been used by Fort Yukon residents for moose and caribou hunting during the lifetime of respondents are depicted in Figure 6. Fall moose hunting areas were generally confined to river corridors, especially as the distance from Fort Yukon increased. These corridors, along the Yukon, Black, Porcupine, Sheenjek, and Christian rivers, and along Birch Creek encompassed the many feeder streams, sloughs, oxbow lakes and ponds adjacent to these major waterways that harbor ideal moose habitat. Within a 30- to 50-mile radius of Fort Yukon, in addition to river corridors used intensively during fall hunting, the moose hunting area also incorporated land areas that were generally accessed by snowmachine during the winter. Major bear hunting areas mapped by Caulfield (1983) were similarly confined to areas immediately adjacent to the Yukon River within 25 miles of Fort Yukon, the lower 10 miles of the Porcupine River and the Birch Creek drainage. Black bears were specifically sought by some hunters as a preferred source of meat and hides. Brown bears were not commonly harvested for human consumption and their harvest was usually associated with the elimination of problem or nuisance bears at fish camps or elsewhere.

Caribou were usually harvested by Fort Yukon residents along a 70-mile stretch of the middle Porcupine River from Graphite Lake to an area near the United States border with Canada (Fig. 6). In late August and September, large numbers of caribou from the Porcupine Caribou Herd generally cross the Porcupine River in this vicinity during their migration to wintering areas farther south. Smaller bands of caribou sometimes remain in this area for much of the winter.

Small mammals such as snowshoe hare, ground squirrel, red squirrel, and porcupine were harvested more or less opportunistically during most seasons of the year. Areas in the immediate vicinity of Fort Yukon were typically hunted specifically for these resources to provide food, pelts, and trapping bait. Snare lines were often set near the community for hares during the winter.

BIRD HUNTING

Seasonally abundant waterfowl and year-round resident birds, such as ptarmigan and grouse, provided some Fort Yukon residents with a relatively stable source of fresh meat throughout much of the year. The significance of this food source in the subsistence economy has been evident in the reliance placed on birds during otherwise lean times (Osgood 1970:28; Nelson 1973:83).

In the past, methods of harvesting birds included the use of blunt arrows for waterfowl and snares for ptarmigan and grouse (Slobodin 1981:516). Shotguns were typically used to harvest waterfowl in the 1980s and shotguns or small caliber rifles were used for taking ptarmigan and grouse. Contemporary methods of waterfowl hunting in a neighboring Yukon Flats community are described in Nelson (1973:73-80).

As described previously, the spring harvest of waterfowl was a notable activity in the seasonal round and the majority of the waterfowl harvested by Fort Yukon residents were taken during that time of year. Table 11 shows the seasonality of waterfowl and crane harvests by species. Survey results indicated that an estimated 69.2 percent of the overall waterfowl harvest was taken during the spring, with 62.2 percent of the ducks, 86.4 percent of the geese, and 38.6 percent of the cranes harvested at this time.

Hunting trips specifically for waterfowl and cranes tended to be concentrated in the nearby wetland areas that virtually surround Fort Yukon. However, the overall area used for harvesting waterfowl encompassed a much larger area along all navigable streams as waterfowl were harvested in conjunction with a wide variety of other spring, summer, and fall harvest activities. Similarly, grouse and ptarmigan were routinely hunted near the community, but were also harvested throughout the entire area utilized by Fort Yukon residents, at fish camps, on fall hunting trips, and during winter trapping activities.

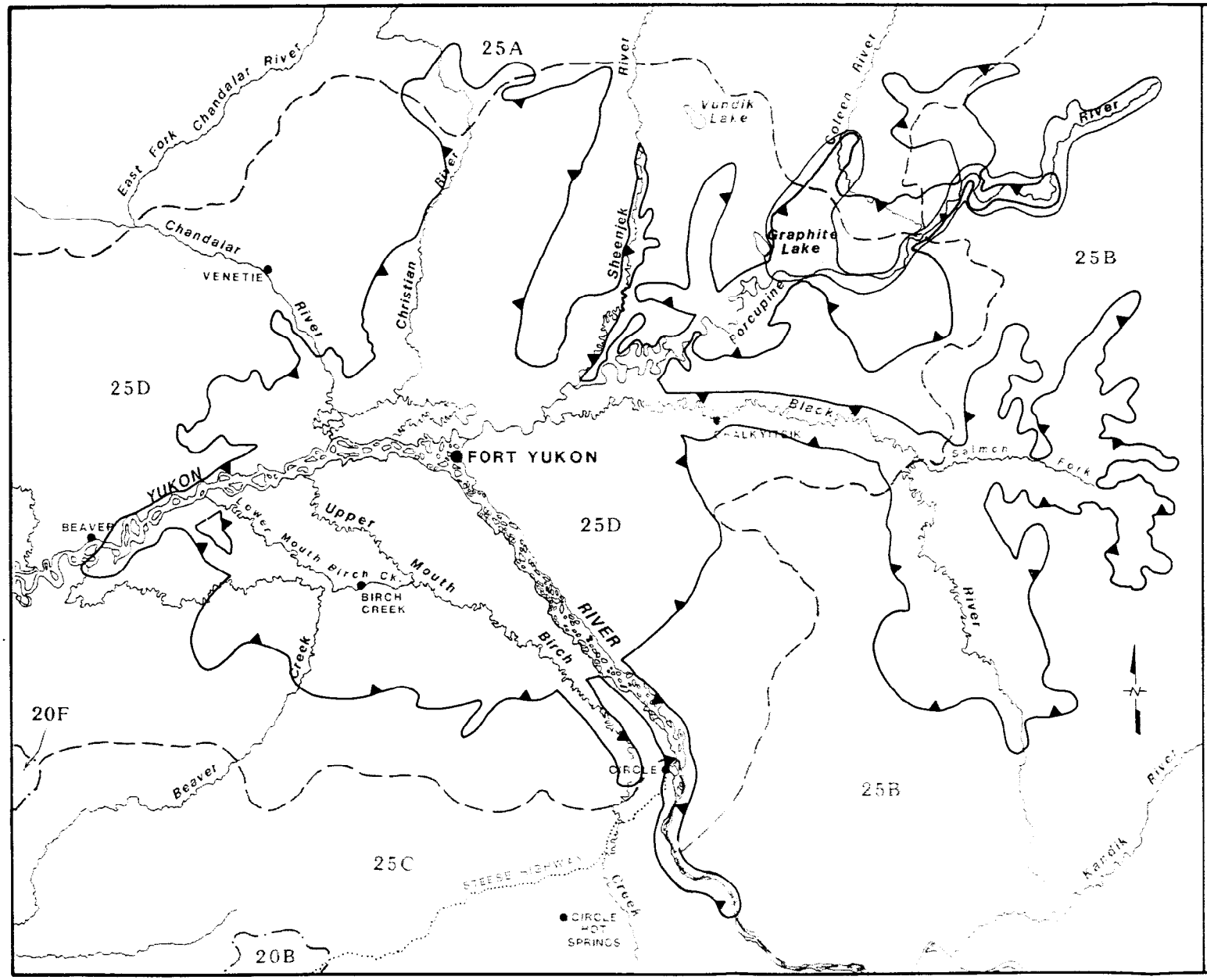


Fig. 6

Fort Yukon Moose and Caribou Hunting Areas ca. 1925-1987

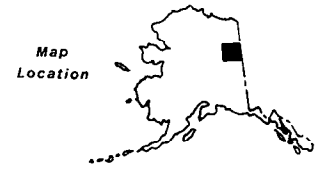
LEGEND

CARIBOU HUNTING

MOOSE HUNTING

This map depicts areas used for subsistence activities based on interviews with 33 Fort Yukon households conducted in 1988. The use of areas other than those depicted may occur and the community should be consulted for definitive information.

Source: State of Alaska Division of Subsistence Technical Paper No. 179.



SCALE 1:1,000,000

0 10 20 30 MILES

0 10 20 30 KILOMETERS

STATE OF ALASKA
DEPT. OF FISH AND GAME
DIVISION OF SUBSISTENCE
JUNE 1989

TABLE 11. SEASONALITY OF WATERFOWL HARVESTED BY SPECIES BY FORT YUKON HOUSEHOLDS, 1986-87

Species	Percentage harvested in spring	Percentage harvested in fall
Ducks	62.2	36.2
Mallard	48.4	51.6
Pintail	54.0	46.0
Canvasback	71.1	28.9
Wigeon	28.2	71.8
Green-winged teal	0.0	100.0
Goldeneye	0.0	100.0
Scoter	88.7	11.3
Geese	86.4	13.6
Canada geese	70.4	29.6
White-fronted geese	96.5	3.5
Snow geese	98.9	1.1
Crane	38.6	61.4
Total	69.2	29.7

NOTE: Not all waterfowl harvests were reported by season or by species. Seasons were designated for 98.4 percent of the harvest by category and the species was indicated for 83.9 percent of the harvest.

FURBEARER TRAPPING AND HUNTING

Trapping has played a premier role in the history and economy of the Fort Yukon area. The mosaic of lakes and uplands that make up the Yukon Flats creates an unusually rich habitat for furbearers. The Hudson's Bay Company capitalized on this abundance and the ability of the Gwich'in to harvest furbearers when it established a fur trading post near the confluence of the Yukon and Porcupine rivers in 1847. For most Gwich'in, trapping became a major focus of the seasonal round. The trapping pattern that emerged entailed movement to winter trapping areas in fall by boat prior to freeze-up with a winter's worth of gear and supplies. Trappers often returned to the settlement around

mid-December to sell furs, participate in holiday celebrations, and obtain needed supplies. Trapping then resumed until spring, when the emphasis shifted to muskrat trapping and waterfowl and small game hunting from spring camps located near productive areas. This pattern was also adopted by many non-Natives, attracted to the upper Yukon during the gold rush and eventually settling in the area after the turn of the century. Even after 60 years of intensive trapping, furbearers in the Yukon Flats were reportedly plentiful in 1912 and the economy of Fort Yukon was described as almost wholly dependent on the sale of furs and dried fish (Carroll 1957: 25). Despite fluctuations in fur prices, the 1920s were remembered as the "heyday" of trapping (Nelson 1973:188). A study in 1940 found that the average trapping income of 66 Native households in Fort Yukon was $844, a sum that in those days enabled a trapper to not only support his household with trapping earnings, but realize a small profit as well (Shimkin 1955:233). Thus, Fort Yukon's reputation as one of the most productive trapping regions in Alaska continued well into this century.

During the 1940s, however, things began to change. Fur prices declined, and by 1949, dramatic decreases were noted in the availability of beaver, muskrat, mink, land otter, lynx, wolves, and coyote on the Yukon Flats (Shimkin 1951: 34). Although 58 percent of Fort Yukon area households relied on trapping for most or some of their income in 1949, trapping alone could no longer support the average household (Shimkin 1955). In the 1950s and 1960s the economic uncertainties inherent with the fur market, a greater acceptance of a village based lifestyle, and the increasing economic diversity of Fort Yukon resulted in a reduction in the percentage of households involved in trapping. For some, trapping patterns remained largely unchanged while others abandoned trapping altogether. Others shifted from the full-time trapping pattern described above to shorter traplines operated from the village setting on trips lasting several days to several weeks (Nelson 1973). The advent and acceptance of snowmachines in the mid 1960s allowed some lines to be lengthened and checked quicker but created an increased dependence on cash. While trapping may have gradually declined from the almost universal industry it was during the early decades of the twentieth century, trapping remained an important, often vital source of income during the winter when other wage employment opportunities were virtually nonexistent. Trapline ownership and trapping skills were retained, and on occasion, high

fur prices, species abundance, and good luck combined to make trapping a lucrative full or part-time occupation. During the 1980-81 trapping season for example, a few exceptional trappers in the upper Yukon River area made more than $50,000 through trapping (Caulfield 1983:78).

During the 1986-87 study year, trapping continued to be a significant component of the mixed subsistence-cash economy of Fort Yukon. Trapping activities comprised a considerable part of the seasonal round, encompassing almost half the year. Survey results indicated that trapping provided cash income, raw material for clothing and crafts, food for both humans and dogs, and trapping bait. Approximately one-half of Fort Yukon trappers maintained the historic pattern, going out to trapping areas in late fall, visiting the community once or twice during the course of the winter to resupply, and returning in late spring after the muskrat season (C. Alexander, pers. comm.). These were trappers operating lines in locations quite remote from Fort Yukon, making trips to the community time consuming and expensive. Other trappers operated from their home in the community, using a snowmobile or dog team to set and check traps on trips lasting from one day to a week.

Areas utilized by Fort Yukon trappers throughout their lifetime are depicted in Figure 7. Trapping areas immediately north of Fort Yukon encompassed productive furbearer habitats in the Sheenjek, Christian, and lower Chandalar River drainages. South of Fort Yukon, areas along the Yukon River, Birch Creek and lower Beaver Creek were extensively trapped. Two more remote areas used by Fort Yukon trappers included the middle Porcupine and lower Coleen River areas, and an area along the Black and Salmon Fork rivers southeast of Chalkyitsik.

During the survey year, an estimated 43 households or 20.2 percent of all Fort Yukon households received income from trapping. Based on reported trapping income from surveyed households, total trapping income for the community was estimated at $221,417, or approximately $5,149 per trapping household. This compares to an estimated potential value of $390,265 or $9,076 per trapping household if the furs of all furbearers harvested had been sold at average prices (Table 12). Some of the difference between potential and reported trapping income can be explained by the fact that not all furs were sold. A few furs were retained for home use or the manufacture of handicrafts for sale. Survey estimates indicated approximately 97 percent of the marten harvested were

TABLE 12. ESTIMATED POTENTIAL VALUE OF FURS HARVESTED BY FORT YUKON TRAPPERS, 1986-87

Species	Estimated number harvested	Average[a] price	Potential value	Percentage of total value
Marten	2,708.5	$ 75.00	$203,138	52.1
Lynx	368.9	350.00	129,115	33.0
Beaver	507.0	40.00	20,280	5.2
Fox	562.2	30.00	16,866	4.3
Muskrat	2,735.6	2.50	6,839	1.8
Wolverine	28.3	200.00	5,660	1.5
Wolf	21.6	250.00	5,400	1.4
Mink	144.8	17.00	2,462	0.6
Otter	11.5	40.00	460	0.1
Weasel	17.8	2.50	45	<0.1
Total			$390,265	100.0

[a]Average prices were determined through interviews with Fort Yukon trappers, price lists from fur buyers, and auction reports.

sold. Of the other species, 96 percent of the red fox, 92 percent of the muskrat, 83 percent of the beaver, and all of the remaining furbearers were sold. Much of the discrepancy between potential and reported income from trapping is probably due to the payment of below average prices at the village level. Individual trappers are at the bottom of a series of transactions which eventually result in finished or tanned furs being sold at auction or made into garments. The up-front, in-season prices paid to trappers is less than the average pelt prices reported by auction houses. Recognizing this, an effort was made by some community members in 1987, to establish a local fur cooperative composed of Fort Yukon trappers and committed to reducing the discrepancy of potential and actual income derived from trapping.

In addition to their fur value, three furbearer species were occasionally eaten by local residents: beaver, muskrat, and lynx. More commonly, meat from these species was utilized as dog food. Beaver carcasses were particularly desirable for use as dog food and had a cash value within the community for this purpose. In 1987, beaver carcasses in Fort Yukon sold for $10 to $20 each.

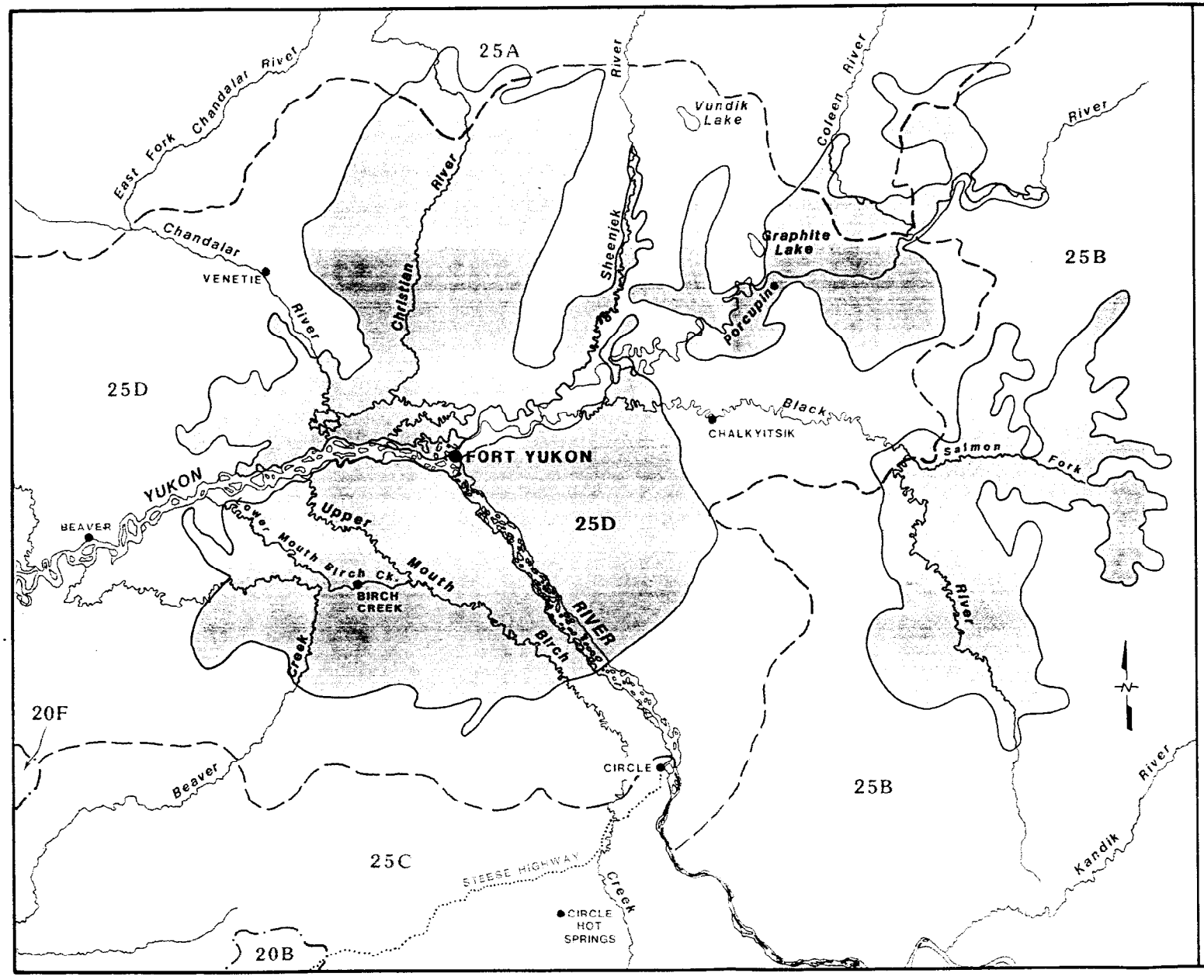


Fig. 7

Fort Yukon Trapping Areas ca. 1925-1987

LEGEND

TRAPPING

This map depicts areas used for subsistence activities based on interviews with 33 Fort Yukon households conducted in 1988. The use of areas other than those depicted may occur and the community should be consulted for definitive information.

Source: State of Alaska Division of Subsistence Technical Paper No. 179.

SCALE 1:1,000,000

0 10 20 30 MILES

0 10 20 30 KILOMETERS

STATE OF ALASKA
DEPT. OF FISH AND GAME
DIVISION OF SUBSISTENCE
JUNE 1989

Table 13 compares participation and potential income derived from trapping in Fort Yukon with recent data from four other interior Alaska communities. Of these five communities, Fort Yukon had the lowest percentage of its population involved in trapping, but potential incomes derived from trapping were much greater in Fort Yukon than elsewhere. These data suggest that Fort Yukon in 1987 still retained its status as one of Alaska's most productive trapping regions.

PLANT AND WOOD HARVESTING

Plant communities in the boreal environment of the Yukon Flats that are significant from a human use standpoint include forest resources such as white and black spruce, birch, aspen, balsam poplar, willow, and alder. These resources provide local residents with raw material for the construction of buildings, caches, fishwheels, fish weirs, fish racks, sleds, snowshoes, and the major source of fuel used for heating and smoking and drying of fish and wildlife. The cutting of wood to fuel steamboats along the Yukon provided an important source of income to residents earlier in the century (Shimkin 1955:223).

An estimated 1,243 cords of firewood were used by Fort Yukon residents during the survey year, averaging approximately 6 cords per household. Of these, an estimated 274 cords were purchased. Information on quantities harvested for building construction and other uses was not collected.

Edible plants and berries were also utilized by Fort Yukon households. High and lowbush cranberries, blueberries, and rosehips were the most commonly used edible plants. These were usually gathered at favorite locations within several miles of the community, along river banks, and in the vicinity of fish camps. Information on the uses of many native plants has been compiled from interviews with community elders and is available from the former museum director (G. Alexander, pers. comm. 1987).

TABLE 13. PARTICIPATION AND INCOME DERIVED FROM TRAPPING IN FIVE INTERIOR ALASKA COMMUNITIES

Community (year)	Percentage and (number) of households trapping	Total potential community income from trapping[a]	Potential trapping income per trapping household
Fort Yukon (1986-87)	20.2 (43)	$390,265.00	$9,076.00
Galena (1985-86)[b]	36.5 (77)	71,148.00	924.00
Minto (1983-84)[c]	46.0 (22)	19,602.00	891.00
Stevens Village (1984-85)[d]	70.0 (21)	31,026.00	1,477.00
Tanana (1986-87)[e]	27.0 (35)	110,034.00	3,143.00

[a]Potential income is calculated by multiplying total harvest of each furbearer by average fur prices for that year.
[b]Marcotte 1989.
[c]Andrews 1988.
[d]Sumida 1988.
[e]Case and Halpin 1989 (using average fur prices from Fort Yukon data).

CHAPTER 4

CHARACTERISTICS OF SUBSISTENCE HARVEST AND USE OF RESOURCES

This chapter describes characteristics of the 1986-87 subsistence harvest and use of fish and wildlife resources in Fort Yukon, based on the household survey. Data are presented on household participation in harvest activities, estimates of harvest quantities, sharing and distribution of fish and wildlife, and the use of local resources as dog food. These estimates are for the 12-month period October 1986 through September 1987.

HOUSEHOLD PARTICIPATION

Fort Yukon households displayed a high degree of involvement in the use and harvest of subsistence resources in 1986-87. All Fort Yukon households used some type of wild resources during the course of the survey period and an estimated 91.5 percent of all households made direct attempts at harvesting (Table 14). Of all households, 87.5 percent successfully harvested at least one resource. Mammals were used by 100 percent of the households, salmon by 97.2 percent, birds by 90.4 percent, non-salmon fish by 89.2 percent, flora by 73.6 percent, and furbearers by 43.8 percent. In terms of actually harvesting resources, birds were harvested by 76.8 percent of households, mammals by 72.8 percent, freshwater fish by 62 percent, berries and plants by 52.7 percent, and salmon by 44.5 percent (Table 14). With the exception of mammals, households attempting to harvest resources were generally successful. Household use was higher than harvest because of resource sharing between households. Salmon was clearly shared most widely, as over twice as many households used salmon, compared to those that harvested it.

Table 15 lists the percentage of households using, attempting to harvest, and successfully harvesting individual resources. The five most widely used resources were moose (98.9 percent of households), king salmon (93.8 percent), snowshoe hare (87 percent), ducks (85.9 percent), and

TABLE 14. ESTIMATED HOUSEHOLD HARVEST AND USE OF RESOURCES BY FORT YUKON RESIDENTS, 1986-87

Fish or wildlife resource category	Percentage of households using	Percentage of households attempting to harvest	Percentage of households harvesting
Mammals (excluding furbearers)	100.0	81.9	72.8
Salmon	97.2	45.7	44.5
Birds	90.4	79.6	76.8
Freshwater fish	89.2	63.2	62.0
Flora	73.6	52.7	52.7
Furbearers	43.8	30.9	30.9
Any resource	100.0	91.5	87.5

whitefish (79 percent). More households attempted to harvest moose than any other single resource (72.2 percent). However, almost one-quarter (24.2 percent) of those households attempting to harvest moose were unsuccessful. Bird species were prominent among the resources harvested by the greatest percentage of households. Grouse, ptarmigan, ducks, snowshoe hare, and geese were the five resources harvested by the greatest percentage of Fort Yukon households (Table 15).

As stated above, the estimated percentage of households using a particular resource was generally greater than the percentage attempting to harvest or successfully harvesting the resource. For instance, 73.1 percent of households used caribou, while only 8.9 percent of the households harvested caribou in 1986-87. This sometimes sizable discrepancy between the percentage of households using a resource and the percentage harvesting it is indicative of the extent to which harvested resources were shared. Sharing and distribution is discussed in more detail elsewhere in this chapter.

HARVEST QUANTITIES

The estimated total number and total pounds of each resource category harvested in Fort Yukon during the survey year were calculated, as well as the mean pounds harvested per household, mean pounds harvested per capita, and the percentage of the overall harvest contributed by each resource (Table 16). The estimated total edible weight of wild resources harvested by Fort Yukon residents during 1986-87 was 625,725.3 pounds. This provided an average of 2,951.5 pounds of subsistence food per household and a per capita harvest of 1,071.5 pounds. A summary of estimated harvest levels in pounds edible weight is also presented in Table 16.

Salmon

Chum salmon comprised a larger proportion of the overall community harvest than any other single species, accounting for an estimated 38.0 percent of the total by weight. The estimated average household harvest of all salmon species was 1,796.0 pounds, resulting in a per capita salmon harvest of 652.0 pounds, which comprised 60.8 percent of the overall harvest (Table 16).

Salmon harvest estimates based on household surveys from this study are presented in Table 17 along with data for the period 1977-88 derived from subsistence catch calendars and post-season interviews conducted annually by the Department of Fish and Game, Division of Commercial Fisheries. Salmon harvests are listed by species on these "catch calendar" surveys. As noted earlier, different stocks of chum salmon are recognized by Fort Yukon residents. These local distinctions are not comparable to the "summer" and "fall" chum designations made by Department biologists and managers. For this reason, chum harvests are reported under the combined category "chum salmon."

Estimates of the total 1987 salmon harvest from this study diverge substantially from the harvest estimates resulting from the 1987 catch calendar survey, primarily due to methodological differences in the way the data were collected. In particular, variations in sampling design, sampling units, and sampling intensity appear to have contributed to these very different harvest estimates. As

TABLE 15. ESTIMATED HOUSEHOLD USE AND PARTICIPATION IN HARVESTING RESOURCES BY FORT YUKON RESIDENTS, 1986-87

Fish or wildlife resource	Percentage of households using resource	Percentage of households attempting to harvest	Percentage of households harvesting resource
Moose	98.9	72.2	54.7
King salmon	93.8	44.0	44.0
Snowshoe hare	87.0	64.3	61.5
Ducks (sp.)	85.9	64.9	64.9
Whitefish (sp.)	79.0	38.3	38.3
Geese (sp.)	77.9	63.8	57.0
Ptarmigan (sp.)	77.0	68.0	65.1
Grouse (sp.)	76.2	66.6	66.6
Chum salmon	75.7	30.5	29.4
Caribou	73.1	12.8	8.9
Berries	70.8	52.7	52.7
Northern pike	59.4	47.0	45.9
Sheefish	45.4	28.4	28.4
Black bear	42.4	33.9	31.0
Porcupine	36.7	28.4	28.4
Beaver	34.9	22.0	22.0
Arctic ground squirrel	34.3	27.5	24.7
Arctic grayling	33.7	30.3	29.2
Muskrat	25.9	18.1	17.0
Lynx	22.5	21.9	20.2
Marten	22.4	22.4	22.4
Red fox	21.3	24.1	21.3
Burbot	18.3	17.2	16.0
Mink	10.8	12.5	10.8
Rosehips	10.1	7.3	7.3
Dall sheep	9.0	2.8	0.0
Wolverine	7.0	14.7	7.0
Crane	6.7	6.7	6.7
Longnose sucker	6.1	6.1	6.1
Wolf	5.4	12.0	4.3
Dolly Varden	5.1	4.0	4.0
Brown bear	4.9	4.9	4.9
Coho salmon	3.8	2.6	2.6
Land otter	3.2	6.5	3.2
Lake trout	2.8	0.0	0.0
Greens	2.3	2.3	2.3
Swan	2.3	2.3	2.3
Deer	2.3	1.1	1.1
Red squirrel	1.7	1.7	1.7
Arctic lamprey	1.1	1.1	1.1
Weasel	0.5	0.5	0.5

TABLE 16. ESTIMATED COMMUNITY, HOUSEHOLD, AND PER CAPITA HARVEST OF WILD RESOURCES USED FOR FOOD IN FORT YUKON, 1986-87

Fish or wildlife resource	Estimated total number harvested[a]	Total quantity harvested (lbs)	Average household harvest (lbs) (N=212)	Per capita harvest (lbs) (N=584)	Percentage of total harvest
Salmon		380,744.1	1,796.0	652.0	60.8
Chum Salmon	47,154.8	238,080.7	1,123.0	407.7	38.0
King Salmon	10,153.9	142,155.0	670.5	243.4	22.7
Coho	118.2	508.4	2.4	0.9	0.1
Freshwater fish		75,965.0	358.3	130.1	12.1
Whitefish (sp.)	18,732.3	35,030.3	165.2	60.0	5.6
Sheefish	2,965.5	17,793.0	83.9	30.5	2.8
Northern Pike	3,859.4	17,367.4	81.9	29.7	2.8
Burbot	948.3	3,793.1	17.9	6.5	0.6
Arctic Grayling	1,980.3	1,386.2	6.5	2.4	0.2
Longnose Sucker	583.7	583.7	2.8	1.0	0.1
Dolly Varden	10.8	9.8	<0.1	<0.1	<0.1
Arctic Lamprey	2.4	1.5	<0.1	<0.1	<0.1
Mammals		143,271.6	675.8	245.3	22.9
Moose	150.1	105,093.2	495.7	179.9	16.8
Snowshoe Hare	6,700.7	16,751.7	79.0	28.7	2.7
Caribou	155.9	15,586.5	73.5	26.7	2.5
Black Bear	149.6	4,346.2	20.5	7.4	0.7
Porcupine	95.8	958.5	4.5	1.6	0.1
Ground Squirrel	706.8	424.1	2.0	0.7	0.1
Deer	2.4	103.0	0.5	0.2	0.0
Red Squirrel	27.9	8.4	<0.1	<0.1	<0.1
Furbearers (edible)		2,683.1	12.7	4.6	0.4
Beaver	82.3[b]	1,646.2	7.8	2.8	0.3
Muskrat	593.2[b]	889.7	4.2	1.5	0.1
Lynx	12.3[b]	147.2	0.7	0.3	<0.1
Birds		20,905.8	98.6	35.8	3.3
Geese (sp.)	2,945.5	11,192.8	52.8	19.2	1.8
Ducks (sp.)	7,111.6	7,111.6	33.5	12.2	1.1
Grouse (sp.)	2,290.1	1,374.0	6.5	2.3	0.2
Ptarmigan (sp.)	2,073.1	829.2	3.9	1.4	0.1
Cranes (sp.)	28.0	223.7	1.1	0.4	<0.1
Swans	9.7	174.5	0.8	0.3	<0.1
Flora		2,156.0	10.2	3.7	0.3
Berries (sp.)	503.8 (gal)	2,015.2	9.5	3.5	0.3
Rosehips	35.2 (gal)	140.8	0.7	0.2	<0.1
All resources		625,725.3	2,951.5	1,071.5	100.0

[a]Fractions of animals result because of expansion from a sample of households (chap. 1, methodology).
[b]Number used for food. See page 53 for additional furbearer harvest data.

TABLE 17. FORT YUKON SUBSISTENCE SALMON HARVESTS AND NUMBER OF DOGS PER FISHING FAMILY, 1977-88, FROM ADFG SUBSISTENCE CATCH CALENDAR SURVEYS AND THIS STUDY

Year	Fishing families (number)	King salmon		Chum salmon		Coho salmon		Number of dogs per fishing family
		Number harvested	Harvest per fishing family	Number harvested	Harvest per fishing family	Number harvested	Harvest per fishing family	
1977	24	1,061	44.2	13,164	567.3	16	0.7	9.1
1978	31	2,642	85.2	21,403	690.4	177	5.7	9.7
1979	33	1,922	58.2	22,236	673.8	30	9.1	7.9
1980	37	2,527	68.3	7,828	211.6	0	0.0	8.0
1981	31	2,794	90.1	24,292	783.6	70	2.3	14.1
1982	25	1,894	75.8	3,360	134.4	125	5.0	5.8
1983	24	1,887	78.6	11,109	462.9	11	0.5	7.0
1984	23	3,608	156.9	10,577	459.0	33	1.4	6.3
1985	25	2,900	116.0	17,129	685.2	3	0.1	10.7
1986	31	3,083	99.4	11,807	380.9	118	3.8	7.0
1987	30	3,950	131.7	16,387	546.2	41	1.4	9.4
1988	39	1,621	41.6	8,983	230.3	370	9.5	6.7
1987[a]	94[b]	10,130	107.8[b]	47,155	501.6[b]	118	1.2[b]	5.2[b]

SOURCES: Walker and Brown (1988), Walker, *et al.* (1989).
[a]Estimates based on household survey findings from this study.
[b]Based on an estimate of 94 fishing households.

outlined in chapter 1, this study utilized a stratified random sample design and recorded harvests for individual households. In 1987 and prior years, the catch calendar survey was not based on a scientific sampling design. Instead, researchers surveyed key contacts known to be associated with certain "fishing families". The strategy of using "fishing families" as the survey unit was based upon the knowledge that salmon fishing is generally a cooperative effort between several related households that make up a cohesive fishing group or family. In theory, contacting key individuals from each fishing family provides an efficient way of gathering harvest data from all the households involved with that group and lowers the possibility of double-counting fish. On the other hand, if a key contact for a particular fishing family is somehow missed by the survey, the harvest of several households may be unaccounted for. Similarly, fishermen who are not part of a large fishing family may also be

overlooked. Thus, the use of "fishing families" as the survey unit places extra importance on contacting a high percentage of those identified as key individuals, and on maintaining a list of key contacts that truly represents all fishing families for a given year. Success in accurately estimating harvest is highly dependent upon these factors. In 1988, the catch calendar survey project adopted a revised methodology that utilized individual households as the survey unit and a two-strata random sampling design. This design provided a greater probability of contacting fishing households and a more reliable estimate of total community harvest.

Differences in sampling intensity between the 1987 catch calendar survey and this study are also evident. As outlined in the methodology section of chapter 1, participation in salmon fishing was one of several criteria used to classify all Fort Yukon households into the categories of high-, medium-, and low-harvest households. Of the 212 households identified in the community, 72 were surveyed. These data resulted in an estimate of 94 Fort Yukon households participating in salmon fishing in 1987. Of 29 high-harvest households identified, 26 were surveyed during this study, resulting in a contact rate of 89.7 percent for this important group. In contrast, the 1987 catch calendar survey data derived from the previous survey method, show that only about one-third (34) of Fort Yukon fishing households were contacted. One would expect that the catch calendar list of key fishing families might correspond reasonably well with the list of high-harvest households. However, of the 34 households contacted, only 10 (34.5 percent) were among the high-harvest households category of this baseline study. This indicates that a significant portion of the salmon harvest apparently was not accounted for using the catch calendar and key fishing family method.

To see how the differences in contact rates and methodology might result in significantly different harvest estimates, we can examine the harvest data for king salmon. The 1987 catch calendar survey recorded a harvest of 1,883 king salmon from the 10 survey households that fell into our classification of high-harvest households. From all surveyed households, the catch calendar survey recorded a harvest of 3,215 kings which was expanded across unsurveyed fishing households for an estimated community total of 3,950. By comparison, our 1987 household survey recorded a harvest of 5,893 king salmon from the 26 high-harvest households sampled, and a total harvest of 7,110 kings by

the 72 surveyed households. This sample total was expanded to all strata to arrive at the total community harvest estimate of 10,154 kings. While the possibility exists that some salmon were double-counted by using "household" as the survey unit, this error is thought to be small. Researchers were conscious of the potential for double-counting fish that might also have been reported by a related household and were careful to explain and phrase survey questions to minimize this. The fact that the reported (unexpanded) harvests differ by a factor of two underscores the importance of maintaining current fishing household lists and attempting to contact each of them.

Differences in methodology aside, Table 17 illustrates the variability of salmon harvests in Fort Yukon from year to year. The catch calendar data for 1977-1987 represent a consistent methodology that should indicate relative levels of harvest. These data show that harvests of king salmon ranged from 1,061 to 3,950 and chum salmon harvests ranged from 3,360 to 24,292. While some of this variability may be attributed to sampling error, variation in harvests can also be explained by fluctuations in salmon run strength, environmental conditions that affect the ability to fish, and choices that individual fishermen make regarding their participation in fishing. Changes in participation rates from year to year can be demonstrated by comparing data for 1987 and 1988. Our estimate of 94 Fort Yukon households participating in salmon fishing in 1987 was followed by the 1988 catch calendar survey estimate (using households as the survey unit) of just 39 salmon fishing households. High water in the Yukon River in the vicinity of Fort Yukon during much of the 1988 fishing season prevented many fishermen from attempting to fish and resulted in reduced harvests by those households that did fish. Thus, salmon harvest estimates for 1988 are some of the lowest recorded for the 12-year period covered by Table 17.

In summary, salmon fishing in Fort Yukon is an important subsistence activity. For a variety of reasons salmon harvests are highly variable from year to year. There appears to be a core group of Fort Yukon households for which salmon fishing is a routine summer and fall activity, and another segment of the population for whom the decision to participate in fishing is weighed each year. The decision to fish is based on many variables including the availability of wage employment, perceived strength of the salmon runs, environmental conditions, and the availability or serviceability of

equipment such as boats, motors, and nets. The seemingly high estimates of salmon harvest for 1987 resulting from this study, compared to estimates for previous years, appears to be the result of improved survey methodology and a more intensive sampling effort. High water conditions in 1988 hindered fishing efforts and resulted in unusually low harvests illustrating the extreme variability of salmon harvests in Fort Yukon from year to year.

Mammals

In 1986-87, mammals were used by all households in Fort Yukon to some degree, with 72.8 percent of Fort Yukon households harvesting resources from this category. Mammals, excluding edible furbearers, accounted for 22.9 percent of the total 1986-87 harvest in Fort Yukon, contributing 675.8 pounds to the household harvest of wild resources. The harvest of mammals alone, at 245.3 pounds per capita, exceeded the average amount of meat, fish, and poultry purchased annually in the United States, which was about 222 pounds per person in 1978 (United States Department of Agriculture 1983). Table 14, presented earlier, shows that moose provided an estimated 105,093.2 pounds of meat to the community, equalling 179.9 pounds per capita, and comprising 16.8 percent of the total harvest. Only king and chum salmon provided a greater percentage of the overall harvest than moose. Snowshoe hare and caribou combined, made up most of the remainder of the harvest and contributed 5.2 percent of the overall harvest by weight. Of the remaining game species, black bear provided an estimated 4,346.2 pounds of meat, or about 20.5 pounds per household. Brown bear were harvested less frequently than black bear. Brown bear hides were utilized but brown bear meat was not used for human consumption. The combined total of all other game mammals (excluding furbearers), while totaling over 1,000 pounds, represented less than 0.3 percent of the total harvest by weight.

Other Resources

Non-salmon fish made up 12.1 percent of the total subsistence harvest in Fort Yukon. The average household harvest of non-salmon fish was 358.3 pounds, with a per capita harvest of 130.1 pounds. Whitefish, followed by sheefish and northern pike made up most of the non-salmon fish harvest. The combined harvest of these three species totalled more than 70,000 pounds in 1986-87 and represented more than 11 percent of the overall subsistence harvest. Burbot, grayling, and sucker combined represented less than one percent of the overall harvest.

Birds were harvested by a greater percentage of Fort Yukon households (76.8 percent) than any other resource group (Table 14). Geese accounted for more than one-half of the estimated 20,905.8 pounds of birds harvested in 1986-87 followed by ducks, grouse, ptarmigan, cranes, and swans. A more detailed species breakdown of the 1986-87 waterfowl harvest is presented in Table 18. Scoter, mallard, and pintail were the predominant duck species harvested and Canada geese, white fronted geese and snow geese were common geese species harvested by Fort Yukon hunters.

The prominent role of furbearers and trapping in the Fort Yukon economy was discussed in chapter 3. Furbearers were trapped primarily for their fur and contributed minimally to the family food supply. On occasion, beaver, muskrat, and lynx were eaten or used as food for dogs. These edible furbearers contributed an estimated 2,683.1 pounds of meat to the harvest total for Fort Yukon. The participation and harvest of furbearers by Fort Yukon residents during the 1986-87 trapping season is shown in Table 19.

An estimated 2,015.2 pounds of berries were harvested during the survey year, or approximately 503.8 gallons. An estimated 52.7 percent of all households harvested berries and 70.8 percent of all households used berries in 1987. Berries constituted 0.3 percent of the overall harvest for the community. Other types of edible greens were harvested and used by and estimated 2.3 percent of households. Information on the quantity of greens harvested and used by households was not collected.

TABLE 18. ESTIMATED 1986-87 WATERFOWL HARVEST BY SPECIES

Species		Total number harvested
Ducks		7,112[a]
	Mallard	1,646
	Pintail	1,059
	Canvasback	211
	Wigeon	404
	Green-winged teal	48
	Goldeneye	9
	Scoter	2,207
	Unknown	1,528
Geese		2,945[a]
	Canada geese	1,071
	White-fronted geese	1,058
	Snow geese	653
	Unknown	163
Total		10,057

[a]Species was indicated for only 78.5 percent of the duck harvest and 94.4 percent of the goose harvest.

TABLE 19. ESTIMATED HARVEST OF FURBEARERS BY FORT YUKON RESIDENTS, 1986-87

Species	Percentage of households harvesting	Estimated total number[a] harvested	Mean harvest per successful household
Beaver	22.0	507.0	10.9
Land otter	3.2	11.5	1.7
Lynx	20.2	368.9	8.6
Marten	22.4	2,708.5	57.0
Mink	10.8	144.8	6.3
Muskrat	18.9	2,735.6	68.2
Red fox	21.3	562.2	12.4
Weasel	0.5	17.8	11.1
Wolf	4.3	21.6	2.4
Wolverine	7.0	28.3	1.9

[a]Fractions of animals result because of expansion from a sample of households.

SHARING OF FISH AND WILDLIFE

The distribution of resources within and between communities is an integral part of the contemporary pattern of subsistence activity in Alaska (Langdon and Worl 1981; Magdanz 1988). Fort Yukon is no exception and a general measure of this sharing and exchange is indicated by the estimated percentage of households that reported receiving or giving specific resources (Table 20). As indicated earlier, the sometimes large differences between the percentage of households harvesting a resource and the percentage of households using a resource (Table 15) is also indicative of resource sharing. An estimated 77.9 percent of Fort Yukon households gave away some type of fish, wildlife, or edible plant resource, while 97.3 percent received resources from other households. In terms of actual numbers of resources, Fort Yukon households harvested an average of 9.4 resources, but used an average of 14.2 resources.

Mammals, primarily moose and caribou, were given away by an estimated 69.4 percent of households and were received by 89.5 percent. Birds were shared by 62.7 percent and received by 59.1 percent. Salmon was given by 47.5 percent, exceeding the 44.5 percent that harvested the resource, suggesting that some secondary distribution occurs, or salmon is received from other communities. Salmon was received by 63.8 percent of households, indicating that households sharing the resource gave to multiple households. This pattern was also shown in the distribution of freshwater fish which was given away by 34.7 percent of households and was received by 60.4 percent. Edible plants were given by 24.1 percent of households and received by 36.6 percent and furbearers were given away by 17.1 percent and received by 26.4 percent.

Survey results showed that over one-half of all Fort Yukon households gave away moose meat and an estimated 80 percent received moose from other households (Table 20). Survey data suggest that caribou meat was either widely distributed by a relatively small number of Fort Yukon households that harvested it, or was imported to Fort Yukon from other communities. Caribou meat was reportedly to other households by 9.5 percent of the households in Fort Yukon but was received by 64.2 percent of given households. Many households likely received caribou meat from relatives and

TABLE 20. ESTIMATED PERCENTAGE OF FORT YUKON HOUSEHOLDS RECEIVING AND GIVING SELECTED RESOURCES, 1986-87

Fish or wildlife resource	Percentage receiving	Percentage giving
Moose	79.2	53.6
Caribou	64.2	9.5
King salmon	62.1	43.5
Whitefish (sp.)	56.5	23.4
Snowshoe hare	50.8	44.0
Geese (sp.)	49.6	46.9
Chum salmon	46.9	27.9
Ducks (sp.)	43.9	52.1
Berries (sp.)	33.8	23.0
Grouse (sp.)	25.8	38.4
Sheefish	24.4	15.1
Ptarmigan (sp.)	21.3	34.7
Beaver	21.3	9.3
Northern pike	20.8	24.8
Arctic ground squirrel	20.4	20.8
Black bear	20.2	25.0
Porcupine	13.0	16.7
Muskrat	11.7	8.2
Dall sheep	9.0	0.0
Arctic grayling	5.6	11.7
Burbot	4.6	9.0
Rosehips	2.8	3.4
Lake trout	2.8	0.0
Lynx	1.7	5.0
Marten	1.7	5.0
Red fox	1.1	1.7
Deer	1.1	1.1
Coho salmon	1.1	0.5
Dolly Varden	1.1	0.0
Brown bear	0.5	2.8
Mink	0.5	0.5
Crane	0.0	5.0
Longnose sucker	0.0	1.1
Swan	0.0	1.1
Wolf	0.0	0.5
Arctic lamprey	0.0	0.0
Greens	0.0	0.0
Land otter	0.0	0.0
Red squirrel	0.0	0.0
Weasel	0.0	0.0
Wolverine	0.0	0.0

friends in Arctic Village and Venetie and secondary distributions also took place. Survey questions did not ask where the caribou meat was received from or given to. In some cases, king salmon was exchanged for caribou meat and some of the salmon reported as being given away was probably sent to these communities. King salmon was given to other households by 43.5 percent of Fort Yukon households, and was reported as being received by 62.1 percent (Table 20). Salmon appeared to be distributed through customary trade and exchange networks.

USE OF FISH AND WILDLIFE FOR DOG FOOD

One of the major uses of wild resources harvested in Fort Yukon was for feeding dogs. Dogs continued to play an important role in supporting subsistence activities in Fort Yukon during the study year. In many areas of the Yukon Flats, dog teams provided the most practical way to fully utilize the extensive network of winter trails established prior to the advent of snowmachines. These trails were made no wider than necessary to accommodate dogs pulling narrow toboggan sleds, and in some areas were too narrow to accommodate snowmachines (C. Alexander, pers. comm. 1989). Trails were gradually being widened, especially along the most traveled routes, but some portions of the trail system in more remote areas of the Flats remained more readily accessed by dog team. In other areas of the Flats, terrain features such as steep draws, numerous gullies, and extended areas of tussocks are more easily traversed with dogs than snowmachines.

Sled dog races held in Fort Yukon in conjunction with spring carnival activities hold the potential for cash prizes and add further incentive for households to maintain dog teams. Whereas some teams are maintained strictly for racing purposes, many of the most competitive teams are those that have been utilized on traplines throughout the winter. Cash prizes may be as high as $2,500 for first place teams in some of the larger local races (C. Alexander, pers. comm. 1989).

Dogs continue to provide some utility to households during the summer months as well. It is a common practice for one or several dogs to be transported to summer fish camps where they are

staked to ward off or warn of approaching bears. Most Fort Yukon area fish camps during the study year utilized dogs in this manner.

Fort Yukon households fed dogs a variety of locally harvested fish and wildlife, totalling 229,193.8 pounds of resources or 36.6 percent of the total harvest of all resources by weight (Table 21). This should be considered a minimum estimate since surveyed households sometimes indicated the use of certain resources as dog food such as snowshoe hare or certain furbearer species, but were unable to specify amounts or, in the case of red fox, conversions to an edible weight equivalent were not made. An estimated 69.1 percent of all Fort Yukon households owned at least 1 dog. The number of dogs owned by an individual household ranged from 1 to 38 dogs. The total number of dogs in the

TABLE 21. ESTIMATED QUANTITIES OF RESOURCES USED FOR DOG FOOD BY FORT YUKON HOUSEHOLDS, 1986-87

Fish or wildlife resource	Pounds used for dog food	Percentage of total resource harvest
Chum salmon	209,110.0	87.8
Sheefish	3,633.9	20.4
Beaver	3,212.3	31.7[a]
Northern pike	2,858.7	16.5
Whitefish	3606.3	10.3
Burbot	1,608.5	42.4
Black bear	1,492.3	34.3
King salmon	1,171.2	0.8
Lynx	870.0	19.7[a]
Brown bear	656.2	15.3[a]
Longnose sucker	396.9	68.0
Arctic grayling	382.6	27.6
Muskrat	167.3	4.1[a]
Coho salmon	24.0	4.7
Grouse	3.6	0.3
Total	229,193.8	36.6[a]

[a]These percentages are based on the pounds of resource harvested that were potentially edible by humans.

community was estimated at 626, or 2.95 dogs per household. The per capita community harvest of all resources is reduced from 1,071.5 pounds to 679.0 pounds when resources fed to dogs are excluded.

The species that were reportedly used to feed dogs in 1986-87, and estimated quantities used for feeding dogs are shown in Table 21. Almost all species of fish harvested by Fort Yukon households were used as dog food to some extent. Chum salmon comprised the greatest percentage of the resources used to feed dogs. Chum salmon was one resource that was almost exclusively harvested specifically to feed dogs. Interestingly, Shimkin (1955:36) reported that in 1949 Fort Yukon residents imported fish from the community of Tanana to feed dogs. This may have been a result of flooding which occurred in Fort Yukon in the spring of that year and disrupted fishing activities. Chum salmon used in Fort Yukon as dog food in 1986-87 appeared to have all been harvested locally. King salmon are not commonly used for dog food. During the survey year, however, one household reported feeding king salmon (in addition to chum salmon) to dogs due to the large number of dogs owned and the success of his fishwheel in harvesting kings that year. Other species commonly used as dog food included black and brown bear, snowshoe hare, beaver, and certain other furbearers (Table 21).

CHAPTER 5

SUMMARY AND DISCUSSION

A study conducted in 1949 found that almost 70 percent of Fort Yukon's population (58 percent of the households) were supported entirely, or to a large degree, by trapping, hunting, and fishing (Shimkin 1955:228). Other studies including Patterson (1974), the Institute of Social and Economic Research (1978), and Caulfield (1983) have documented the significance of subsistence activities in Fort Yukon. The continued importance of subsistence resources in the contemporary economy is supported by the findings of the present study.

In 1987 the local cash economy of Fort Yukon was fueled, to a large extent, by federal, state, and local government jobs. An estimated 65 percent of the available employment in Fort Yukon was funded directly or indirectly through these sources. Much of this employment was temporary, part-time, or seasonal. Although Fort Yukon residents held an estimated 380 jobs during the survey year, only 25 percent of the jobs were full-time, year-round positions (Table 4, chap. 2).

The 1987 survey found that Fort Yukon households had cash incomes ranging from $1,762 to $120,024 with an estimated median income of $17,856 and a mean household income of $28,010. An estimated 21.3 percent of Fort Yukon households fell below the 1987 federal poverty income guidelines for Alaska.

An estimated 89.6 percent of the households received income from wage employment. Households also received income from non-wage sources such as trapping, social security benefits, retirement, and government aid programs (Table 8, chap. 2). Among all 212 households the estimated mean income from non-wage sources was $4,836 with the Alaska permanent fund dividend and trapping contributing more than one-half of this amount (31.6 and 21.6 percent respectively). Among trapping households, trapping was the largest non-wage source of income, contributing an average of $5,149 to household income. The total potential cash income derived from the sale of furbearers based on average fur prices and estimated harvest numbers was $390,265 (Table 12, chap. 3).

A 1978 study by the Institute of Social and Economic Research found that 42 percent of the Native households interviewed in Fort Yukon reported that half or more of their food was obtained from hunting, fishing, and gathering activities. An additional 27 percent responded that a portion of their food, although less than one-half, consisted of local subsistence resources. Estimates of the present study indicate that all Fort Yukon households used local fish, wildlife, and plant resources to some extent during the survey period and that an estimated 87.5 percent successfully harvested subsistence resources. A high percentage of households (30.9 to 76.8 percent) harvested resources in each of the six categories of salmon, freshwater fish, mammals (other than furbearers), birds, furbearers, and edible flora. Through patterns of exchange and sharing, an even greater percentage of households reported using these resources.

A comparison of estimated harvest levels of selected resources in 1949 and the 1986-87 study year are presented in Table 22. Differences in the population of Fort Yukon between those two study years make pounds per capita harvest the most useful index for comparison. Noteworthy are similarities in harvest levels of beaver, hare, and moose. The 66-pound difference in the per capita

TABLE 22. COMPARISON OF SELECTED GAME HARVEST ESTIMATES FOR FORT YUKON, 1949 AND 1986-87

	1949 Harvest estimates			1986-87 Harvest estimates[a]		
Game resource	Number harvested[b]	Total pounds[c]	Per capita pounds (N=470)[b]	Number harvested	Total pounds	Per capita pounds (N=584)
Beaver	545	10,900	23.2	507.0	10,140.0	17.4
Caribou	42	4,200	8.9	155.9	15,586.5	26.7
Ducks	1,900	1,900	4.0	7,111.6	7,111.6	12.2
Geese	145	551	1.2	2,945.5	11,192.8	19.2
Ground squirrel	1150	690	1.5	706.8	424.1	0.7
Moose	165	115,500	245.7	150.1	105,093.2	179.9
Muskrat	24,200	36,300	77.2	2,735.6	4,103.0	7.0
Snowshoe hare	4,600	11,500	24.5	6,700.7	16,751.7	28.7

[a]This study.
[b]Shimkin 1951.
[c]Total pounds for 1949 calculated using 1987 usable weight conversion factors.

harvest of moose between the two studies may indicate a slightly lower use of moose today than in 1949. This level of difference may also be attributable to normal variations in the annual harvest of moose. Muskrat and ground squirrel harvests were significantly higher in 1949 than in 1986-87. Caribou and waterfowl harvest levels appear to have increased significantly in 1986-87 over 1949 harvest levels (Table 22).

Patterson (1974) estimated that Fort Yukon residents harvested approximately 611,425 pounds of wild resources averaging approximately 1,136 pounds per person per year. The estimated total pounds harvested based on the present study was 625,725.1 pounds, or 2,951.5 pounds per household. This equates to 1,071.5 pounds per capita, a figure strikingly similar to the 1974 estimate. Subtracting the portion used for feeding dogs, the per capita harvest for 1986-87 was 679.0 pounds. This figure is more than three times the 1979 average of 222 pounds per capita of meat, fish, and poultry purchased annually in the United states (United States Department of Agriculture 1983). Salmon comprised the greatest percentage of the overall community harvest by weight at 60.8 percent. Mammals (excluding furbearers) accounted for 22.9 percent of the harvest, freshwater fish made up 12.1 percent, and edible furbearers, birds, and plants and berries made up the remaining 4 percent.

Typical of other predominantly Native, non-road connected communities in Alaska, Fort Yukon's food production was undertaken by a relatively small percentage of households. It is estimated that less than 30 percent of the households accounted for over 90 percent of the community's overall harvest (Fig. 8). An estimated 10 percent of the households produced about 65 percent of the total pounds of resources harvested during the survey year. The variability in household food production is explained, in part, by the use of fish and wildlife resources for dog food. Some Fort Yukon households reported having more than 30 dogs and utilized significant quantities of wild resources as dog food. Dogs continue to support subsistence activities in the Yukon flats as a reliable and sometimes essential mode of winter transportation; as a potential source of income through breeding and cash prizes for sled dog races, and as guards against bears in fish camps. A minimum estimate of 36.6 percent of the total subsistence harvest in Fort Yukon was fed to dogs (Table 21, chap. 4).

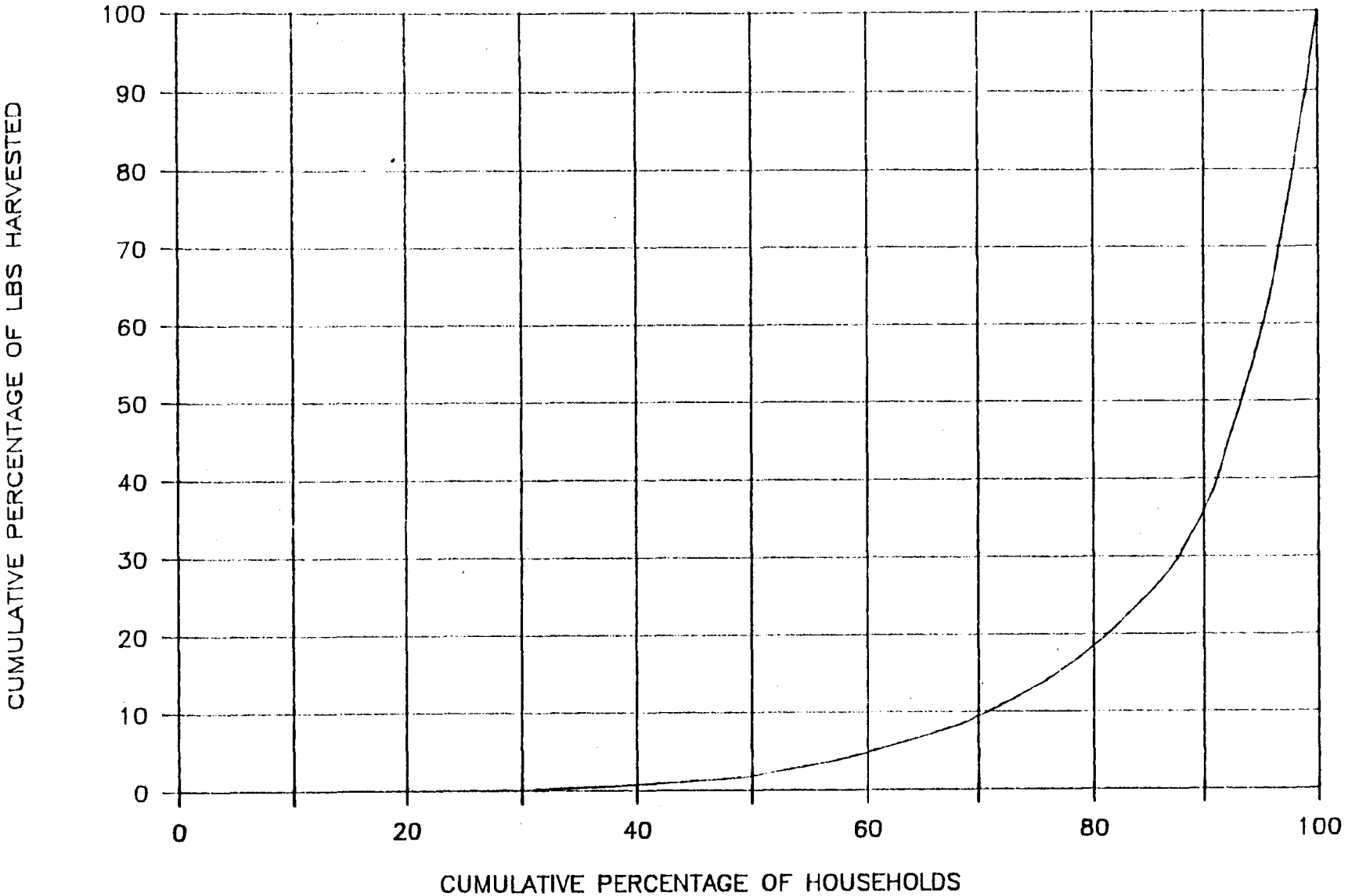


Fig. 8. Cumulative percentage of total harvest (in pounds) by Fort Yukon households, 1986-87.

Survey findings point to a high degree of sharing of wild resources in Fort Yukon with moose, caribou, king salmon, and waterfowl among the most widely distributed (Table 20, chap. 4). The most productive households in Fort Yukon provided for others by maintaining patterns of resource sharing, an important aspect of contemporary subsistence production.

A comparison of harvest levels of ten Athabaskan communities in interior Alaska shows that estimated harvest levels of Fort Yukon households are well within the range documented for other communities and are comparable to those found in much smaller communities (Table 23). This finding is especially significant in light of assumptions that are often made about the continuing role of subsistence in communities that have more employment opportunities, serve as subregional or regional centers, and that appear to have a more diversified cash economy. In summary, subsistence harvest and use of local fish and wildlife resources in 1987 continued to be an integral part of the mixed economy of Fort Yukon, and were consistent with estimates of subsistence use made nearly 40 years earlier in 1949, and again in 1974.

TABLE 23. COMPARISON OF FISH AND WILDLIFE HARVEST (IN POUNDS) FOR TEN INTERIOR ALASKA COMMUNITIES

Community	Number of households	Mean household harvest (pounds)	Total per capita harvest (pounds)	Per capita harvest (excluding dog food)
Fort Yukon[a]	212	2,951	1,071	679
Galena[b]	211	2,574	787	787
Tanana[c]	128	5,828	2,159	801
Minto[d]	48	3,971	1,015	--[e]
Stevens Village[f]	30	3,416	1,139	578
Beaver[g]	31	1,837	730	459
Huslia[h]	57	3,652	1,082	677-711
Hughes[i]	22	6,443	1,511	--[e]
Allakaket/Alatna[j]	39	3,528	908	--[e]
Tetlin[k]	28	2,022	532	--[e]

[a]This study.
[b]Marcotte 1989.
[c]Case and Halpin 1989.
[d]Andrews 1988.
[e]No data.
[f]Sumida 1988.
[g]Sumida 1989.
[h]Marcotte 1986.
[i]Marcotte and Haynes 1985.
[j]Halpin 1987.

REFERENCES

Alaska Department of Labor
1987 Alaska Population Overview 1985 Estimates. Research and Analysis Section, Juneau.

Alaska Department of Revenue
1988 Federal Income Taxpayer Profile 1983-1985 by Alaska Community and Income Level and Filing Status. Juneau.

Andrews, Elizabeth F.
1988 The Harvest of Fish and Wildlife for Subsistence by Residents of Minto, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 137.

Burch, Ernest S., Jr.
1985 Subsistence Production in Kivalina, Alaska: A Twenty-Year Perspective Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 128.

Case, Martha and Libby Halpin
1989 Contemporary Wild Resource Use Patterns in Tanana, Alaska 1987. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 178.

Carroll, James A.
1957 The First Ten Years in Alaska: Memoirs of a Fort Yukon Trapper 1911-1922. New York: Exposition Press.

Caulfield, Richard A.
1983 Subsistence Land Use in Upper Yukon-Porcupine Communities, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 16.

Caulfield, Richard A., Walter J. Peter, and Clarence Alexander
1983 Gwich'in Athabaskan Place Names of the Upper Yukon-Porcupine Region, Alaska: A Preliminary Report. Alaska Department of Fish and Game, Division of Subsistence, Juneau, Technical Paper No. 83.

City of Fort Yukon
1986 Census of Fort Yukon. Unpublished. On file, Division of Subsistence, Alaska Department of Fish and Game, Fairbanks.

Coffing, Michael and Sverre Pedersen
1985 Caribou Hunting: Land Use Dimensions, Harvest Level and Selected Aspects of the Hunt During the Regulatory Year 1983-1984 in Kaktovik, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 120.

Darbyshire and Associates
1979 Yukon Flats Regional Government Study. Technical Report No. 2, Data Reconnaissance. Prepared for the Department of Community and Regional Affairs, Division of Local Government Assistance, Anchorage.

Fison, Susan
1987 Fort Yukon Community Profile. Prepared for the Department of Community and Regional Affairs by Fison and Associates, Anchorage.

Hadleigh-West, Frederick
1963 The Netsi Kutchin: An Essay in Human Ecology. Ph.D. thesis. Department of Geography and Anthropology, Louisiana State University and Agricultural and Mechanical College.

Halpin, Libby
1987 Living Off the Land: Contemporary Subsistence in Tetlin, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 149.

Institute of Social and Economic Research
1978 Yukon-Porcupine Regional Planning Study, University of Alaska, Fairbanks.

Langdon, Steve and Rosita Worl
1981 Distribution and Exchange of Subsistence Resources in Alaska. Division of Subsistence, Alaska Department of Fish and Game, Technical Paper No. 55.

Magdanz, James S.
1988 Research Design: Subsistence Trade and Barter in Wild, Renewable Resources in Alaska. On file with Division of Subsistence, Alaska Department of Fish and Game.

Marcotte, James R.
1986 Contemporary Resource Use Patterns in Huslia, Alaska, 1983. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 133.

1989 Subsistence Harvest of Fish and Wildlife by Residents of Galena, Alaska, 1985-86. Division of Subsistence, Alaska Department of Fish and Game, Fairbanks, Technical Paper No. 155.

Marcotte, James R. and Terry L. Haynes
1985 Contemporary Resource Use Patterns in the Upper Koyukuk Region, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 93.

McKennan, Robert A.
1959 The Upper Tanana Indians. Yale University Publications in Anthropology Number 5. New Haven: Yale University.

1965 The Chandalar Kutchin. Arctic Institute of North America, Montreal, Technical Paper No. 17.

Nelson, Richard K.
1973 Hunters of the Northern Forest: Designs for Survival Among the Alaskan Kutchin. Chicago: The University of Chicago Press.

Osgood, Cornelius
1970 [1936] Contributions to the Ethnography of the Kutchin. Yale University Publications in Anthropology Number 14. New Haven: Yale University.

Patterson, Art
1974 Subsistence Harvests in Five Native Regions. Prepared for the Joint Federal-State Land Use Planning Commission for Alaska. Anchorage: Resource Planning Team.

Rollins, Alden M.
1978 Census Alaska: Numbers of Inhabitants, 1792-1970. Anchorage: University of Alaska Library.

Schneider, William S.
1976 Beaver, Alaska: The Story of a Multi-Ethnic Community. Ph.D. dissertation. Department of Anthropology, Bryn Mawr College. Ann Arbor: University Microfilms.

Shimkin, Demitri B.
1951 Fort Yukon, Alaska: An Essay in Human Ecology, I. Alaska Development Board, Juneau.

1955 The Economy of a Trapping Center: The Case of Fort Yukon, Alaska. Economic Development and Cultural Change 3(3):219-240.

Slobodin, Richard
1981 Kutchin. In Subarctic. June Helm, ed. pp. 514-532. Handbook of North American Indians, Vol. 6. Washington, D.C.: Smithsonian Institution.

Stuck, Hudson
1914 Ten Thousand Miles with a Dog Sled: A Narrative of Winter Travel in Interior Alaska. New York: Charles Scribner's Sons.

1917 Voyages Along the Yukon and Its Tributaries: A Narrative of Summer Travel in Interior Alaska. New York: Charles Scribner's Sons.

Sumida, Valerie A.
1988 Land and Resource Use Patterns in Stevens Village, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 129.

1989 Patterns of Fish and Wildlife Harvest and Use in Beaver, Alaska. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 140.

Sumida, Valerie and Clarence Alexander
1985 Moose Hunting by Residents of Beaver, Birch Creek, Fort Yukon, and Stevens Village in the Western GMU 25(D) Permit Moose Hunt Area, 1984-85. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 121.

United States Department of Agriculture
1983 Food Consumption: Households in the West, Seasons and Year 1977-78. Consumer Nutrition Division, Human Nutrition Information Service, Washington, D.C., Report No. H-10, Nationwide Food Consumption Survey 1977-78.

United States Department of Commerce
1980 1980 Census of the Population. Vol. 1, Characteristics of Population. Bureau of the Census, Washington, D.C.

United States Department of the Interior
1987 Yukon Flats National Wildlife Refuge Final Comprehensive Conservation Plan, Wilderness Review, and Environmental Impact Statement. Fish and Wildlife Service, Anchorage.

Walker, Robert J. and Louis Brown
1988 Historic Subsistence Salmon Harvests Catalog. Division of Subsistence, Alaska Department of Fish and Game, Anchorage.

Walker, Robert J., Elizabeth F. Andrews, David B. Andersen, and Neil Shishido
1989 Subsistence Harvest of Pacific Salmon in the Yukon River Drainage, Alaska, 1977-88. Division of Subsistence, Alaska Department of Fish and Game, Juneau, Technical Paper No. 187.

Wolfe, Robert J.
1987 The Super-Household: Specialization in Subsistence Economies. Paper presented at the 14th Annual Meeting of the Alaska Anthropological Association, Anchorage, March 12 and 13, 1987. On file with the Division of Subsistence, Alaska Department of Fish and Game, Fairbanks.

APPENDIX 1

HOUSEHOLD SURVEY FORM
FORT YUKON SUBSISTENCE USE STUDY, 1987

HH ID # _____ Date _____ Interviewer _____

Subsistence is an important part of the lives of many people in this area, and we are studying subsistence activities in Fort Yukon. This information will help decision makers and other people in the state better understand the importance of subsistence in your community. Your name will not be used on this survey and you do not have to answer any questions you don't want to.

Many things affect how a family hunts and fishes including the size of the household, ages, birthplace, how long you have lived in Fort Yukon and whether or not you are Native. It would help us to know the following things about people that lived in this house during the last 12 months (from October 1986 through September 1987).

1. HOUSEHOLD INFORMATION

ID#	M/F	Relation-Ship To Person 1	Birth Date	Residence Of Mother When You Were Born	Year Moved To Ft Yukon	Previous Residence	Native Y	Native N
1 Head								
2 Head								
3								
4								
5								
6								
7								
8								
9								
10								

2. Of these people, during the past year... (use ID #)

Who went hunting? _____

Who participated in fishing? _____

Who went trapping? _____

Who gathered berries or plants? _____

We are trying to learn what kinds of fish and game people use, how much they get, and what subsistence foods are shared with people in other households. These questions are for hunting, fishing, trapping, and gathering activities by you or anyone living in this household for the past 12 months (from October 1986 through September 1987).

3. **FISH**	Did You Use?		Did You Fish For?		Number Harvested By Method					Received Any?		Gave Any Away?	
	Y	N	Y	N	Fish-Wheel	Gill Net	Hooking	Rod & Reel	Other	Y	N	Y	N
King Salmon (60)													
Summer Chum (61) "Silvers"													
Fall Chum "Dog (62) Salmon"													
Coho Salmon (63) "Chinook"													
Humpback White- (64) Fish					Number Harvestd								
Ciscos "Sm Fsh- (65) Wheel WF"													
Other Whitefish (66)													
Sheefish (67)													
Burbot "Lush"or (68) "Ling Cod"													
Northern Pike (69) "Jackfish"													
Grayling (70)													
Lake Trout (71)													
Dolly Varden or (72) Arctic Char													
Longnose Sucker (73)													
Other (Specify) (79)													

From October 1986 through September 1987

4. **BERRIES AND PLANTS**	Did You Use?		Did You Gather?		Total # Of Gallons Harvested	Received Any?		Gave Any Away?	
	Y	N	Y	N		Y	N	Y	N
Blueberries (80)									
Lowbush Cranberries (81)									
Highbush Cranberries (82)									
Other Berries (83)									
Greens (84)									
Other (specify) (89)									

5. **LAND MAMMALS**	Did You Use?		Did You Hunt For?		Total Number Harvested	Number Used For Eating	Received Any?		Gave Any Away?	
	Y	N	Y	N			Y	N	Y	N
Moose (100)						XXXXXXX XXXXXXX				
Caribou (101)						XXXXXXX XXXXXXX				
Sheep (102)						XXXXXXX XXXXXXX				
Brown Bear (103)										
Black Bear (104)										
Porcupine (105)						XXXXXXX XXXXXXX				
Snowshoe Hare (106)						XXXXXXX XXXXXXX				
Ground Squirrel (107)						XXXXXXX XXXXXXX				
Other (Specify) (109)						XXXXXXX XXXXXXX				

From October 1986 through September 1987

6. **FURBEARERS**	Did You Use? Y	N	Did You Trap Or Hunt For? Y	N	Total Number Harvested Trap	Hunt	Number Used For Eating	# Furs Sold	Received Any? Y	N	Gave Any Away? Y	N
Marten (130)							XXXXXXX XXXXXXX					
Lynx (131)												
Fox (132)							XXXXXXX XXXXXXX					
Mink (133)							XXXXXXX XXXXXXX					
Wolverine (134)							XXXXXXX XXXXXXX					
Wolf (135)							XXXXXXX XXXXXXX					
Beaver (136)												
Muskrat (137)												
Land Otter (138)							XXXXXXX XXXXXXX					
Other (Specify) (149)												

7. **BIRDS**	Did You Use? Y	N	Did You Hunt For? Y	N	Total # Harvested Sprng	Fall	Received Any? Y	N	Gave Any Away? Y	N
Mallards (90)										
Pintails (91)										
Canvasbacks (92)										
Scoters "Black (93) Ducks"										
Other Ducks (94)										

From October 1986 through September 1987

7. **BIRDS, Continued**	Did You Use?		Did You Hunt For?		Total # Harvested		Received Any?		Gave Any Away?	
	Y	N	Y	N	Sprng	Fall	Y	N	Y	N
Canada Geese (95) "Honkers"										
White-Fronted (96) "Speckled"										
Snow Geese (97)										
Other Geese (98)										
Cranes (99)										
Ptarmigan (100)										
Grouse (101)										
Other (Specify) (109)										

8. Did you use any fish or game to feed dogs? Yes ____ No ____

List the kind and amount of fish and game you used to feed dogs.

Species	Amount	Species	Amount	Species	Amount
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

9. We are also trying to learn how fish and game are shared among villages and regions. In the past 12 months, with which communities have you shared the following fish or game.

Communities Sent To

MOOSE	SALMON	CARIBOU
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Communities Received From

MOOSE	SALMON	CARIBOU
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

10. Sometimes people in communities like Fort Yukon go to other villages to hunt, fish, or gather berries and plants. In the past year, have you or other people in this house visited other villages to hunt, fish, trap, or gather berries or plants?

yes ____ no ____

VILLAGE	ACTIVITY
_____	_____
_____	_____
_____	_____

11. Did anyone from another village stay with you during the past year and hunt, fish, trap, or gather plants and berries while they were here?

yes ____ no ____

Village	Activity
_____	_____
_____	_____
_____	_____
_____	_____

12. Transportation and equipment affect where and how people hunt and fish. How many of the following items does your household have?

____ boat

Size: _____
Type: _____

____ outboard

HP: _____
HP: _____
HP: _____

____ Three- or four-wheeler

____ Snowmachine

____ Sleds

____ Dogs

____ Dog Pack

____ Car or Truck

____ Airplane

____ Fish Camp

____ Smokehouse

____ Fish Racks

____ Fish Nets

type: _____
_____
_____

____ Hunting/Trapping Cabin

____ Traps and Snares

____ Caches

____ Freezers

13. Sometimes a person's job interferes with their being able to hunt and fish, and sometimes it provides enough income to buy equipment needed for subsistence hunting and fishing. Employment can also influence the way a family hunts or fishes. It would help us to know about your household's employment and income for the past 12 months.

HH Member ID	Job Title	Employer	# Hours Worked Per Week	# Weeks Worked Per Year	Which Months Worked	Amount* Earned

* hourly, monthly, or total

14. Other Income Sources

Indicate Monthly Amount Received From:

Social Security Income $ _____

Longevity Bonus $ _____

Adult Public Assistance $ _____

AFDC $ _____

Energy Assistance $ _____

Pension $ _____

Retirement $ _____

Indicate Yearly Amount Received From:

Commercial Fishing $ _____

Trapping $ _____

Corporation Dividends $ _____

National Guard $ _____

Handicrafts $ _____

Other (Specify)

_____ $ _____

15. Please estimate your household's cash income in 1986 (including trapping wages, commercial fishing, social security, etc.)

Total $ _____

16. The cost of living in an area is often considered when assessing the role of subsistence. It would be useful to know what some of your household's expenditures are.

Estimated Monthly HH Expenses:

rent or house payment	$ _____	phone	$ _____
electricity	$ _____	gas for outboards	$ _____
stove oil	$ _____	gas for snowmachines	$ _____
propane	$ _____	other (specify)	
groceries	$ _____	_____	$ _____
water utility	$ _____	_____	$ _____

17. Total amount of firewood used per year _____ (cords)

No. Cords purchased: _____ Cost: $ _____

No. Cords hauled: _____

APPENDIX 2. COMMON, SCIENTIFIC, AND GWICH'IN NAMES OF RESOURCES USED BY FORT YUKON RESIDENTS, 1986-87.

Common name	Scientific name	Gwich'in name[a]
Fish		
King Salmon	*Oncorhynchus tshawytscha*	*luk choo*
Chum Salmon	*Oncorhynchus keta*	*hii (shii)*
Coho Salmon	*Oncorhynchus kisutch*	*needlii*
Broad Whitefish	*Coregonus nasus*	*chiishoo*
Humpback Whitefish	*Coregonus pidschian*	*neeghan*
Round Whitefish	*Prosopium cylindraceum*	*khaltai'*
Least Cisco	*Coregonus sardinella*	*ch'ootsik*
Bering Cisco	*Coregonus laurettae*	*luk dohohtr'i'*
Northern Pike	*Esox lucius*	*iltin*
Sheefish	*Stenodus leucichthys*	*shryah*
Burbot	*Lota lota*	*chehluk*
Longnose Sucker	*Catostomus catostomus*	*deets'at*
Arctic Grayling	*Thymallus arcticus*	*shriijaa*
Mammals		
Moose	*Alces alces*	*dinjik*
Caribou	*Rangifer tarandus*	*vadzaih*
Black Bear	*Ursus americanus*	*shoh zhraii*
Brown Bear	*Ursus arctos*	*shih tthoo*
Snowshoe Hare	*Lepus americanus*	*geh*
Porcupine	*Erethizon dorsatum*	*ts'it*
Arctic Ground Squirrel	*Spermophilus undulatus*	*tthah (tthaa)*
Red Squirrel	*Tamiasciurus hudsonicus*	*dlak*
Muskrat	*Ondatra zibethicus*	*dzan*
Marten	*Martes americana*	*tsuk*
Mink	*Mustela vison*	*chihdzuu*
Lynx	*Felis canadensis*	*ninjii*
Red Fox	*Vulpes vulpes*	*neeqoo*
Wolverine	*Gulo gulo*	*natryah*
Land Otter	*Lutra canadensis*	*tryah*
Wolf	*Canis lupus*	*zhoh*
Beaver	*Castor canadensis*	*tsee*
Birds		
Mallard	*Anas platyrhynchos*	*neet'ak choo*
Northern Pintail	*Anas acuta*	*ch'iriinjaa*
American Wigeon	*Anas americana*	*chalvii*
Canvasback	*Aythya valisineria*	--
Greater Scaup	*Aythya marila*	*taiinchoo*
Lesser Scaup	*Aythya affinis*	--
Common Goldeneye	*Bucephala clangula*	*chiik'ii*
Green-Winged Teal	*Anas crecca*	*chi'idzinh*

APPENDIX 2.--Continued.

Common name	Scientific name	Gwich'in name[a]
Bufflehead	*Bucephala albeola*	*tl'aandii*
Oldsquaw	*Clangula hyemalis*	*aahaalak*
White-Winged Scoter	*Melanitta fusca*	*njaa*
Surf Scoter	*Melanitta perspicillata*	*deetree'aa*
Northern Shoveler	*Anas clypeata*	*dehdrik*
Greater White-Fronted Goose	*Anser albifrons*	*deechy'ah*
Canada Goose	*Branta canadensis*	*khaih*
Snow Goose	*Chen caerulescens*	*gwigeh*
Sandhill Crane	*Grus canadensis*	*jyah*
Spruce Grouse	*Dendragapus canadensis*	*daih*
Ruffed Grouse	*Bonasa umbellus*	*treeqwat*
Sharp-Tailed Grouse	*Tympanuchus phasianellus*	*ch'ahtal*
Willow Ptarmigan	*Lagopus lagopus*	*daagoo*
Rock Ptarmigan	*Lagopus mutus*	*daaky'aa*
Plants		
White Spruce	*Picea glauca*	*ts'iivii*
Black Spruce	*Picea mariana*	--
Paper Birch	*Betula papyrifera*	*aat'oo*
Balsam Poplar	*Populus balsamifera*	*t'aa*
Willow (sp.)	*Salix (sp.)*	*k'aii*
Bog Cranberry	*Vaccinium vitis-idaea*	*natl'at*
Highbush Cranberry	*Viburnum edule*	*trahkyaa*
Bog Blueberry	*Vaccinium uliginosum*	*jak*
Rosehips	*Rosa acicularis*	*nitsih*
Wild Rhubarb	*Polygonum alaskanum*	*ts'iigiu*
Labrador or Hudson Bay Tea	*Ledum palustre*	*ledii masket (?)*

[a]Gwich'in names taken from Caulfield (1983:52-54).

APPENDIX 3. EDIBLE WEIGHTS OF SELECTED FISH AND WILDLIFE RESOURCES USED BY FORY YUKON RESIDENTS

Resource	Edible weight (pounds)
King Salmon	14.0
Summer Chum Salmon	4.8
Fall Chum Salmon	5.3
Coho Salmon	4.3
Humpback Whitefish	3.0
Cisco	0.6
Lake Whitefish	4.5
Whitefish (general)	3.0
Sheefish	6.0
Northern Pike	4.0
Burbot	4.0
Longnose Sucker	1.0
Arctic Grayling	0.7
Arctic Lamprey	0.6
Moose	700.0
Caribou	100.0
Black Bear	100.0
Deer	42.5
Porcupine	10.0
Snowshoe Hare	2.5
Arctic Ground Squirrel	0.6
Red Squirrel	0.3
Muskrat	1.5
Lynx	12.0
Beaver	20.0
Grouse	0.6
Ptarmigan	0.4
Ducks	1.0
Geese	3.8
Crane	8.0
Swans	18.0
Berries	4.0/gallon