

SUBSISTENCE HARVEST OF FISH AND WILDLIFE  
BY RESIDENTS OF GALENA, ALASKA, 1985-86

by

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## ABSTRACT

This report described the importance of wild food to Galena residents. One-half of the 74 sampled households indicated using over 800 edible pounds of wild food, and all households indicated using at least 50 edible pounds. Key resources, used by at least one-half of sampled households included moose, fall chum salmon, berries, ducks, geese, and grouse. The quantities of wild food harvested averaged 2,573.9 edible pounds per household, or 787.1 edible pounds per person. The resources making the largest contribution to that total were summer chum salmon, moose, fall chum salmon, king salmon, and whitefish. King salmon, fall chum salmon, and moose accounted for 77.3 percent of the edible weight of food used for human consumption. Although the proportion of the total harvest represented by other resources was less, other resources played an important role in the annual harvest cycle. Of households harvesting some species, most (53.1 percent) harvested more than 5 of the 25 resources asked about in the survey.

Galena households displayed considerable variation in the quantities of fish and game harvested and used. This variation represented a specialization between households and supported the pattern of "core households" of local families being the basic social organization of hunting and fishing activities.

Subsistence activity varied considerably between households in Galena. Households headed by a Native couple harvested over 14 times the amount taken by non-Native couples. Their use of resources, as measured on a per capita basis, was four times greater. Households headed by people originally from outside Galena or the region

displayed a per capita harvest less than one quarter of those of local origin. Harvest quantity and diversity generally increased with the age of the household head. Also, the highest harvest per capita was found with households headed by a couple with children less than 18 years of age at home and with households of single males with no dependents. These two household types and ones headed by a couple with no dependents were characterized by above average use of wild food. Finally, households with annual incomes between \$20,000 and 40,000 displayed the highest per capita harvests, yet the use of resources was more evenly distributed among income groups.

Galena's role as a subregional center has a number of manifestations. A large number of residents in 1986 were originally from the outlying communities along the middle Yukon and Koyukuk rivers. There were examples of those residents continuing to use areas near those communities to harvest fish and wildlife. In addition, there was pronounced sharing which occurred between residents of Galena and those communities. Residents originally from outside the region displayed much lower harvest levels. However, they did participate in a wide variety of harvest activities, but were comparatively less active in salmon fishing, wood gathering, and trapping.



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## CHAPTER 1. INTRODUCTION

This report documents the contemporary pattern of harvest and use of wildlife resources by Galena residents. Galena is located along the Yukon River 270 miles west of Fairbanks (Fig. 1). Data come primarily from a survey conducted with 74 of 211 (35 percent) Galena households of hunting, fishing, and trapping activities from June 1985 through May 1986. In addition, interviews with long-term residents were conducted for mapping geographical areas used for wildlife harvests. Historical information on land and resource use is included for comparison, although historical uses were not a focus of study.

### PURPOSE OF STUDY

The three primary purposes of this study were:

- 1) to describe contemporary harvest and resource use in Galena;
- 2) to examine the relationship between Galena and the neighboring communities in terms of land use, sharing, and social ties; and
- 3) to provide an overview of Galena's economy.

To accomplish this, the following objectives were developed:

- 1) to document the area used by Galena residents for harvesting fish and wildlife resources;
- 2) to provide a single year's harvest data for fish, wildlife, and plant resources (June 1985 to May 1986);

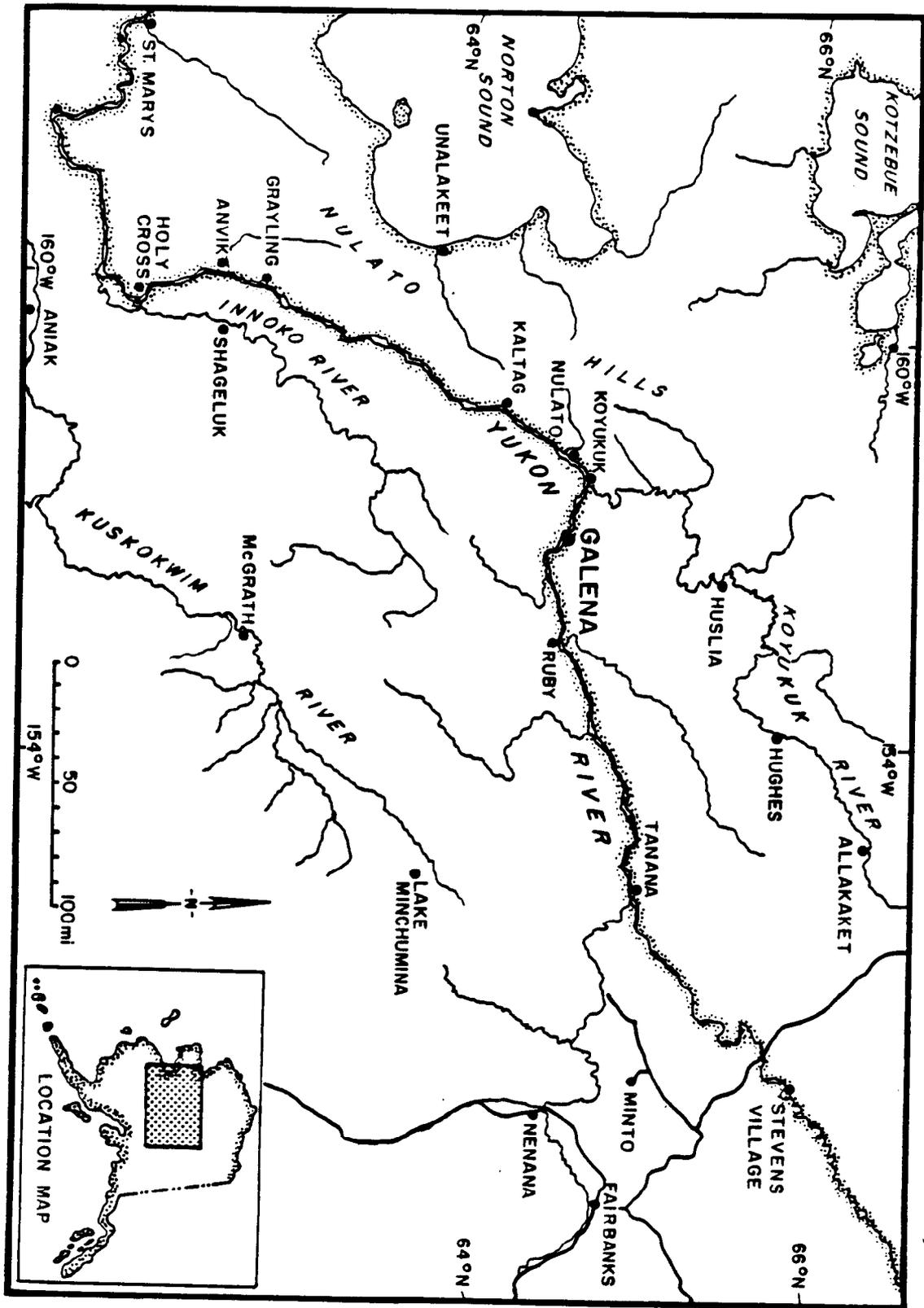


Fig. 1. Location of Galena, Alaska.

- 3) to describe the general contemporary pattern of harvest and use of area resources by Galena residents;
- 4) to describe the sharing of salmon, moose, and caribou between Galena and other area village residents;
- 5) to describe the distribution of resources within local family units;
- 6) to list services and employment sources in Galena;
- 7) to examine the relationship between wage employment and participation in subsistence harvests at a household level; and,
- 8) to provide an historical overview of Galena's resource use.

There were several reasons for conducting this study. Contemporary information on land and resource use patterns for Galena is useful for a variety of public and management decisions concerning wildlife use in the Galena area. Land use planning and regulatory issues are broad in scope and involve a larger number of user groups and agencies.

In 1986, federal land use planning was in progress for four National Wildlife Refuges used by Galena residents: Innoko, Koyukuk, Nowitna, and Selawik. These conservation units were established by Congress in the 1980 Alaska National Interest Lands Conservation Act (ANILCA). One of the four purposes for establishing these refuges was to provide the opportunity for continued subsistence uses by local residents. An accurate depiction of these subsistence uses could help insure their recognition in management of the Wildlife Refuges. Additionally, Section 802 of ANILCA requires that any other uses of these lands have the least adverse impact possible on rural residents who depend upon subsistence use of the resources of such

lands, and that subsistence uses shall have priority over other uses when restrictions are necessary.

At the time of this study, land use planning also was being conducted on lands administered by the federal Bureau of Land Management and the Alaska Department of Natural Resources. The significant private landholders in the area were Native regional and village corporations, such as Doyon, Ltd.; K'oyitl'ots'ina, Ltd.; and Gana-A'Yoo, Ltd. (Fig. 2). The potential was considerable for resource and economic development and changing land management regimes on each of these land holdings. This study was designed to provide information which could be used in managing public and private lands for uses compatible with subsistence activities.

Data on hunting, fishing, and trapping activities was also expected to contribute to discussions on several potential fishing and hunting regulatory issues. One is the future allocation of Yukon River salmon between the United States and Canada. Other issues include the allocation of fish and game among different user groups in Alaska, changes in federal waterfowl hunting regulations, the implementation of the subsistence priority, the inclusion of trapping as part of subsistence, the use of salmon for dog food, and the interest in allowing drift gill nets for salmon fishing near Galena. Decisions on regulations governing these activities benefit from information of contemporary subsistence uses. This report is expected to aid that process.

Some aspects of fish and wildlife use by Galena residents have been documented previously, and baseline subsistence surveys have been conducted in some neighboring communities. The Division of

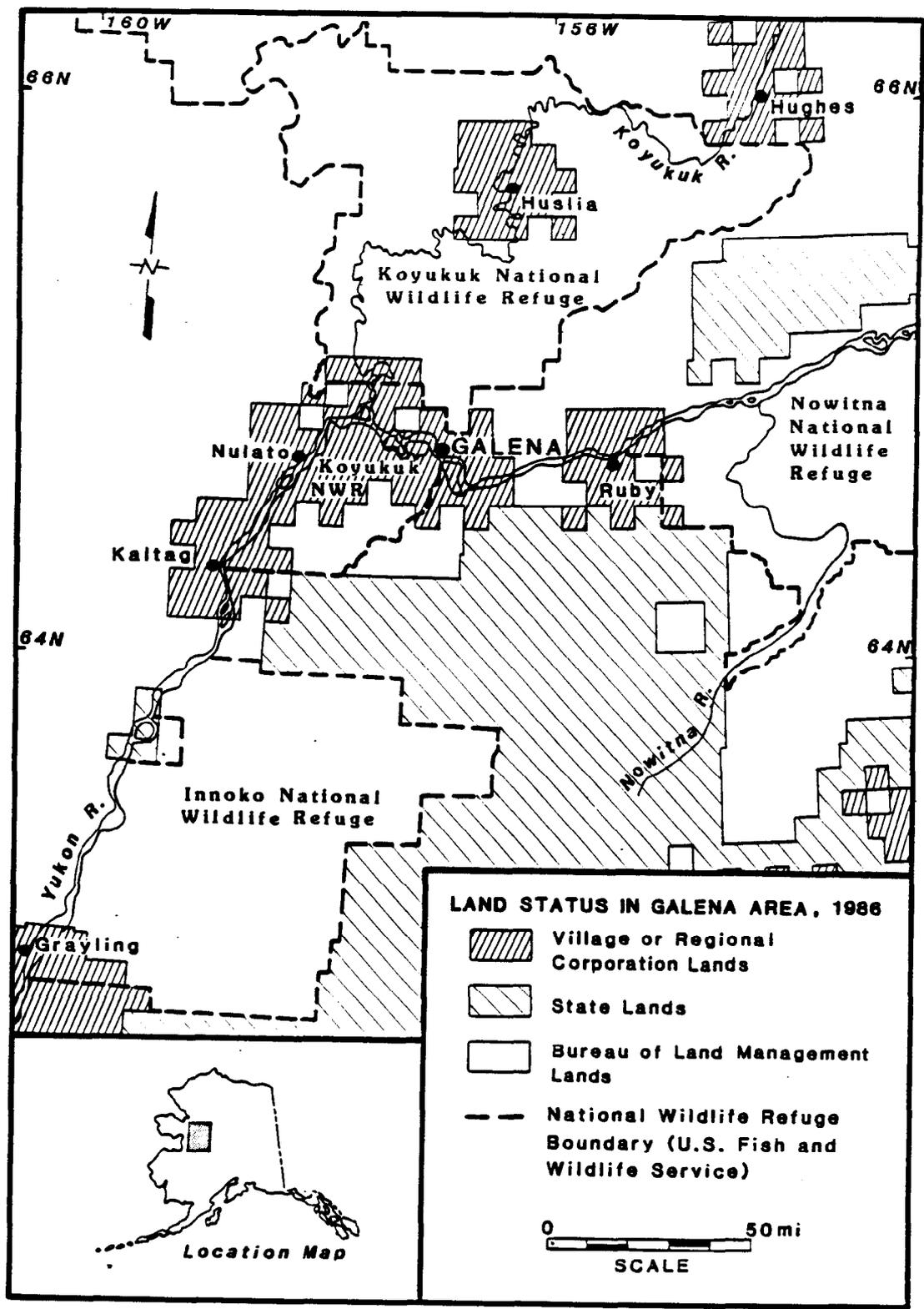


Fig. 2. Land status in Galena area.

Commercial Fisheries, Alaska Department of Fish and Game has recorded salmon, whitefish, and sheefish harvests by Galena subsistence fishermen since 1958 (Walker 1988). An account of salmon fishing at a local fish camp has been written by a local resident (Solomon 1981). Activities of Galena trappers using the Kaiyuh Flats were summarized in a recent report (Robert 1984). Winter travel with one Galena trapper was described by Lael Morgan (1973). A very general overview of subsistence participation by Galena residents was obtained during a survey on economic development conducted for the City of Galena (Alaska Attitudes 1983).

Several wildlife harvest studies have been conducted in surrounding communities in recent years: Kaltag (Wheeler 1989); Kaltag and Nulato (Marcotte 1982); Koyukuk (United States Department of the Interior 1986); Ruby (Looman 1987); and Huslia (Marcotte 1986). Autobiographies by the late Jimmy Huntington (1968) and Edwin Simon (1981) offer both a historical perspective and an understanding of the importance of these resources in the day-to-day life of local residents.

Among ethnographic accounts of the Koyukon Athabaskan, several provide useful background information on subsistence activities (Carlo 1978; Clark 1981; Loyens 1966; Nelson 1983; Sullivan 1942). However, quantitative harvest information were not included in most of these reports.

## METHODOLOGY

Household interviews and key informant interviews were conducted similar to those in other Division of Subsistence research projects (Andrews 1988; Sumida 1988) in interior Alaska. The primary focus of the household interviews was to obtain up-to-date harvest and use data for a 35 percent sample of Galena households. Household interviews were conducted between August 1986 and January 1987. In addition to the household sample, key respondent interviews were conducted to provide background on local subsistence patterns and historical patterns of harvest.

### Sample

Contacting all community households was beyond the project's fiscal and personnel resources. It was determined that a relatively high level of accuracy could be obtained through surveying a representative sample of households. A 35 percent sample of Galena households was selected. It was unclear if a stratified or unstratified design would give the most precise harvest estimates, given the uncertainties involved in accurately ranking households for a stratified draw. Consequently, a design was developed which could be used either as an unstratified random, or a stratified random method, depending upon an analysis of variation within strata.

Because there was no existing data set with which to place households into strata, three strata were selected using the following process. First, a list of all permanent community

households was compiled. Households which were not included were United States Air Force personnel (300 people), all of whom lived on the military base next to Galena, and non-local construction workers (about 25) that temporarily resided in construction camps. Households residing in Galena for less than one year at the time of the survey were not included on the household list since questions on local harvest activity during the previous 12 months would not have applied.

Second, the households were grouped into three strata on the basis of both their estimated harvest participation and their consumption of resources. Both harvest and use of wild resources were included as the basis for stratification since both factors were considered important for estimating the level of subsistence activity by Galena households. The three strata were: low harvest and low use, low harvest and high use, and high harvest and high use. The second stratum referred to households that exhibited little participation in harvesting, but benefited from receiving wild foods from others, usually on a regular basis.

Households were classified into one of these three strata by three key respondents selected by the researcher who were thought to be knowledgeable about household harvest and use of community households. The criteria for ranking households was whether the household's levels of harvest or use were "above" or "below" average, based on their understanding of community practices. The resulting number of households in each of the three strata were: 102 households with low harvest and low use, 46 low harvest and high use, and 63 high harvest and high use.

Because of the uncertainty inherent in this key respondent classification approach, it was decided to randomly draw a 35 percent sample (74 households) proportionally from the three groups. That means that the random draw could also be used as a simple, unstratified random sample of all 211 households, should the classified households not perform well in analysis. In fact, this is how the survey results eventually were analyzed. This approach was used because during analysis the stratification technique was determined to offer no better estimates of total household harvests and use than the simple random sample. Two apparent problems associated with the stratification technique emerged. One was the fact that key respondents probably classified harvest and use on the basis of a household's long-term pattern. Yet, only a single year's activities were addressed in the survey. Thus, the most recent year of activities might differ from the long term pattern. Another problem was that households were categorized more on the basis of participation in a variety of different subsistence activities, and not on the overall quantities of resources harvested. Finally, in a community of large and ethnically mixed as Galena, respondents might not know the subsistence activities of all households, especially those with which the respondents might not have regular dealings.

In sum, the random sample of 74 households was a representative sample of the whole community. Of the 74 sampled households, 64.9 percent were Native households, that is, those with at least one adult Native member. In 1980, the most recent year in which United States census figures were available, 74 percent of Galena's population was Alaska Native (excluding Air Force personnel) (United

States Department of Commerce 1984). Nineteen of 74 sampled households (25.7 percent) were located in the "old site" area of Galena, 51 of 74 households (68.9 percent) were at the new town site, and the remaining four households (5.4 percent) were located within the dike area north of the Air Force base. Twelve of 74 sampled households (16.2 percent) held limited entry commercial fishing permits in 1985. In the community as a whole, 28 of the 211 households (13.3 percent) held limited entry commercial fishing permits.

#### Instrumentation and Procedure

A nine-page survey (Appendix 1) was used during the household interview sessions to collect harvest and socioeconomic information for the period from June 1985 to May 1986. Many survey questions were similar to those used elsewhere in the state by the Division of Subsistence for comparability of research findings. Other questions, such as those on the exchange of resources with other communities, were included to address specific research objectives. Typically, interviews were conducted with the head of household in his or her home and lasted between 30 minutes and 2 hours. All household surveys were conducted between August 1986 and January 1987 by the author who was a four-year Galena resident at the time.

In addition, key respondent interviews were conducted to provide background on specific topics such as historic fishing, hunting, and trapping activities. Interviews with eight residents, each with personal first-hand knowledge of Galena's early history,

were conducted by another Division research staff member from the Fairbanks office.

Mapped data was collected at a community level by the author during interview sessions with seven key respondents who were selected on the basis of their knowledge of community use of different harvesting areas. Land use information was collected to show the total extent of community use. For hunting and trapping, areas used between 1971 and 1986 were marked on 1:250,000 scale and 1:500,000 scale maps, depending on the extent of area covered and type of map respondents were most familiar with. Fishing areas for 1986 were recorded on 1:63,360 scale maps, a scale which allowed better clarity of specific site locations. Fishing was summarized on 1:250,000 scale maps.

Survey data were coded for computer entry and was analyzed using the Statistical Package for the Social Sciences (SPSS) and Lotus 1-2-3 programs. Harvest quantities of edible species were converted into pounds of edible weight using conversion factors (Appendix 2). The Division's data management staff provided descriptive statistics and review of the statistical data used in this report.



## CHAPTER 2. THE CONTEMPORARY COMMUNITY OF GALENA

Galena is located along the north bank of the Yukon River 270 air miles west of Fairbanks, in an area historically occupied by Koyukon Athabaskan peoples (Fig. 1). In 1986, the community remained predominantly Alaska Native, despite its development as a trade and transportation center for the middle Yukon River area and the presence of an Air Force installation next to town. It was not connected by road to other communities. In this report the Middle Yukon area is used to refer to the area of the Yukon River and including the communities of Kaltag, Nulato, Koyukuk, Galena, and Ruby.

### HISTORY

Prior to the settling of Galena, Loudon and Koyukuk served as the largest villages along the Yukon River between the Koyukuk and Nowitna rivers. Koyukuk was a trading settlement at the mouth of the Koyukuk River with a 1920 population of 121 (Rollins 1978). Loudon was a Native winter village 13 miles upriver contemporary Galena. It had a telegraph station and a population of 64 in 1920. Residence in both settlements occurred for only a portion of the year as families traveled to fish camps, trapping camps, and other seasonal settlements throughout the year. One single family fish camp was located at the mouth of Kala Slough directly across from present-day Galena, a location where one of Galena's oldest residents was raised.

In 1918 a miner named Sam Kinkaid developed a lead ore (galena) mine in the Kaiyuh Mountains 18 miles to the south (Orth 1971:358). Ore was brought to the Yukon River for shipment outside the state. The mine employed 18 non-Native workers and operated until 1922, according to local residents.

According to local accounts, a local Native named John Antoski moved the operation of his roadhouse from a point four miles downriver to the present-day site of Galena after the mine opened, thereby, becoming the first resident of Galena. The roadhouse was part of the dog team mail carrying system. After 1920 residents from Loudon, a settlement 13 miles upriver, followed Antoski and settled at Galena. Many Loudon residents dismantled their log houses and rafted the logs to the new settlement. Loudon's population shift to Galena was explained by elderly Galena residents in 1986 as a response to running out of wood nearby, and not having additional room to build houses at the base of the steep bluff behind the village site. The Native Council at Loudon provided a forum for a community decision on moving to the Galena site, according to a Galena resident living at Loudon at the time. Although Loudon was eventually abandoned as a year-round settlement, other uses have continued. For example, in 1986 the cemetery was still used by Galena residents and some land parcels were in individual private ownership. Also, the Loudon Village Council has remained active as the traditional Native council for Galena. In 1921, Catholic church members from Nulato built a church in Galena made with wood from an old saloon at Ruby, 51 miles upriver from Galena. Josephine Roberts, who was raised in Galena, described it during the 1920s as a place

where the sternwheeler riverboats would not stop, but would only slow down to toss the mail up on the bank (Roberts 1983). In 1928 a school opened in Galena, but attendance was seasonal as most families traveled to trapping camp for the winter. A post office was established in 1932 (Orth 1971:358). The first airplane landed in Ruby in 1920, marking the beginning of aircraft replacing dog teams for mail carrying in the region, although this shift was not immediate.

A major stimulus for further settlement at the site of Galena came in 1940 when the United States Army selected Galena as a site on the Alaska-Siberia route for ferrying lend-lease aircraft to the Soviet Union (Cloe 1984:149). One local resident recalled that there were about 11 to 15 families living in Galena at the time when the first 14 soldiers were dropped off without tents or provisions. After the initial fear of the soldiers subsided, local residents took them in and the soldiers helped around the village with woodcutting and other chores. It was another month before the 200 additional troops arrived and the airstrip was constructed. This military installation provided the opportunity for wage employment and drew several more area residents to Galena throughout World War II. During 1953, the base was all but abandoned with only the Civil Aeronautical Authority active. The U. S. Air Force returned in the mid 1950s and has maintained the station as a forward intercept site since that time. An Air Force radar station on a hill six miles east of Galena was used from the 1950s to 1984. By 1986, there were 300 military personnel stationed at the base.

## GOVERNMENT AND SERVICES

Galena was incorporated as a fourth class city in 1971 and as a first class city in 1973. The city government was run by a city manager reporting to a seven member city council. The city provided employment for about 24 people in 1986 in office administration; the police department; the electric, water, and sewer utilities; and the health clinic. The clinic was staffed by a nurse practitioner, two physician's assistants, and two alcoholism and mental health counselors employed by the city, and a dentist employed by the Public Health Service.

The Galena City School District was one of the largest employers in the community. Enrollment for kindergarten through 12th grade was 148 in May 1986 and 171 in September 1986. Often students from nearby communities boarded in Galena while completing 11th and 12th grades at the Galena high school.

Gana-A'Yoo Ltd., the Native village corporation incorporated under the Alaska Native Claims Settlement Act (ANCSA), is an amalgamation of the village corporations of Kaltag, Nulato, Koyukuk, and Galena with its corporation offices in Galena. The office employed six people. The corporation also operated a hardware store in Galena, a construction company with a headquarters in Galena, and an airline with a headquarters in Fairbanks. Community residents were employed in the businesses located in Galena.

Tanana Chiefs Conference, Inc., the regional Native non-profit corporation, had a subregional office in Galena employing five

people. The Loudon Village Council was also active, but did not offer full-time employment positions.

Federal government operations in Galena included a Federal Aviation Administration (FAA) field office, a Bureau of Land Management (BLM) regional fire fighting center, two U. S. Fish and Wildlife Service refuge headquarters (Koyukuk and Nowitna), and the Post Office. BLM offered local employment only during the summer fire fighting season and the U. S. Fish and Wildlife Service employed 10 people in 1986. The largest employer of the federal government was the U.S. Air Force which stationed over 300 enlisted personnel in Galena. These individuals served 12-month unaccompanied tours, so staff turnover was constant and military families were not present. The Air Force (Department of Defense) also employed about 15 civilian employees for base maintenance and food service. These positions were permanent and the workers were Galena residents.

State government services included small offices of the Department of Public Safety (two employees in 1986), the Department of Health and Social Service (three employees), the Department of Fish and Game (two employees), the Court System (two employees), and the Department of Transportation (12 employees). The Department of Transportation maintained the single 6,665-foot runway used by both military and civilian aircraft. The University of Alaska offered college courses through the Galena Rural Education Center.

Most private businesses in Galena were in service, trade, or construction. In 1986, air transportation was provided by one airline with non-stop flights to Anchorage and three airlines with direct flights to Fairbanks. Each airline employed several residents

of Galena as ticket agents, baggage handlers, or pilots. Flights to Hughes, Huslia, Koyukuk, Nulato, Kaltag, and Ruby connected through Galena. Galena offered two taxi companies, a restaurant, a lodge, a bar, a cable television service, and a laundromat. Retail stores included two general stores; two fuel depots; a snowmachine and outboard sales and service store; a hardware store; and a gun shop. There were several local building contractors working on various phases of the following projects during 1984-86: river bank stabilization, elementary school construction, a new airport control tower, and building construction jobs for the Air Force. In 1986 two commercial fish processing plants were in operation. Non-profit organizations included two churches (Catholic and Protestant), a public radio station, and Galena Preschool, in addition to Tanana Chiefs Conference, Inc. noted above.

#### LAND STATUS

The days when local hunters could traverse the land without concern for land status are long past. Beginning in the 1980s, a complex pattern of land ownership has influenced hunting, trapping, land use planning, and land development potential. Figure 2 shows the major land holdings in the Galena area. In the immediate vicinity of the community was land owned by the Native corporation Gana-A'Yoo. State land selections were located primarily south and to the east of Galena, but also to the northeast.

The federal government was the largest landholder in the region with public lands located north, west, and southwest of Galena. Three National Wildlife Refuges (NWR) encompass large areas of land in the middle Yukon area. The Koyukuk NWR begins five miles north of Galena and extends 110 miles northward to the Purcell Mountains between the communities of Huslia and Selawik. About 83 percent of the 4.5 million acres within the Koyukuk refuge are under the jurisdiction of the U.S. Fish and Wildlife Service. Other lands considered in-holdings consisted of village or regional corporation lands, Native allotments, and state selections. The Nowitna NWR, east of Ruby, encompasses an area of 2.0 million acres of which 91.5 percent was owned by the federal government. Extending from Galena to Kaltag and including the Kaiyuh Flats is the northern unit of the Innoko NWR. In 1986, this unit was administered by the Koyukuk NWR and refuge plans proposed that both the administration and name be transferred permanently due to its close proximity to the Galena headquarters. In the northern Innoko unit, 47 percent of the 751,000 acre unit is federally owned, with most of the remainder belonging to Gana-A'Yoo. In 1986 Gana-A'Yoo exercised an option under Section 907 of ANILCA to participate in the Alaska land bank program, and accordingly has placed much of their land with the U.S. Fish and Wildlife Service for management.

The Bureau of Land Management manages several tracts of federal land northeast of Galena along the Kokrines Hills. They also have jurisdiction over lands west of Nulato, including much of the Nulato Hills.

## POPULATION

### Community Population

The population of Galena has grown for several decades with the largest increases taking place in the 1940s and 1970s. Population figures since 1930, the first census year after Galena was established, are presented in Table 1. The construction of the Galena Air Force site in the 1940s accounts for most of the 300 percent growth during the period between 1940 and 1950 when over 200 men were stationed at the base. The rapid growth through the 1970s coincides with a period of increased statewide economic development and the establishment of local Galena offices by several agencies.

TABLE 1. POPULATION OF GALENA, 1930-86<sup>a</sup>

Year	Population		
	Civilian	Air Force	Total
1930	67		
1940	44		44
1950	176	na	na
1960	261	200	461
1970	302	279	581
1980	441	324	765
1981			827
1982			849
1983	553	323	876
1984			897
1985			947
1986	688	310	998

<sup>a</sup> Source: Alaska Department of Labor 1987; United States Department of Commerce 1984

In 1980, the most recent year United States census figures are available, 74 percent of the population was Alaska Native (United States Department of Commerce 1984). These individuals are predominantly Koyukon Athabaskan, although some Eskimo people from coastal or downriver communities have married Galena residents and settled there. Figures from the city's February 1983 census showed 553 non-military and 323 military residents for a total of 876. The Alaska Department of Labor (1987) provisional estimate of 947 in July 1985 places Galena as the 36th largest community in the state. Galena's recent population increase accounted for by an increase in the number of residents from outside the local region as well as people and families from surrounding communities.

#### Sample Population

The 35 percent sample surveyed for purposes of this study represented 74 of 211 households or 242 (35 percent) of an estimated 690 non-military residents in Galena in 1986. The proportion of the sample in specific age groups is shown in Figure 3 and Table 2. About 50 percent of the sample population was between ages 20 and 59, 44 percent less than 20 years of age, and the remainder (6 percent) greater than 60 years of age.

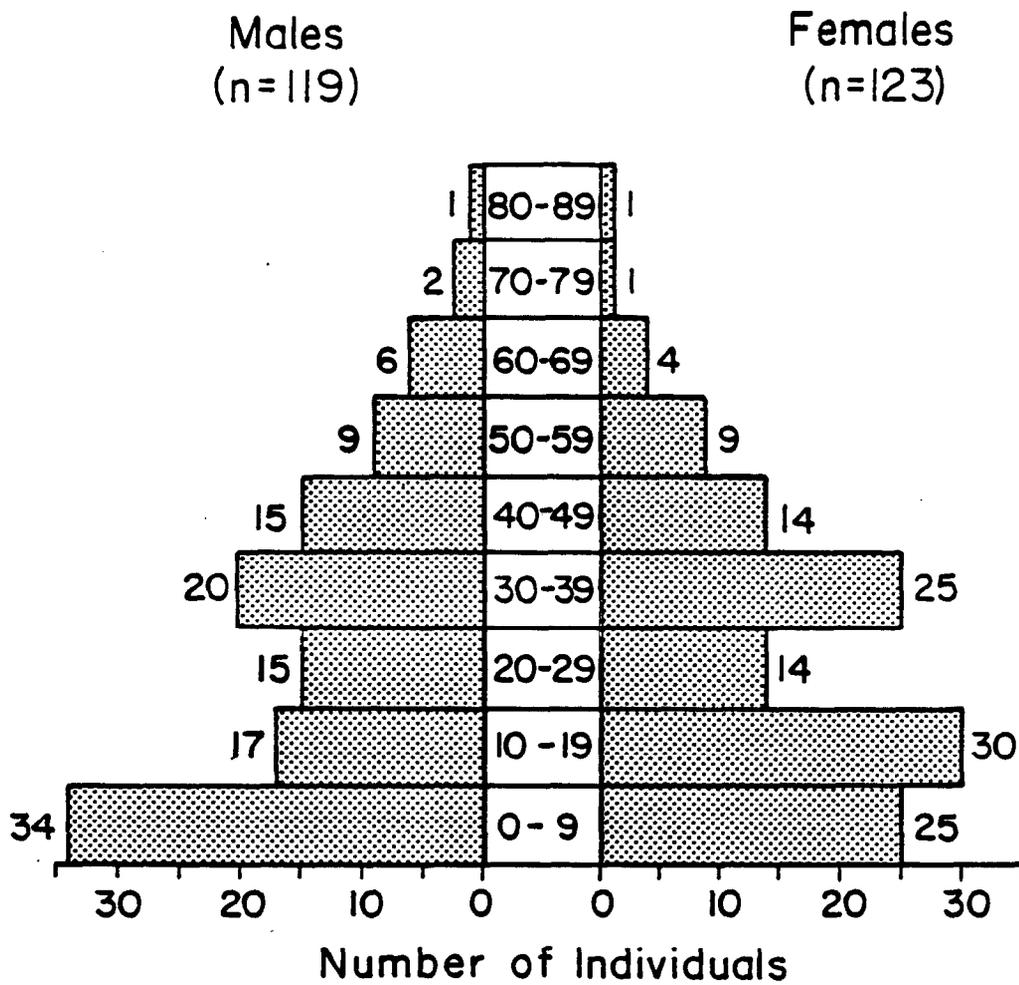


Fig. 3. Age and sex structure of sample population, Galena 1986.

TABLE 2. DISTRIBUTION OF SAMPLE POPULATION BY AGE AND SEX, GALENA 1986

Age Category	Males		Females		Total	
	Number	(%)	Number	(%)	Number	(%)
0- 9	34	(14.0)	25	(10.3)	59	(24.4)
10-19	17	(7.0)	30	(12.4)	47	(19.4)
20-29	15	(6.2)	14	(5.8)	29	(12.0)
30-39	20	(8.3)	25	(10.3)	45	(18.6)
40-49	15	(6.2)	14	(5.8)	29	(12.0)
50-59	9	(3.7)	9	(3.7)	18	(7.4)
60-69	6	(2.5)	4	(1.7)	10	(4.1)
70-79	2	(.8)	1	(.4)	3	(1.2)
80-89	1	(.4)	1	(.4)	2	(.8)
All ages	119	(49.2)	123	(50.8)	242	(100.0)

Sample household size ranged from one to nine persons (Table 3) and averaged 3.27 persons. Most community households had two or three people. Over three-fourths had four people or less. On the average there were .94 adult males per household, .97 adult females per household, and 1.35 children (less than 18 years of age) per household. Forty-eight of the 74 households (64.9 percent) had at least one adult Native member and 66.2 percent of the households reported having family relatives in other Galena households.

Birthplaces of sampled household heads are summarized in Table 4. A majority (58.1 percent) of household heads were born in the middle Yukon and Koyukuk River area, of which 18.9 percent were born in Galena or Louden. Many of the 39.2 percent who had moved to Galena from the surrounding communities stated they had moved because of the economic opportunities available in Galena. A significant

TABLE 3. FREQUENCY OF HOUSEHOLD SIZES OF SAMPLE, GALENA 1986

Household Size	Number of Households	Percentage of Total (n=74)
1	12	16.2 %
2	16	21.6
3	16	21.6
4	14	18.9
5	9	12.2
6	4	5.4
7	0	0.0
8	2	2.7
9	1	1.4
Total	74	100.0

TABLE 4. BIRTHPLACE OF HOUSEHOLD HEAD OF GALENA SAMPLE HOUSEHOLDS, 1986

Birthplace of Household Head	Number of Households	Percentage of Total (n=74)
Galena <sup>a</sup>	13	17.6 %
Louden <sup>a</sup>	1	1.4
Koyukuk <sup>a</sup>	7	9.5
Nulato <sup>a</sup>	10	13.5
Kaltag <sup>a</sup>	1	1.4
Ruby <sup>a</sup>	2	2.7
Blackburn <sup>a</sup>	1	1.4
Huslia <sup>b</sup>	2	2.7
Hughes <sup>b</sup>	2	2.7
Cutoff <sup>b</sup>	1	1.4
Dulbi River <sup>b</sup>	1	1.4
Kateel River <sup>b</sup>	1	1.4
Huslia River <sup>b</sup>	1	1.4
Anchorage	1	1.4
Outside Alaska	30	40.5
Total	74	100.0

<sup>a</sup> Middle Yukon River communities, or former settlements

<sup>b</sup> Koyukuk River communities, or former settlements

proportion, 41.9 percent, were born outside the middle Yukon region, primarily outside of Alaska. The residence of parents at the time of birth was used to define "birthplace."

Data were also compiled on location of previous residence for household heads. Similarly, 54.0 percent previously resided in the middle Yukon River and Koyukuk River area, 33.8 percent resided elsewhere in Alaska, and 12.2 percent previously resided outside Alaska. Of the total, 16.2 percent had always resided in Galena,

How long people have resided in a community provided another indication of the community's composition. Most (58.1 percent) of 74 household heads in the sample had lived in Galena or the surrounding communities their whole life. The remainder had resided there as follows: 12 (16.2 percent) had resided in the community less than 3 years, 10 (13.5 percent) between 3 and 5 years, and 9 (12.2 percent) more than 5 years. Mean length of residency of households heads in Galena was 24.5 years. This contrasted with the pattern found in smaller communities in the region, such as Huslia, where 94.6 percent of the household heads were locally born and the average length of residency in the community was 39.1 years (Marcotte 1986)

Sample household composition is summarized in Table 5. Two-thirds of the households were headed by a married couple while one-third were single parent households.

TABLE 5. GALENA SAMPLE HOUSEHOLD COMPOSITION, 1986

Household Type	Household Headed By			
	Single Male (n=11)	Single Female (n=14)	Couple (n=49)	Total (n=74)
No dependents	10.8%	5.4%	14.9%	31.1%
Dependents, all less than 18 yrs.	2.7	8.1	43.2	54.1
Dependents, 18 yrs. and over	1.4	5.4	8.1	14.9
<b>Total</b>	<b>14.9</b>	<b>18.9</b>	<b>66.2</b>	<b>100.0</b>

## EMPLOYMENT

The Galena economy offered a wider variety of employment opportunities than did the surrounding communities in the middle Yukon and Koyukuk River area (Wheeler 1989; Looman 1987; United States Fish and Wildlife Service 1986). The higher employment rate was evident in Galena's 1986 average number of weeks of employment per household per year of 57.0 weeks as compared with Huslia's 37.3 weeks in 1984 (Marcotte 1986). The average number of weeks of wage employment per adult household member was 29.7 weeks in Galena, over twice that in Huslia (Marcotte 1986). The average number of income sources per household was 1.66 in Galena in 1986. In addition, there were 19 commercial fishing jobs not included in the calculations above.

Employment sources in Galena are summarized in Table 6. The list includes both percentage of total number of jobs and percentage of sampled households receiving income from these sources. In 1986, many jobs were seasonal, such as those in construction, fish processing, or with the federal Bureau of Land Management. In addition to these employment sources, 6.8 percent of households reported income from retirement or social security and 1.4 percent from transfer payments. These figures may be somewhat low since many respondents felt income questions were unusual in a subsistence harvest survey and did not fully divulge household financial details. The prominence of the government, construction, and service sectors of the economy was apparent. The percentage of sampled households receiving income from these sources adds to over 100 percent because several households received income from more than one type of job.

Although mining did not provide employment for members of sampled households directly, mineral exploration in the nearby Kaiyuh Mountains to the south relied on local services and, therefore, contributed to the local economy in 1986. Construction jobs were available in building projects for the Air Force, a new water and sewer utility for the city, a new elementary school, and a riverbank stabilization project as noted earlier. Manufacturing jobs were those in the fish processing plant. Jobs associated with the local air services and taxi companies were grouped with transportation. The finance jobs listed included those in private business, including the ANCSA corporation. Civilian employment with the Air Force was also examined. Nine of the 117 jobs (7.7 percent) were directly with

TABLE 6. INCOME SOURCES FOR SAMPLE HOUSEHOLDS, GALENA, 1986

Source	Percentage of Total Jobs (n=136) <sup>a</sup>	Percentage of Sample Households Receiving Income from Sources
Mining	0.0 %	0.0 %
Construction	18.4	25.7
Manufacturing	1.5	2.7
Transportation	6.6	9.4
Trade	7.4	8.1
Finance	1.5	2.7
Service	6.6	16.2
Local government	15.4	21.6
State government	9.6	17.6
Federal government	14.7	21.6
Agriculture	.7	1.4
Commercial fishing	14.0	16.2
Other wage employment	.7	1.4
Other self employment	2.9	5.4
Retirement, social security		6.8
Transfer payments		1.4
Total	100.0	

<sup>a</sup> 117 jobs documented plus 19 commercial fishing jobs

the Air Force and 7 of 74 households (9.4 percent) received income from these sources. These jobs included maintenance, civil engineering, and food service.

The indirect economic contributions of the Air Force site in Galena was reflected in many sectors of the cash economy. Galena's role as a regional transportation center, and the resulting transportation sector jobs, were possible because of the 6,665-foot paved runway. The Alaska Department of Transportation, which provides runway maintenance services to the Air Force, represented the largest portion of the State of Alaska work force in Galena in 1986.

A major source of seasonal employment was the Bureau of Land Management which maintained a regional operations center in Galena providing logistic support for fire suppression aircraft and fire fighting crews. Galena also served as a bulk shipment point for commercially-caught salmon and salmon roe during summer months. Several state agencies staff area offices in Galena. As mentioned above, these include Departments of Public Safety, Health and Social Services, Fish and Game, Transportation, and the Alaska State Court System.

The median household income of the sample during the survey year was \$33,200, with a range of \$1,000 to \$90,000. Data compiled from federal tax returns showed a 1985 average taxable wages per return of \$27,223 (Alaska Department of Revenue 1988). A summary of Galena average taxable wages for 1983-85 is compared with Huslia and Anchorage in Table 7. It shows that Galena's mean income is somewhat lower than Anchorage, but about twice that of nearby villages like Huslia. This higher income is evidence of the greater employment opportunity in Galena, because of its subregional center functions.

TABLE 7. AVERAGE TAXABLE WAGES PER RETURN, 1983-85<sup>a</sup>

Year	Number of Returns (Galena)	Galena	Huslia	Anchorage
1983	251	26,107	10,313	29,408
1984	244	27,456	10,206	30,858
1985	249	27,223	9,904	31,734

<sup>a</sup> Source: Alaska Department of Revenue, 1988



CHAPTER 3. FISH AND WILDLIFE RESOURCE BASE AND  
SEASONAL ROUND OF SUBSISTENCE ACTIVITIES

THE NATURAL ENVIRONMENT

Climate

The climate of interior Alaska is continental, characterized by extreme summer and winter temperatures and light precipitation. Summer temperatures generally range between +38 and +68 degrees Fahrenheit, with winter temperatures ranging between -20 and +18 degrees (United States Department of Commerce 1989). The extreme low has been recorded at -64 and a high of +92 degrees. Precipitation averages 14 inches, including an average 54 inches of snowfall. August had been the wettest month, averaging 2.7 inches of rainfall, while April has been the driest month, averaging 0.5 inches. December and February have had the heaviest snowfall. There is no precipitation on 64 percent of the days. Winds are generally calm or light averaging 7.4 knots.

The average temperature in Galena ranged from 52 to 68 degrees Fahrenheit in July and from -20 to -3 degrees in January, with an average annual average temperature of 23.6 degrees. Between 1949 and 1979, Galena precipitation averaged 13 inches per year with 59 inches of snowfall (United States Department of Commerce 1989). Galena averages 90 days of a frost-free growing season. In an average year, the Yukon River is frozen sufficiently for human travel from November 4 until May 11, giving an average of over six months of solid river

ice (David Chapman pers. comm., 1989). The elevation of Galena is 120 feet and the community is susceptible to flooding, caused by either high runoff due to snowmelt or by spring breakup ice jams on the Yukon River. In 1985, Galena experienced slightly above average rainfall (16.4 inches) and a warmer average temperature (24.9 degrees).

### Physiography

Galena is situated within the Koyukuk Flats physiographic province (Wahrhaftig 1965:27). This province is an extensive lowland, with thaw lakes, meander belts near the rivers, broad rolling silt plains with thaw sinks, and bedrock hills. Much of the area is underlain with permafrost. It is discontinuous along main river channels but generally continuous in most other locations.

### Plant Communities

A variety of vegetation types are found near Galena. The river flood plains are covered with closed spruce-hardwood forests where white spruce and balsam poplar dominate (Viereck 1972). Poorly-drained flats away from the rivers include treeless bogs where grasses, sedges, and mosses dominate. Black spruce, tamarack, birch, and willow are found in open low growing spruce forests. Forest fires up to several thousand acres in size play a major role in modifying vegetation and altering wildlife habitat. These ecosystems

support wildlife typical of the boreal forest and includes such species as moose, wolf, and beaver. Fish, plant, animal, and bird resources used for subsistence are presented in Appendix 3.

#### HISTORICAL ROUND OF RESOURCE USE

An aboriginal pattern of harvest activities of the Koyukon for the period prior to 1838 has been summarized by Clark (1981). These activities were closely matched to the availability of resources throughout the year, with people working together in varying size groups, from households to entire bands, and moving to particular harvest locations each season. Ducks, geese, other waterfowl, muskrat, and beaver, were hunted at spring hunting and trapping camps. At summer fishing sites, family members repaired or built traps and weirs, caught salmon, whitefish, and sucker, and hunted nearby. Men hunted for game with each other on trips away from camp in the late summer. During fall, people traveled to camps, usually situated at stream outlets, where grayling and whitefish were trapped in basket traps, small game was snared, and large game was hunted. People then moved to winter villages, often located near caribou fences which were designed to intercept caribou during their annual migration. Throughout the winter, wicker traps were set under the ice in rivers for burbot, sheefish, whitefish, and pike and in lakes for blackfish. Furs were taken for use in clothing but did not have the prominent role in trading as they did subsequently, after contact with Euroamericans. Late winter activities included trapping,

harvesting caribou, and traveling to neighboring areas for trade. Trading partnerships provided both cultural and economic ties between neighboring cultures (Huntington 1968). In April, people returned to spring camps.

During the period between 1838 and 1867, the Koyukon Athabaskans came into direct contact with Russian fur traders. The establishment of the Russian trading post at Nulato in 1838 (Zagoskin [1847] 1967) resulted in more direct trade and an increase in trapping activity in the region.

The late 1800s was a period of improved transportation, greater contact with outsiders, higher fur prices, and an increased trade for imported goods. The credit system of supplying trappers in the fall with supplies for a winter's trapping and receiving payment in furs at the end of the trapping season prompted an exchange for receiving imported and manufactured goods and staple foods, such as flour, sugar, and tea. The increased use of dogs for winter transportation spurred a greater summer fishing effort, for which the fishwheel became a great asset after the turn of the century.

After gold discoveries on the Klondike in 1897, the subsequent exploration in interior Alaska brought an influx of miners, traders, and missionaries among others. This period resulted in increased settlement in summer and winter villages and a shift away from single extended family camps for sustained periods of time (Clark 1981). The use of caribou fences was eventually abandoned as local Native people shifted their emphasis to harvesting other wildlife resources, such as salmon from the Yukon and Koyukuk Rivers, but also at a time when caribou numbers declined in the area.

Descriptions of harvest activities during the early to mid 20th century in the Galena area have been written by Solomon (1981:53-83), a local resident, and Sullivan (1942), a Jesuit student. Sullivan observed hunting, fishing, and trapping by residents of Kaltag, Nulato, and Koyukuk in 1936. These practices are believed to be similar to those of Galena residents at that time. Interviews with elderly Galena residents as part of this study resulted in the collection of several accounts of seasonal activities which are included below.

Residents emphasized the need to travel to the different camps throughout the year in order to get enough food. Travel was on foot, by dog sled, or in boats pulled by dogs or poled by hand. Spring camps were often made on lake shores, so that muskrat, waterfowl, and blackfish could all be taken nearby from a single camp. Whitefish and pike were taken also if streams were nearby. Ducks and geese were a mainstay the diet in spring and fall. Snares were set along lake shores in summer to catch ducks. One resident noted waterfowl eggs were not specifically looked for, but were gathered and eaten, if found. Cranes and swans were taken less frequently.

Muskrats were trapped for food and their furs. Small snares were placed on trails near muskrat houses, or they were shot with a .22 caliber rifle. Some hunters marked muskrat houses in fall using stakes in order to find them more easily in the winter. Beaver were also taken by rifle in the 1920s, but since 1930 trappers have used only traps or snares. Fishing in lakes and lake outlet streams occurred during spring. People stayed at spring camp until after the river ice went out. In early June, a potlatch celebration was held

each year in Koyukuk bringing together people from the Nulato, Koyukuk, and Galena area.

The role of fish in the diet was very important. It was a staple food source which could be obtained throughout much of the year and preserved through drying. Nets were originally made from sinew or willow bark strips, which had to be kept wet in birch bark baskets to keep from cracking. These were replaced by nets braided locally of twine obtained from unraveling canvas cloth, which were later replaced by nets of commercial manufacture.

A fishwheel was operated before 1920 near the 1986 location of Galena by Stockman and Honea, two telegraph operators living at Loudon. At first, a single fishwheel was operated at Loudon to catch summer chum salmon. All of the seven or eight families living in Loudon reportedly worked together to harvest and process king, summer chum, and fall chum salmon. Each family received a portion of the dried and smoked salmon. Later more than one fishwheel was operated at Loudon.

Dip nets were used from boats to catch fall chum salmon near Galena. One resident reported using a drift gill net at various locations and eventually being successful with it at Kallands, 134 miles above Galena.

Basket-type fish traps were commonly used during winter (Sullivan 1942:63). These traps, about 10 feet long and 2 feet wide, were made of spruce and willow and were set below the ice in tributary streams and rivers in locations with swift currents, as well as on the Yukon River. Whitefish and burbot were reportedly caught in great numbers as were trout, grayling, and sucker. Burbot

were also caught under the ice using hooks made from wire by local fishermen.

During spring people traveled to spring camp to hunt muskrats, ducks, and beaver (Roberts 1983:15). Ducks, geese, and muskrats were hunted by men in early morning hours from late April to breakup (Sullivan 1942:137). Women plucked and cleaned birds, some of which were used for immediate consumption and the rest were preserved by drying and salting, stored in sacks, and brought back to the village.

Ducks taken in fall were stored in holes dug into the ground and covered. Sullivan (1942:41) reported hunters sometimes took ducks during twilight and that 20 to 30 birds were taken during a day and night of hunting under favorable conditions. A hunter stayed on the lakes hunting until he had 50 to 70 ducks. This hunting took place during late July between the summer chum and fall chum salmon runs.

Spruce grouse, hare, and ptarmigan were all prominent in the diet. One Galena man recalled that hare, as well as spruce grouse, were taken in fall using brush fences with snares placed at holes in the fence. Hare were also taken in drives without the use of fences, as described by Sullivan (1942:110), and they were taken commonly in snares set near winter camps. Porcupine were taken in fall and winter.

People living at Louden or settled along the Yukon River between Koyukuk and Ruby generally hunted caribou either near the Huslia River to the north or along the Yuki River south of the Yukon River. One woman from Louden recalled that a group of 10 to 11 men traveled by dog team into the mountains each winter about February

hunting for caribou. The meat of the caribou they got was shared with the other households. Caribou were taken also by men hunting individually in September and October (Sullivan 1942:77).

According to respondents, black bears were once snared with rope made from moose hide. More commonly, they were hunted during fall or taken from dens after freeze-up prior to deep snowfall. Spiritual associations with bear were important and bear products received great care and respect. Rules affecting their treatment included such conduct as women not wearing mittens or clothing made of bear skin or that bones from bear must be burned or deposited in the river (Loyens 1966:91).

Moose hunting has been a major harvest activity this century, although moose availability has fluctuated. Several local hunters reported seeing their first moose in the late 1920s. Hunters spent several days tracking a moose after tracks were found. One Galena man recalled running down a moose and cornering it in a creek before shooting it with his only two shells. Bull moose were sometimes called in by scraping a dry moose scapula against a tree. Cow moose were called by striking moose antlers replicating the sound of a bull (Sullivan 1942:72). Moose were taken throughout the year and moose hunting during late May was not infrequent (Sullivan 1942:138).

After freeze-up, most Loudon families traveled to winter trapping camps, although a few stayed and trapped from Loudon. Often furs could only be traded for credit at the local store at Loudon and not sold for cash. There was also store in Koyukuk after 1924. By the 1920s marten and mink traps were available for purchase. Sullivan (1942:90) indicated that steel traps were used extensively

by 1936, although familiarity with snares and deadfalls still existed. Red fox and lynx were also caught by those who stayed at Louden for the winter. Fox were not eaten, but lynx were considered excellent. Land otter were also taken and eaten.

Beaver were a main food source and were taken with either rifles, snares, or traps. One older Galena trapper recalled his harvest was about 40 beaver each season. One woman recalled that before starting to use traps in the 1930s and 1940s, most beaver were shot before freeze-up in fall. Meat was preserved by partially drying then smoking the meat. Beaver furs were used extensively for clothing.

It is useful to look at the variety of employment sources available historically as a component of the developing mixed subsistence-cash economy. Elders repeatedly stressed the importance subsistence since these jobs generally provided only limited support during the year, supplementing rather than replacing subsistence harvests. One older resident caught fish and cut wood which he sold to the U.S. Army Signal Corps telegraph personnel at Louden. Others reported their parents cut and sold wood to the steamboats navigating the Yukon River beginning in 1897. Cord wood was stacked on the river bank and was later picked up by the boats as needed, although high water sometimes caused wood piles to float away. Several area residents sold wood up to 1942, after which time the remaining freight boats converted to oil fuel. A few individuals, such as Antoski mentioned earlier, ran roadhouses providing services to travelers between Nome and Fairbanks or Nenana, while others mushed sled dog teams carrying the mail between roadhouses. Another older

resident recalled hauling supplies to the galena ore mine for Sam Kinkaid for five dollars a day. One Galena man, chosen to be the school teacher in 1938 after the scheduled teacher failed to show up on the summer's last barge, taught for nine years.

Several residents stressed the lack of jobs and money available during the 1930s. In the 1940s, the Air Force base in Galena provided employment for many in construction and food service, which resulted in people moving to Galena from the surrounding communities of Ruby, Koyukuk, Cutoff (near present-day Huslia), and Nulato.

#### Historical Changes in Animal Populations

The populations of many of the animal species harvested in interior Alaska fluctuate considerably, particularly caribou and furbearers. For example, hunters have reported low numbers of lynx, hare, muskrat, ptarmigan, and porcupine in recent years and correspondingly, the harvests of these species have been very limited.

Recent fluctuations in moose, caribou, and wolf populations in the Koyukuk River valley have been described by Huntington (1985). Caribou numbers were low between 1800 and 1884, increasing between 1892 and 1910, and declining between 1911 and 1914 as wolf populations reached high levels (Huntington 1985). Caribou again increased in the early 1920s. The presence of Western Arctic Caribou Herd in the lower Koyukuk River area in winter has been intermittent. These caribou wintered near the Hogatza River from 1950 to 1970 (Hemming 1971). During winter 1985-86, Western Arctic Caribou were

seen in the Koyukuk River drainage after a 12-year hiatus (James 1987).

Wolf bounties after 1910 encouraged their harvest, but use of poison to control wolves also harmed other furbearer species, so trapping generally declined between 1911 and 1914. Furbearer populations were also low between 1928 and 1934 necessitating a closure of marten and beaver trapping for six years (Huntington 1985:62). During the study year, beaver harvests in Game Management Unit 21 were above average and marten harvests were about average (Osborne 1988:64).

Moose have historically been taken by the Koyukon, although their local abundance has fluctuated considerably. Moose were often available in the upper Koyukuk River area near Allakaket, but rarely in the lower Koyukuk River valley until about 1945 (Simon 1981:50; Nelson 1982:26). Many older residents recall when they saw or took a moose for the first time, which in many cases was in the late 1920s. Huntington (1985) reported that 1938 was the beginning of when moose were regularly taken and that area moose populations remained high until 1954. Buckley (1967:192) reports an increase in moose populations in the Koyukuk River valley during the 1960s. Since 1980, the moose population levels in the middle Yukon and lower Koyukuk rivers area have been stable at high levels (Osborne 1987).

#### CONTEMPORARY ROUND OF FISH AND WILDLIFE HARVEST

Resource harvesting by Galena residents is a pattern of recurring use in specific seasons each year. A generalized depiction

of seasonal harvest for Galena residents in 1985, shown in Figure 4, is generally representative of 1980-85. Both usual and occasional harvest periods are shown. Seasonality of harvests changes, however, through time depending upon the availability of species, substitution of other species, and changes in fishing and hunting regulations. Also, individual households in the community varied somewhat in the time when their harvests occurred. Scientific terms for the species harvested are in Appendix 3.

During 1980-85, furbearers were trapped during the winter months when furs were prime, generally starting in early November as soon as the freezing of the lakes and rivers permitted safe travel. Early season emphasis was on marten, lynx, and red fox, while beaver were trapped most heavily through February and March. Land otter were caught during the same time as beaver while wolf and wolverine were taken whenever available throughout the winter. "Land and shoot" taking of wolves was most common in February and March. Trapping continued through the season as long as furs were in good condition.

Moose were generally taken only during the 20-day September season and the 10-day February season, but some were taken at other times when absolutely needed. Caribou were harvested when most accessible during the late winter months of February, March, and April. Black bear were taken throughout the summer and fall. Waterfowl were primarily hunted as they first arrived in spring and as they gathered in early to mid August through September before migrating south.

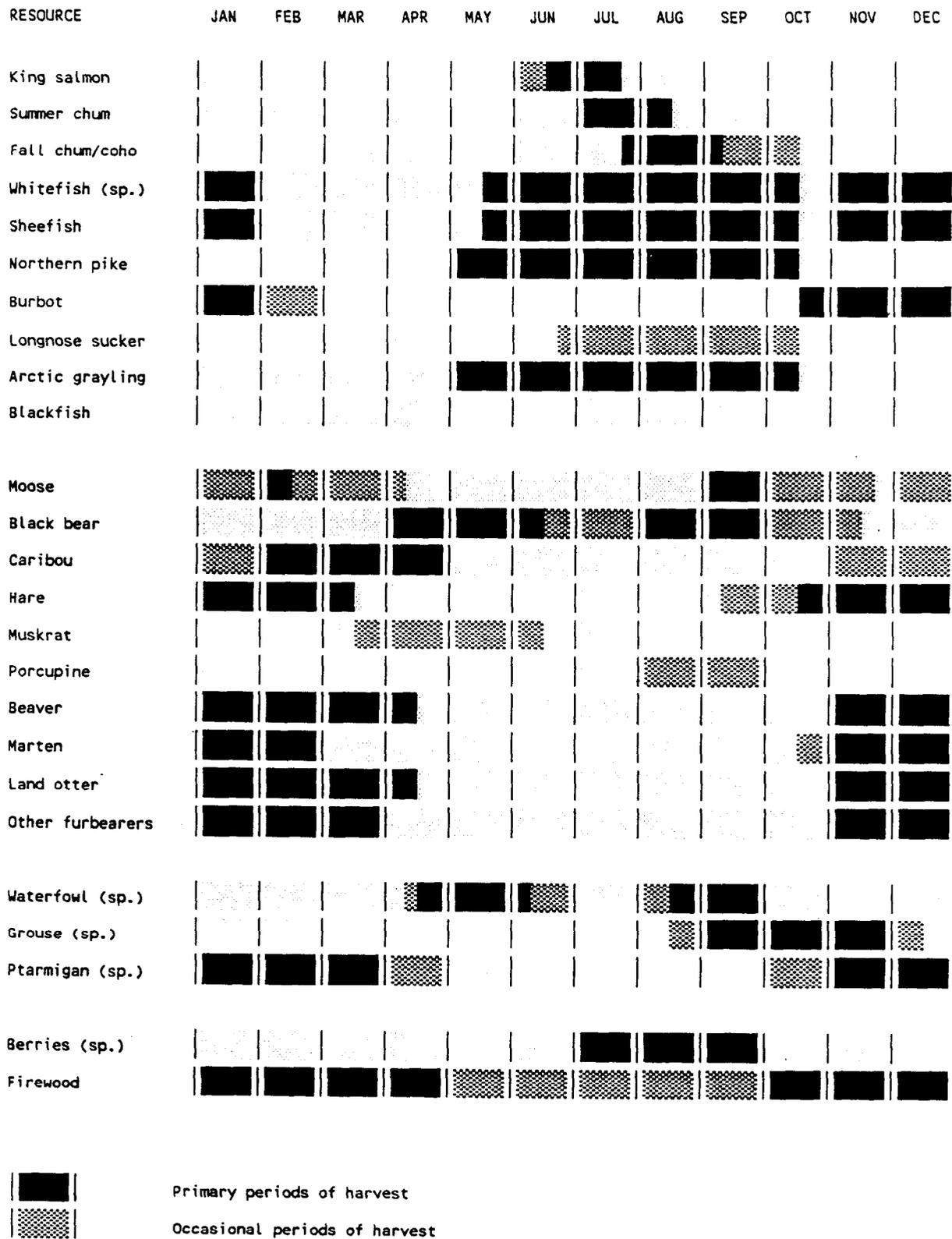


Fig. 4. Seasonal round of subsistence activities, Galena circa 1980-86.

The first king and summer chum salmon were caught in late June continuing into July. Fall chum and coho salmon were harvested throughout August and into September. Burbot fishing was concentrated during and just after freeze-up on the Yukon River, while Arctic grayling, longnose sucker, and other fish species were taken throughout much of the year, thereby providing an important source of fresh fish.

Specific patterns of camp use has changed since historic and aboriginal times, although the emphasis on winter trapping camps and summer fish camps remains an significant part local harvest activity. Use of fish camps in 1985 was strongly associated with commercial fishing. Of the 13 sampled households using fish camps, 12 had a member who possessed a limited entry commercial salmon fishing permit. Fish camps were typically situated at locations which had been in family use for many years. In several cases the entire household relocated to the fish camp for the duration of the salmon harvest. Travel between fish camps and Galena has been influenced in part by the "split week" salmon fishing periods (two days open, one day closed, two days open, two days closed) which applied to both subsistence and commercial fishing.

Moose hunting camps were usually set up on only a temporary basis, generally by members of the hunting party and not the entire household. However, some hunters used the same locations from year to year. Hunting camps were used for several days to over a week.

Trapping camps were used by 41.9 percent (13 of 31) of trappers in the sample. Unlike historic times, entire family groups did not occupy these camps for the season. It was not uncommon for a single

male whose trapping area was over 50 miles from Galena to spend much of the trapping season at his camp. One influence, such as mandatory school attendance, has tended to preclude entire families from seasonally residing in trapping camps.

Spring camps were less commonly used, although several individuals still had spring camps. The primary spring harvest activity was waterfowl hunting. Muskrat were pursued less frequently than in historic times, which was attributed by several residents to the current low levels of muskrat population and the prices paid for muskrat pelts.



## CHAPTER 4. SALMON FISHING

### SPECIES HARVESTED

Fishermen in Galena harvest four types of salmon: king (or chinook), summer chum (or dog salmon), fall chum (locally called silvers), and coho salmon. Each of these species pass through the middle Yukon area on the way to spawning streams, either locally or further upriver. King salmon (*Oncorhynchus tshawytscha*) are the season's first arrival and are caught from mid-June to mid-July. They are a large (18.4 lbs. average) highly prized fish sought for their value as an "eating" fish. The summer run of chum salmon (*O. keta*) passes through the area in great numbers during the month of July. These fish have traditionally been used as an important food source for people as well as for dogs, hence the name "dog salmon." In the 1980s, they have had an additional importance as the main species harvested for the local commercial fishing industry. A second run of chum salmon, referred to as fall chum by state fish management biologists, are harvested during late July, August, and early September, depending upon run timing. The fall run fish are larger in size than summer chum, richer in oil, and are locally referred to as "silvers" due to their bright color. Also present in late summer are true coho salmon (*O. kisutch*) which are similar in size as the fall chum and are also called silvers locally. They tend to run concurrently with fall chum and therefore are caught at the same time. Average sizes of these fish caught near Galena are: 18.4 lbs. for king salmon, 6.1 lbs. for summer chum salmon, 7.5 lbs. for

fall chum , and 6.4 lbs. for coho salmon (Fred Andersen, pers. comm. 1987).

#### COMMERCIAL AND SUBSISTENCE FISHERIES

In state statute commercial fishing means fishing with the "intent of disposing...for profit, or by sale, barter, trade, or in commercial channels" (A.S. 16.05.940). In contrast, fishing for subsistence uses is the:

"non-commercial customary and traditional uses of wild, renewable resources by a resident domiciled in a rural area of the state for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or for sharing for personal or family consumption" (A.S. 16.05.940).

No license or permit was required for subsistence salmon fishing in 1986, while a "limited entry" permit was required for commercial salmon fishing. In middle Yukon River communities, limited entry commercial fishing permits have been generally obtained through inheritance, although they can be purchased. Upper Yukon fishwheel permits for commercial salmon fishing sold for an average of \$11,667 in 1985. Upper Yukon set gill nets for commercial fishing sold for an average of \$10,600 in 1983 (Commercial Fisheries Entry Commission 1986).

The clear regulatory distinction between the commercial and subsistence fisheries that is made today did not exist as recently as the early 1970s. Prior to that time, all Galena residents could catch salmon for either exchange for groceries or sale through the

developing commercial fish packing plant in Galena. Barter and sale was conducted on an as-needed basis balanced with a household's subsistence salmon needs. Before 1973, few Galena fishermen complied with state gear licensing requirements for commercial fishing (Pope 1980). In fact, several fishwheels could be operated under a single fishwheel registration number, and commonly were. With the beginning of limited entry commercial fishing in 1976, only limited entry permit holders could sell salmon. Commercial salmon roe sales were included under the permit in 1977. In 1986, there were 25 Galena residents who had a permit to fish for salmon for sale in the Upper Yukon River Management Area.

In 1986, commercial and subsistence fishing activities were somewhat inseparable in most family-based summer fish camps which, as mentioned above, usually were headed by a person with a commercial salmon permit. Families were able to keep any portion of commercial harvest for their own subsistence needs. Thus, fish caught within commercial guidelines could be used for eating purposes. Often some household members set a net for king salmon for subsistence purposes while the permit holder operated the commercial gear. Typically boats, processing equipment, and labor are used interchangeably. Indeed 57.9 percent of the fall chum salmon used for subsistence purposes in 1985 were fish caught with commercial gear and retained for subsistence purposes rather than being sold. The combined commercial and subsistence fishing functions of fish camps in the neighboring community of Kaltag has been further discussed by Wheeler (1989).

Aspects of the fishing regulations have also tied the two types of fishing together. Commercial and subsistence fishing by Galena residents occurred in subdistricts 4A, 4B, and 4C of the Yukon Management Area (Fig. 5) and therefore, was restricted by regulations pertaining to salmon fishing in those areas. Both types of fishing were regulated by weekly fishing periods that closed the district to commercial and subsistence salmon fishing from 6:00 p.m. Tuesday to 6:00 p.m. Wednesday and from 6:00 p.m. Friday to 6:00 p.m. Sunday (Alaska Board of Fisheries 1986:37). The weekly closures were intended to manage the fishery to insure adequate stock escapement to spawning streams made necessary by the commercial fishing pressure. Subsistence fishing was also closed during these periods because of concern that fish caught during a commercial closure ostensibly for subsistence may end up being sold after the 24 or 48-hour closure ended. This has tended to create an added regulatory burden and increased work for those families who fish solely for subsistence and do not own a commercial fishing permit. Thus, like commercial fishing, subsistence fishing was allowed only four days per week during two separate 48-hour periods (Alaska Board of Fisheries 1986:37). Subsistence salmon fishing gear was restricted also as noted below.

Air Force enlisted personnel were not active in local commercial or subsistence salmon fishing. There was also not a significant rod and reel fishery for salmon locally. Salmon in the middle Yukon are not easily caught with rod and reel because the water is silty and the fish are not feeding.

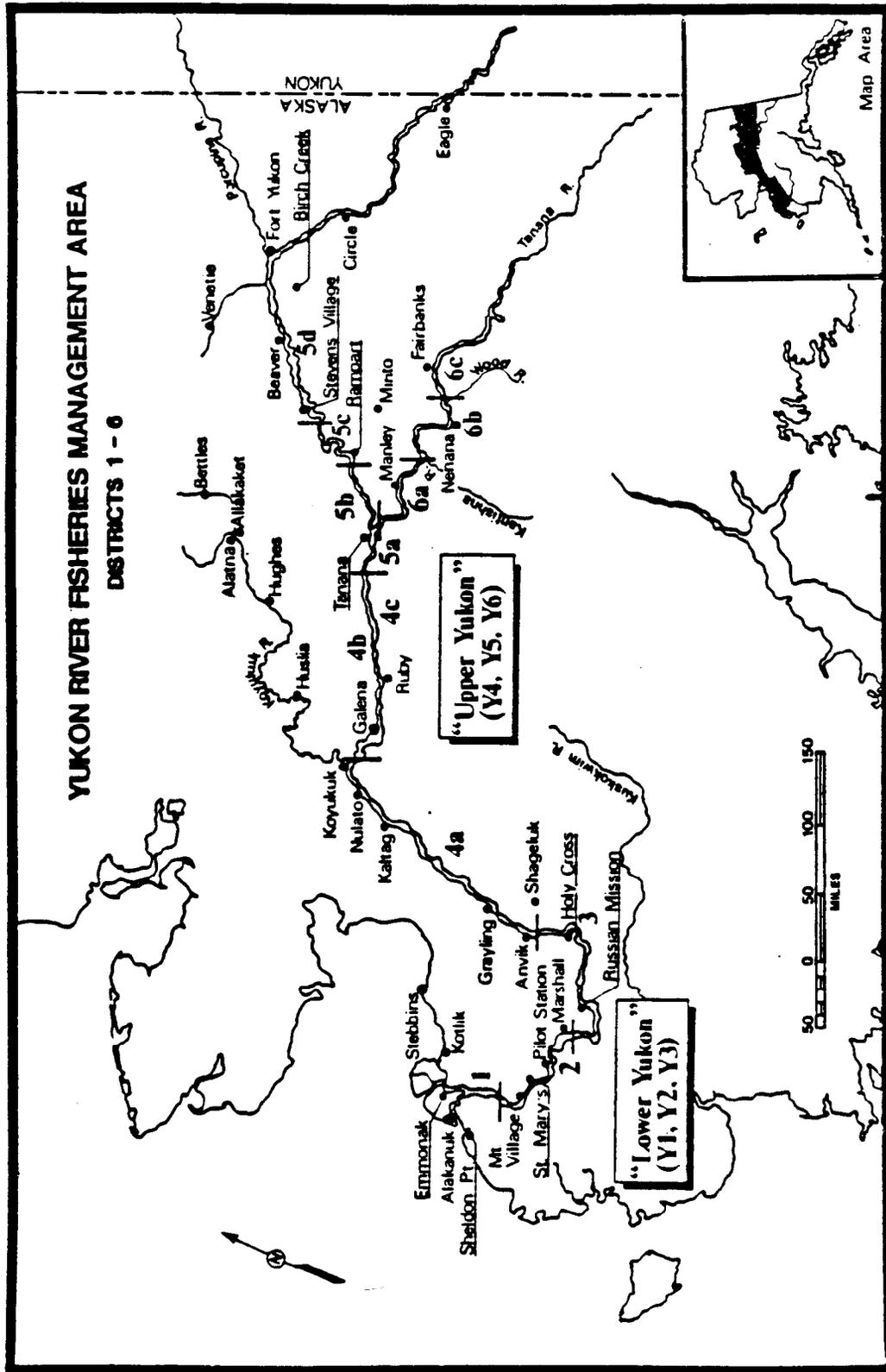


Fig. 5. Yukon River drainage salmon fisheries management districts, 1986.

## FISHING GEAR

In 1985 subsistence salmon harvests were obtained using three different types of salmon fishing gear: set gill net, drift gill net, and fishwheels. Set gill nets were used to harvest all four species of salmon. Drift gill nets were used for king and fall chum salmon. Fishwheels were used both for commercially harvesting salmon and for subsistence uses. Those fishermen holding limited entry commercial fishing permits often retained a portion of their catch from the operation of their set net or fishwheel for subsistence uses. Also, both summer and fall chum salmon were caught by individuals using a fishwheel which was not being used for commercial fishing at the time. For example, one commercial fisherman who had stopped fishing for the season allowed his father the use of his fishwheel in order to harvest salmon for eating. The use of each type of gear for taking salmon is described in the following section.

### Fishwheels

Fishwheels have been and continue to be a common sight in summer along the Yukon River near Galena. Since their introduction and use beginning in the 20th century, they have become a common means for harvesting salmon, particularly summer and fall chum. In 1985, 98.8 percent of the summer chum harvest and 74.1 percent of the fall chum salmon harvest were taken using fishwheels (Fig. 6). This included both salmon retained from the household's commercial catch and salmon

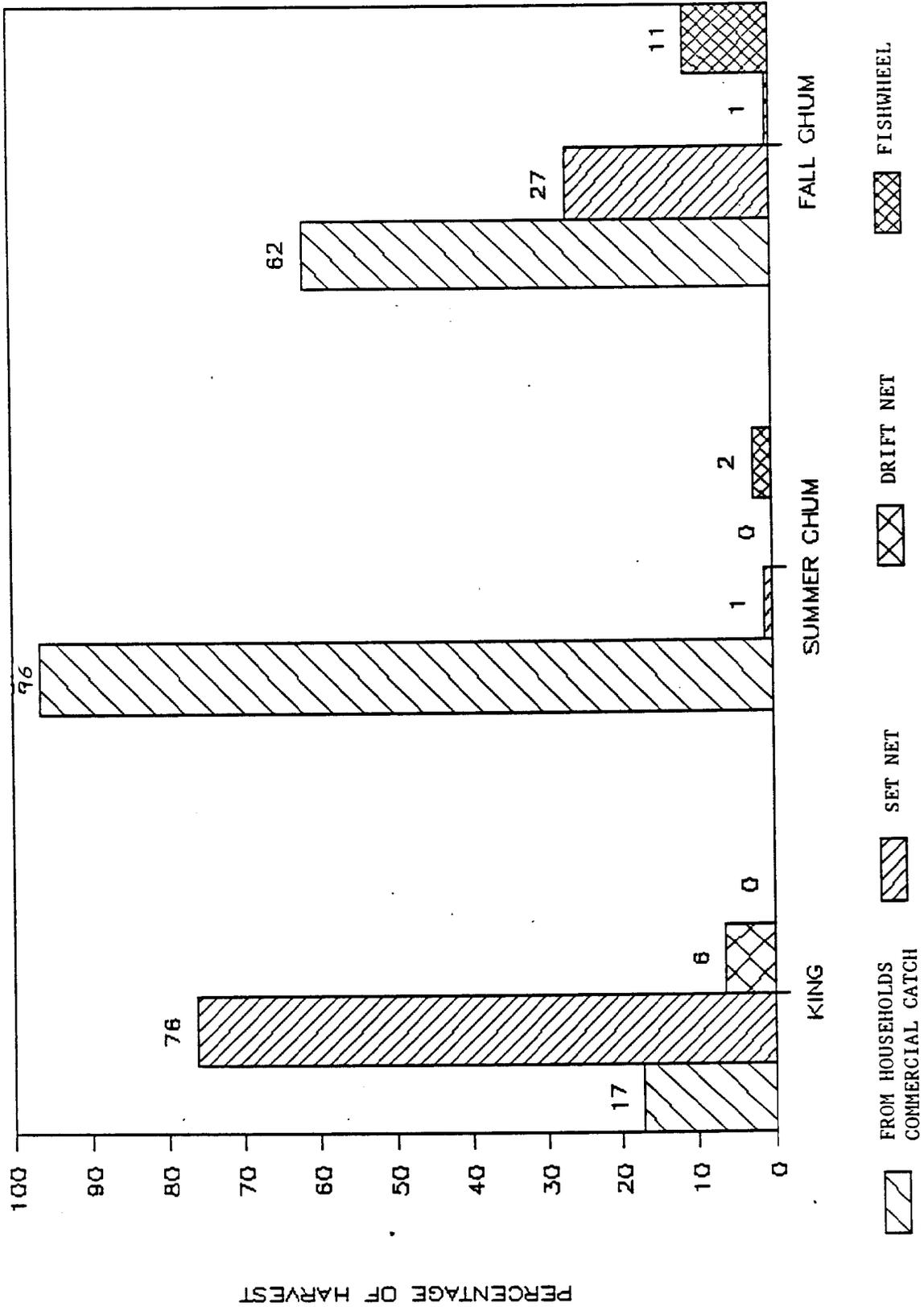


Fig. 6. Subsistence salmon harvest by gear type, Galena 1985.

caught in fishwheels which were not being used for commercial fishing at the time.

Basically, a fishwheel consists of two wire-mesh baskets attached to an axle which is supported by a floating log raft. The river's current forces the rotation of the baskets in a downriver direction allowing the baskets to scoop up salmon as they ascend the river. The fish are channeled into a box on the river side of the wheel where they are picked up by the fisherman and transferred into a boat. An underwater lead made of spruce poles is sometimes used on the shore side of the wheel to help divert more fish toward the basket.

Compared with using set or drift gill nets, a fishwheel represents a significant investment of time and effort in its construction and placement. However, once in operation in a suitable site, large numbers of chum salmon can be caught. The fishwheels were less effective in catching king salmon. Construction requires about 2 weeks of labor and \$400 for imported manufactured materials, according to a local fisherman. Three years was reported as an average useful life of a fishwheel before water soaking, moving ice, and the elements take their toll. Fishermen try to place fishwheels along sections of riverbank where a main channel runs near the shore. It is common to find the most elderly member of a fishing family deciding precisely where to place the fishwheel.

Fishwheels are primarily used for commercial fishing because of the potential for large harvests of summer chum salmon and the fact that summer chums are targeted in the commercial fishery. Fishwheels are also effective in the Galena area for catching fall chum salmon,

an important subsistence resource. The subsistence use of fishwheels includes limited entry salmon fishing permit holders retaining a portion of their catch for subsistence purposes, and non-permit holders temporarily using another person's wheel, generally after the peak of the run.

#### Set Nets

Set gill nets were used primarily for harvesting king and fall chum salmon. Three-fourths of all king salmon taken for subsistence were caught using set gill nets (Fig. 6). Prehung set gill nets were generally ordered from a supplier in Anchorage and cost about \$150 to \$250 depending upon mesh size and length. Most nets ordered were 8-1/4 inch stretched mesh used for king salmon or 5-1/2 inch mesh stretched mesh used for chum salmon. Net length was generally 60 to 120 feet. Nets were set using an anchor and buoy at one end and fixed to the shore or island at the other. Productive locations are where an irregularity in the shoreline creates an eddy thereby producing an area where fish can be more easily caught.

Nets can be more easily relocated to a new site than fishwheels, but fishermen cited problems with the work required in untangling driftwood from set nets during periods of rising river levels. Some Galena residents have limited entry commercial permits for set nets but set nets were considered less practical than fishwheels if larger quantities of fish were to be harvested, which is generally the case with commercial fishing. Most set nets were used for subsistence purposes. At other times of the year, gill nets

were also set under the ice for whitefish, sheefish, and pike during the winter.

### Drift Nets

A third method for harvesting salmon for subsistence use in 1985 was with drift gill nets. In 1981, the legal use of drift gill nets for subsistence salmon fishing was extended to that part of subdistrict 4-A below Cone Point (near Bishop Mountain), 16 miles below Galena (Alaska Board of Fisheries 1986:54). Since then an increasing number of Galena fishermen have traveled about 18 miles downriver to drift for king and fall chum salmon for subsistence. In 1985, 6.4 percent of the king salmon and 0.5 percent of the fall chum salmon harvest were taken in drift gill nets.

To drift for salmon, a gill net is attached to the boat, placed in the water, and allowed to drift downriver with the boat perpendicular to the direction of the current. Typically, unrelated individuals fish together during the evenings for several hours at a time. This method of salmon fishing can be effective for catching king and fall chum salmon with economy of effort since separate trips are not needed to reset or pull gear at the beginning and ends of the open weekly fishing periods. In 1985 and continuing through 1988, the use of drift nets for salmon fishing has not been legal upriver from Cone Point.

### Dip Nets

Dip nets were not commonly used near Galena and were not listed as a legal gear type, but limited interest in their use remains. This method essentially involves catching fish by means of a basket net a few feet in diameter attached to a long pole which is dipped through the water. There are historical accounts of their use further downriver near Nulato from canoes and from shore (Sullivan 1942:8) and also upriver near Ramparts (Schwatka 1893:256). In 1985, dip nets were an effective means of catching a small number of salmon from the shore without the aid of a boat.

### SUMMER FISH CAMPS

Spending the summer fishing season at a fish camp has been and continues to be both an important cultural activity and an important economic activity for many Galena residents. The camps were the primary locations for salmon fishing and processing activities. Most Galena fish camps supported both commercial and subsistence fishing, although a few were used solely for subsistence fishing activities. The camps were especially important as places for younger helpers to acquire the knowledge of fishing skills and values from the older generation. A excellent description of a local fish camp and summer salmon fishing activities at Bishop Mountain, 16 miles downriver from Galena, was written by Madeline Solomon (1981). Work crews at fish camps generally included several members from an extended family,

although friends and visitors from other communities were often present for varying periods of time. For example, one camp included children who were attending school in Fairbanks and relatives from Huslia. This afforded the opportunity for several to help the family with the work load and share in the harvest. Most of the fish camp locations have been used from year to year and many have been selected as Native allotments, private land holdings under federal Indian legislation. These camps usually included improvements such as a cabin, tent platforms, smokehouses, and fish drying racks. Other camps were set up for a single year's use, such as those used by a few Galena fishermen when fishing in subdistrict Y4-A below Koyukuk. Camp locations were generally near favorable set net or fishwheel sites. Occasionally, a fishing household operated gear close to Galena and processed fish along the riverbank in town, an arrangement that helped minimize transportation costs.

Fish camps ranged from being situated 143 miles downriver from Galena to 50 miles upriver. The average distance for a camp downriver was 50 miles and upriver 22 miles. Two-thirds (66 percent) of camps were situated within 36 miles of Galena. Although fish camps were occupied throughout the salmon fishing season, there was regular river travel between the camps and town.

#### FISHING AREAS USED

Major salmon fishing areas used by Galena residents during 1986 are shown in Figures 7, 8, and 9. These figures include areas used

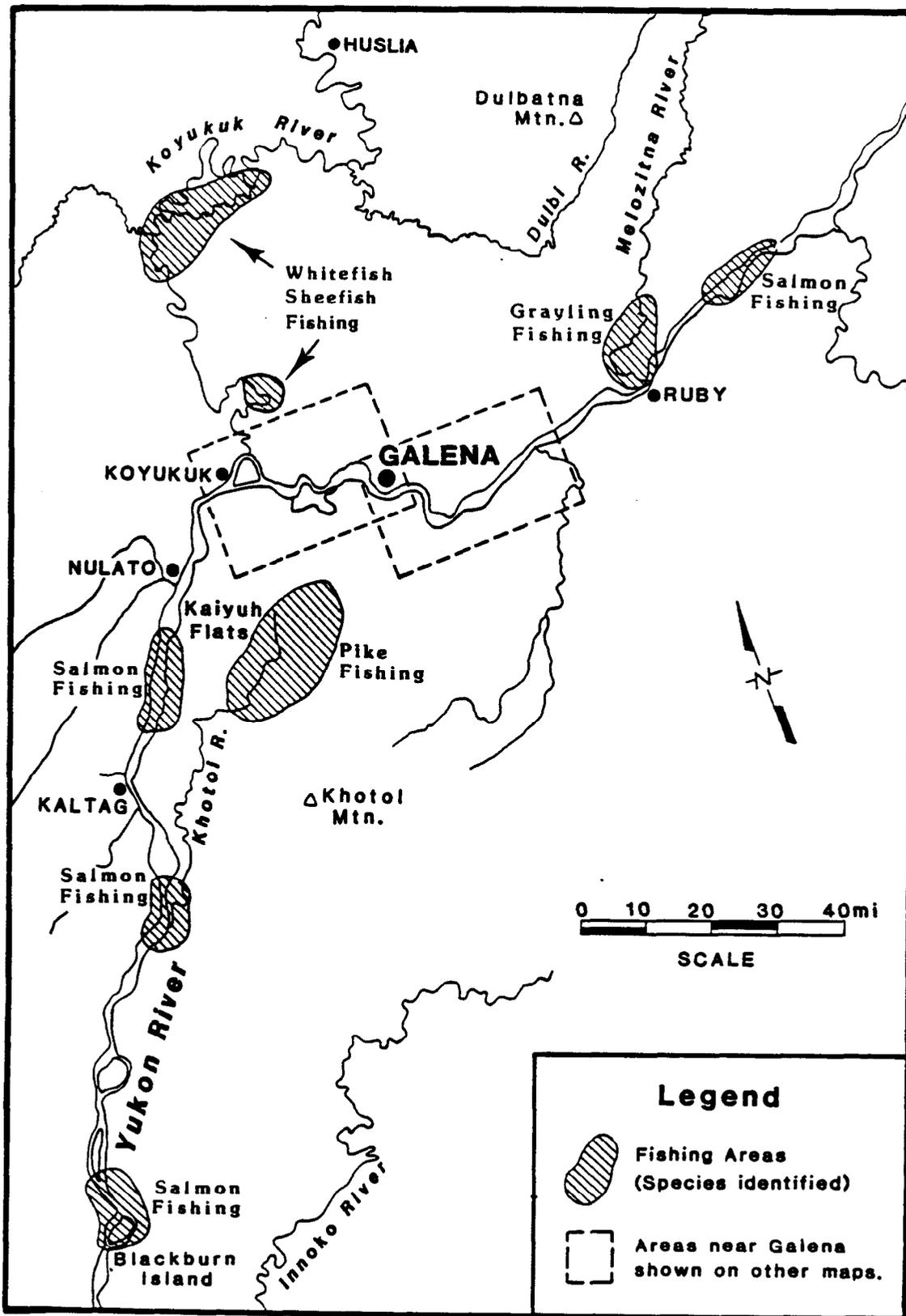


Fig. 7. Galena subsistence fishing areas, 1986.

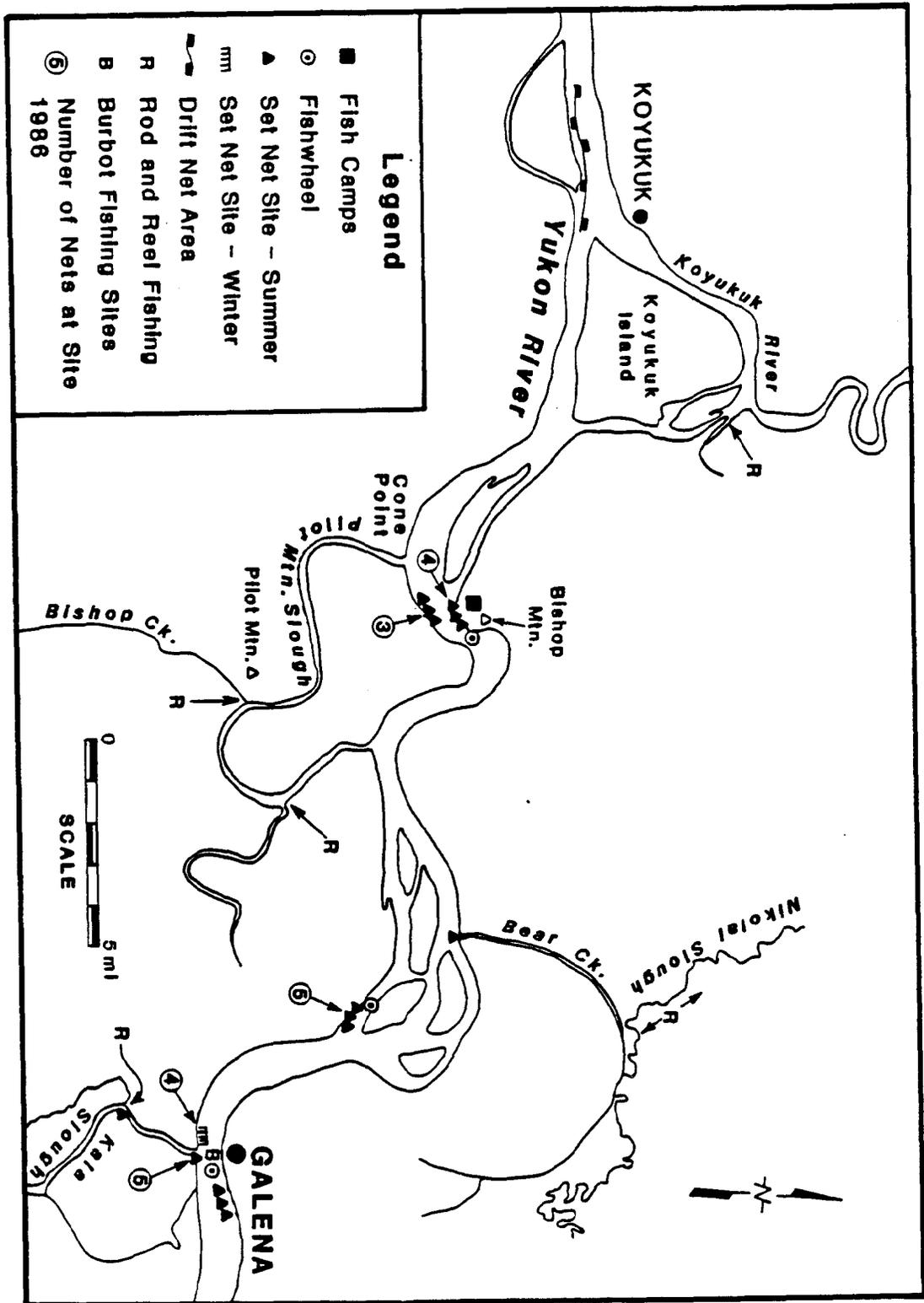


Fig. 8. Galena subsistence fishing sites used in 1986 (western area).

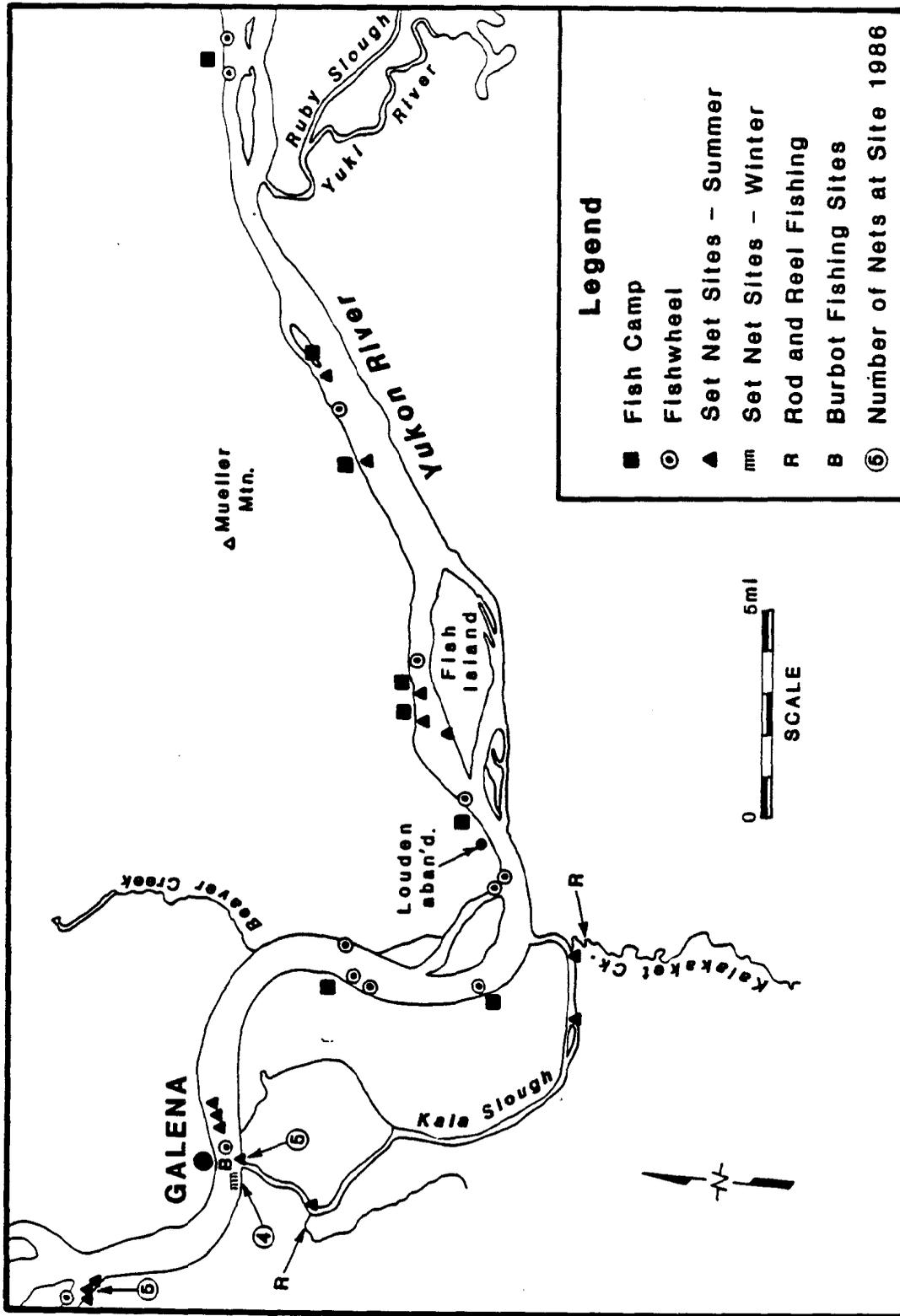


Fig. 9. Galena subsistence fishing sites used in 1986 (eastern area).

for salmon fishing by all Galena fishing households, not just those included in the 35 percent sample. Figure 7 depicts the extent of the use Yukon River used by Galena residents for subsistence fishing, including salmon. Furthest downriver, near Blackburn Island, was a fish camp used by a Galena household which was originally from that area. This camp was 143 miles from Galena. The other fish camps south of Kaltag and between Kaltag and Nulato were used by Galena residents formerly from Kaltag or whose family members resided in those communities. Salmon fishing also took place as far upriver as 20 miles above Ruby where two Galena households helped a Ruby resident at his fish camp. A few salmon were harvested along the Koyukuk River during moose hunting season in September.

Figures 8 and 9 detail fishing areas within 36 miles of Galena where most salmon fishing occurred. Both summer set net and fishwheel sites were located directly in front of town, at the upper end of Jimmy Slough (five miles downriver from Galena), and at Bishop Mountain (Fig. 8). The salmon fishing site at Bishop Mountain was especially productive, particularly for king salmon, because of the swift current and large eddy produced as the river flows past the 200-foot rock face of the mountain. Several households from both Galena and Koyukuk used the fish camp in 1986. The location has been in continuous use as a fish camp as far back as people can remember. Solomon (1981:79) recalled that several different families had lived there throughout her lifetime. Upriver from Galena, above Beaver Creek, there were set net sites used for salmon fishing (Figs. 7, 9). Fishwheels were more commonly used downriver (Figs. 7, 8). Most salmon fishing above Galena was along the north bank.

Drift gill nets were used along a straight stretch of the river near Koyukuk in order to catch king salmon, fall chum, and coho (Fig. 8). Nets set under the ice, burbot sets, and rod and reel fishing sites are discussed in Chapter 5.

#### PARTICIPATION AND HARVESTS

King salmon were harvested by 23 percent of the sampled households. Harvests averaged 63 fish for those households participating (Table 8). Fall chum salmon were harvested by 21.6 percent of the households and harvests averaged 231 fish. Average summer chum harvests were substantially greater, 2091 fish, but they were harvested by fewer households. The greatest number of sampled households that fished for salmon harvested king salmon followed by fall chum and coho combined and summer chum salmon.

The estimated total community subsistence harvests were expanded from the 35 percent sample of households surveyed: 3,057 king salmon, 10,559 fall chum salmon, and 59,622 summer chum salmon. In addition to these harvests, three of the 74 sampled households reported salmon harvests totaling 5 king salmon and 15 sockeye salmon, which were caught on the Copper River, Portage Creek near Dillingham, and near Anchorage. These fish were used for eating purposes and in at least one case, contributed significantly to the household's food supply. However, these are exceptions as most fish used in Galena derive from local Yukon River stocks.

TABLE 8. SUBSISTENCE SALMON HARVEST OF GALENA RESIDENTS,  
JUNE 1985 - MAY 1986

Resource Harvested	Percentage of Sample Households Harvesting (n=74)	Of Households Harvesting		Estimated Total Community Harvest (n=211)
		Range of Harvests	Mean Harvest	
King salmon	23.0 %	2-709	63	3,057
Fall chum and coho	21.6	6-1,562	231	10,559
Summer chum	13.5	10-10,000	2,091	59,622
Any salmon species	32.4			
All salmon species	9.5			

Table 9 shows harvest ranges for king salmon, summer chum salmon, and fall chum and coho salmon combined for sampled households. By far, most households harvested no king salmon, summer chum salmon, or fall chum salmon. Instead, a minority of Galena households harvested the majority of the community's supply of salmon.

Table 10 shows mean household harvests of subsistence salmon in pounds dressed weight. The total mean household harvest was 1,782 pounds of salmon. The per capita harvest of salmon was 544.9 pounds per person. Of this, 151.8 pounds per person was used for human consumption, while 393.1 pounds per person was used for feeding dogs.

TABLE 9. FREQUENCY OF SUBSISTENCE SALMON HARVEST FOR  
SAMPLE HOUSEHOLDS, GALENA, 1985

Resource	Harvest Range	Frequency	Percentage
King salmon	0	57	77.0 %
	1-19	8	10.8
	20-39	3	4.1
	40-59	5	6.8
	60 +	1	1.4
	total	74	100.0
Summer chum Salmon	0	64	86.5
	1-19	1	1.4
	40-59	1	1.4
	200-299	2	2.7
	500-599	1	1.4
	700-799	1	1.4
	1,000 +	4	5.4
	total	74	100.0
Fall chum and Coho salmon	0	58	78.4
	1-19	4	5.4
	20-39	2	2.7
	40-59	3	4.1
	100-199	1	1.4
	200-299	4	5.4
	1,000 +	2	2.7
	total	74	100.0

King salmon, summer chum salmon, fall chum salmon, and coho salmon subsistence harvests for the years 1977-88 are shown in Table 11. These estimates for total community harvest were derived from post-season surveys of Yukon River communities conducted annually by

TABLE 10. AVERAGE SUBSISTENCE SALMON HARVESTS IN  
EDIBLE POUNDS, GALENA 1985

Resource Harvested	Mean Household Harvest (n=74)	Per Capita Harvest (n=242)
King salmon	199.9 lbs.	61.1 lbs.
Fall chum and coho salmon	280.2	85.7
Summer chum salmon	1,299.8	397.5
All salmon species	1,782.1	544.9

the Alaska Department of Fish and Game, Division of Commercial Fisheries and are often used to indicate trends in subsistence salmon harvests (Walker and Brown 1988). However, they may be conservative estimates of the total harvest for particular communities. For example, in 1985, the combined harvest estimate from the annual post-season survey was about 31 percent of the amount estimated as a part of this study. One explanation for the higher estimate is that the community wide random sample used in this study included several households which were not listed as "fishing families" regularly contacted for the annual surveys. Of the 24 sampled households which harvested salmon, only 12 (50 percent) were present on the list of fishing families used for the annual survey in 1985. Most of the individuals contacted for the annual surveys were associated with established fish camps, thus were more likely to get included when surveyers updated the list of fishing families in the community. Most of the 12 which were not listed for the annual surveys fished without using fish camps.

TABLE 11. ESTIMATED KING SALMON, SUMMER CHUM SALMON, AND FALL CHUM AND COHO SALMON  
SUBSISTENCE HARVESTS, GALENA 1977-88<sup>a</sup>

Year	Number of Fishing Families	King Salmon		Summer Chum		Fall Chum and Coho		Total Pounds
		Fish	Pounds	Fish	Pounds	Fish	Pounds	
1977	17	1,155	15,939	3,226	14,840	2,301	12,886	43,665
1978	24	945	13,041	8,930	41,078	3,015	16,884	71,003
1979	28	1,591	21,956	4,218	19,403	2,597	14,543	55,902
1980	34	1,205	16,624	13,102	60,269	3,597	20,143	97,036
1981	25	570	7,866	15,089	69,409	3,475	19,460	96,735
1982	21	735	10,143	20,434	93,996	2,511	14,062	118,201
1983	21	1,477	20,383	5,789	26,629	5,018	28,101	75,113
1984	21	1,226	16,919	19,480	89,608	7,722	43,243	149,770
1985 <sup>b</sup>	20	1,329	18,340	16,212	74,575	5,548	31,069	123,984
1986	25	1,046	14,435	6,618	30,443	5,284	29,590	74,468
1987	34	1,270	17,526	11,776	54,170	11,939	66,858	138,554
1988	50	1,982	27,352	7,413	34,100	5,337	29,887	91,339

<sup>a</sup> source: Walker and Brown 1988

<sup>b</sup> see text for explanation of discrepancy between these estimates and those presented in Table 8.

In later years, an effort was made to improve the completeness of the list of fishing families used in contacting fishermen for the annual harvest surveys (Walker, Andrews, Anderson, and Shishido 1989). It was found that in years prior to 1988, only about one-half of the fishing families were listed, which would have resulted in low estimates of the total community harvest.

The precision of an extrapolation from a sample is affected by the sampling fraction and the standard deviation of the measured value. In the case of household salmon harvest levels, the upper limit of the range of harvest was well above the mean and exerted an disproportionate effect on the expanded total community harvest estimate.

A large number of households obtained salmon by receiving fish from other households or purchasing fish from others in the community. The result was that a larger proportion of households had these resources available for their use. For example, while only 23 percent of households harvested king salmon, 51.4 percent of households received king salmon and 14.9 percent purchased king salmon. As a consequence, 82.4 percent of Galena households surveyed reported using king salmon during the study year. Sharing between households took place within the community of Galena or among related family members in nearby communities.

Fall chum salmon were also widely distributed throughout the community. A total of 45.9 percent of households received fall chum salmon from other households and 23.0 percent purchased fall chum salmon from others. Local households who purchased fall chum salmon did so in small quantities by and large: the median household

purchase was 10 fish, based on the 17 households which purchased fall chum salmon. A total of 85.1 percent of the sampled households used fall chum salmon in their household.

Summer chum salmon distribution patterns differed from that of other salmon since these fish were harvested for different purposes, primarily the commercial sale of the roe and dog feed of the remainder of the fish. Most summer chum were caught by limited entry permit holders because of the commercial value of the roe. The carcasses of these fish were dried then generally traded, bartered, or shared within Galena or neighboring communities for use as a dog feed by dog owners and mushers. Thus, much of the summer chum salmon used for subsistence purposes were actually a by-product of a commercial enterprise. Only 21.6 percent of households reported using summer chum salmon, somewhat higher than the 13.5 percent (10 of 74) of the households harvesting summer chum salmon.

Of these 10 sampled households (13.5 percent) harvesting summer chum salmon, 6 held commercial fishing permits and used their gear for subsistence purposes also. These 6 households harvested 96.4 percent of the total 20,910 summer chum salmon caught for commercial purposes. The other 4 households, those without commercial fishing permits, caught the remaining 3.6 percent of the summer chum subsistence harvest, using set nets or fishwheels borrowed from other households.

## PROCESSING AND USE

Once salmon were caught and brought back to fish camps, or back to Galena, they were cleaned and cut for drying and smoking. Summer chum salmon were processed in large numbers due to the comparatively larger harvest for commercial roe sales. These fish were hung from outdoor drying racks placed along the beach and lightly smoked from a nearby fire as they air dried. Afterwards, summer chum were tied together in bales of 50 fish each and stored in caches for later use as dog feed. A small portion of the catch, particularly fish taken at the onset of the run, were eaten fresh or half-dried and cooked over a campfire.

King salmon were carefully processed for eating. Most king salmon were cut into long strips or were cut with small cross cuts with the skin left intact. These fish were air dried carefully and then smoked in smokehouses. Bellies were sometimes salted and packed in jars as were strips to be used for winter. Whole king salmon were often frozen, especially when only a few were caught and brought back directly to town. Fall chum and coho salmon were preserved for eating through drying and smoking or freezing.

King salmon, fall chum salmon, and coho salmon were the primary salmon used for human consumption. By edible weight, 56.5 percent of all salmon consumed were fall chum and coho salmon, 40.3 percent were king salmon, and only 3.2 percent were summer chum salmon.

## FISHING REGULATIONS

The subsistence fishing regulations in place in 1985 have been influenced by regulatory actions taken over the last 70 years, beginning with the response to the 1918 development of commercial fishing in the lower Yukon River which caused widespread concern over its impacts on upriver subsistence fishing (Gilbert and O'Malley 1921).

Table 12 lists some of the major regulatory actions implemented since that time. The commercial fishery for king salmon was reopened in 1932, after a seven-year closure. Commercial salmon fishing in the Galena area developed in the late 1960s when whole fish and roe were exported (Pope 1980:20).

The subsistence salmon fishery on the middle Yukon River has been regulated primarily by restrictions on fishing time, fishing areas and gear type. No permit has been required to fish with nets or wheels for subsistence. No quotas have been established for the fishery, and family harvest are determined by the family themselves, a form of self-regulation. In these regards, the fishery resembles that of the Kuskokwim and Yukon River districts as a whole. As early as 1954, restrictions on fishing time were instituted, designed to allow a segment of the run to pass upriver untouched.

Reductions in the number of days of fishing per week applied to both commercial and subsistence fishing. The result was that subsistence salmon fishing was allowed five days per week, and after 1979, it was allowed four days per week on a "split week" schedule of

TABLE 12. CHRONOLOGY OF MAJOR ACTIVITIES AND REGULATIONS INFLUENCING  
SUBSISTENCE SALMON FISHING IN THE MIDDLE YUKON RIVER AREA

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1918	Carlisle Packing Co. (Seattle) begins commercial salmon operations at the lower Yukon River, resulting in major issue concerning impact on subsistence harvests upriver.
1919	Investigation report by Gilbert and O'Malley recommends regulatory tools still used today: allocations, quotas, alternating periods, and subsistence priority.
1925-31	Commercial salmon fishing closed in lower Yukon River.
1954	Weekend closures begin for subsistence fishing.
late 1960s	Galena commercial salmon fishery develops, export of roe and whole fish.
1974	Weekly subsistence fishing periods reduced from 7 to 5 days per week; District 4 boundaries changed.
1974-1977	Commercial sale of roe from subsistence caught fish allowed between 1974-77, but prohibited after 1977.
1976	Limited entry commercial salmon fishing implemented for Arctic-Yukon-Kuskokwim area. Individual eligibility based on previous commercial fishing.
1976	District 4 divided into three subdistricts.
1979	Weekly subsistence fishing period changed to 4 days per week on "split week" schedule.
1981	Subsistence drift net fishing for king salmon opened in Subdistrict 4-A.
1983	Subsistence drift net fishing for fall chum salmon opened in Subdistrict 4-A.

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two days open, one day closed, and two days open. Gear type regulations in the fishery allowed the use of gill nets, fishwheels, or beach seines for harvesting salmon.

Limited entry commercial fishing was implemented for the Arctic-Yukon-Kuskokwim area in 1976 (Pope 1980:23). Individual

eligibility was based on previous fishing activity. The result was that by 1982 a total of 19 Galena residents had limited entry permits for fishwheels, and an additional 6 held permits for set nets.



## CHAPTER 5. FISHING FOR NON-SALMON SPECIES

Non-salmon fish species such as whitefish (*Coregonus* sp.), sheefish (*Stenodus leucichthys*), and northern pike (*Esox lucius*) can be harvested locally throughout virtually the entire year, often when other sources of fresh food are unavailable. For example, in December when the moose hunting season is closed and many other species are not readily available, nets or hooks set under the ice can catch fresh whitefish and burbot (*Lota lota*). Seasons of harvesting non-salmon fish are shown in Figure 4. They are harvested in all months except February-April. While fall and spring were the primary seasons of harvest, whitefish and sheefish were commonly caught incidentally in set gill nets and fishwheels used for salmon fishing in summer. Other non-salmon species harvested by Galena residents during the study year included Alaska blackfish (*Dallia pectoralis*) and longnose sucker (*Atostomus catastomus*). Arctic grayling (*Thymallus arcticus*) and trout (*Salvelinus* sp.) were also caught using rod and reel gear from May to October.

Table 13 shows the percentage of sampled households harvesting these different fish species and the average harvest for those households. The estimated total community harvests were expanded from the 35 percent sample of Galena households surveyed. All harvests were reported by the number of fish caught except Alaska blackfish which were measured by the number of pounds harvested. Table 14 shows the mean non-salmon harvests in edible pounds harvested by sampled households for subsistence purposes. The

TABLE 13. NON-SALMON FISH HARVESTS OF GALENA RESIDENTS,  
JUNE 1985 - MAY 1986

Resource Harvested	Percentage of Sample Households Harvesting (n=74)	Of Households Harvesting		Estimated Total Community Harvest (n=211)
		Range of Harvests	Mean Harvest	
Northern pike	32.4 %	1-30	8.8	601
Sheefish	24.3	2-35	10.1	519
Burbot	20.3	2-60	14.7	627
Whitefish	18.9	2-2,000	260.6	10,402
Arctic grayling	10.8	4-200	33.8	770
Trout	6.8	6-50	18.8	268
Alaska blackfish	4.1	20-100 lbs	48.0 lbs	411 lbs
Longnose sucker	2.7	10-30	20.0	114

TABLE 14. AVERAGE SUBSISTENCE NON-SALMON FISH HARVESTS IN  
EDIBLE POUNDS, GALENA 1985-86

Resource Harvested	Mean Household Harvest (n=74)	Per Capita Harvest (n=242)
Northern pike	17.1 lbs.	5.2 lbs.
Sheefish	18.4	5.6
Burbot	10.1	3.0
Whitefish	147.9	45.2
Arctic grayling	2.6	0.7
Trout	1.9	0.5
Alaska blackfish	1.9	0.5
Longnose sucker	1.2	0.3
All non-salmon species	201.2	61.5

combined annual harvest of non-salmon fish in Galena was 61.5 pounds per person.

#### NORTHERN PIKE

Northern pike were harvested by 32.4 percent of the sampled households, making pike fishing one of the most common fishing activities in Galena and equal to the level of participation in salmon fishing. Although overall about one-third of sampled households harvested pike, non-Native households were twice as likely as Native households to harvest pike. This contrasts with the harvest of other non-salmon species, which was higher for non-Native households. Galena residents harvested northern pike from May to October during periods of open water, and occasionally from November to January under the ice using gill nets.

Pike was one of the few species taken regularly by Air Force enlisted personnel stationed at Galena because they could be taken with sport fishing gear (rod and reel) at locations accessible by river. The harvest quantities of base personnel were not documented in this study.

During summer months pike were harvested using rod and reel by Galena households. Since lures do not work well in the silt laden water of the Yukon River, most people fished for pike along clear small tributaries, sloughs, and lakes. Most summer pike fishing takes place during day or evening trips from Galena with small groups. Work crews at summer salmon fishing camps were generally

busy with salmon fishing and did not fish for pike. For others not involved in salmon fishing, an abundant supply of pike could be obtained for relatively little effort and with a minimal amount of gear. Thus, for many, pike fishing offered an important harvest opportunity. Occasionally, pike were also caught incidentally in salmon fishing gear along the main river. The total pike harvest was about 5.2 pounds per person in 1985-86, for a total community harvest of 601 fish.

#### SHEEFISH

Sheefish were harvested from late May to October and from November to January. In 1985-86, 24.3 percent of Galena households harvested sheefish. Of active harvesters, household harvests ranged from 2 to 35 fish, with a mean of 10.1 fish. The larger harvests typically were among households that had summer fish camps and caught sheefish incidental to their catch of salmon in fishwheels and set gill nets. Alternately, one household reported harvesting 25 using rod and reel and another 10 sheefish using a net set under the ice in the Yukon. Rod and reel fishing of sheefish typically took place along clearwater tributaries of the Yukon within 50 miles of Galena. The total community harvest of sheefish was 519 fish, or about 5.6 pounds per person in 1985-86. This means that sheefish harvests equalled that of northern pike in terms of total weight.

## BURBOT

Burbot were harvested from freeze-up in late October through February. Fishing usually occurred near the shores of the Yukon River within walking distance from town. Most fishermen used a hook with live blackfish for bait. The hook was attached by a short line to a willow stick, usually one hook per line, then placed at the bottom of the river with the stick extending up through a hole in the ice. Hooks were checked every one or two days. Hooks were also placed under the developing shore ice in the days preceding the river's complete freezing.

Burbot fishing required little travel or gear. Most burbot fishing took place along the Yukon River directly in front of town. The fish were a favorite food of many. A special delicacy with many was the livers. In 1985-86, 20.3 percent of households harvested burbot, with household harvests ranging from 2 to 60 fish. One 39 year-old household head joked that he was not old enough to fish for burbot yet, referring to fact that burbot fishing is associated with older people who can readily fish without requiring complex gear or the help of others. Burbot were used for eating and were widely shared. Burbot were not fed to dogs. In 1985-85, the total community harvest was 627 fish, or about 30.0 pounds per capita.

## WHITEFISH SPECIES

Although many whitefish species occurred in the Galena area, most of the harvest consisted of two species -- broad whitefish

(*Coregonus nasus*) and humpback whitefish (*C. pidschian*). Smaller catches are made of least cisco (*C. sardinella*), Bering cisco (*C. laurettae*), and round whitefish (*Porsopium cylindraceum*). These species were grouped together for purposes of the survey. Whitefish were harvested with nets or fishwheels from May through October when the river was open and from November through January using nets set under the ice. Generally, smaller mesh nets, 5 7/8 inch mesh, were used for taking whitefish. However, most of the harvest came from fishwheels used for salmon fishing along the Yukon River. Consequently, the harvest of whitefish took place in locations similar to those described in the previous chapter for salmon fishing. In 1985-86, 18.9 percent of households harvested whitefish, with household harvests ranging from 2 to 2,000 fish.

Whitefish were eaten fresh, or processed by drying and smoking or freezing. Several used the fish in making "Indian ice cream," a rich whipped dessert made with fish and berries often served during special occasions. Others used the whitefish eggs by frying them to eat. The two households that harvested over 200 whitefish, also used about 95 percent of their fish for feeding dogs. Whitefish provided the largest volume of subsistence fish after salmon. In 1985-86, the total community catch was 10,402 fish, or about 45.2 pounds per capita. As mentioned above, a portion of the whitefish caught was used to feed dogs.

## OTHER FRESHWATER FISH

### Alaska Blackfish

The Alaska blackfish (*Dallia pectoralis*) frequents the lakes and small sloughs in the Galena area. Blackfish were caught after freeze-up, from late October to December, using basket traps set through holes in the ice of nearby lakes. Only 4.1 percent of the sampled households harvested blackfish in 1985-86. Since traps catch blackfish in excess of the numbers needed by one individual or household for eating or bait for burbot fishing, the fish were shared among many households. Once caught, the fish were stored alive in plastic buckets, drums, or even bathtubs until they were used for bait. Some were sent to relatives in Kaltag and Nulato where their availability was limited until after the Yukon River freezes solid enough for safe travel to blackfish areas on the Kaiyuh Flats.

Historically blackfish were an important food source during times of other food shortage. In 1986, they were still used by some elderly residents as food, but more by choice than necessity. Methods of preparation included baking and frying whole. Most commonly, they were used as bait. In 1985-86, the total community harvest was about 411 pounds of blackfish.

### Arctic Grayling

Grayling were harvested from May to October along freshwater tributaries of the Yukon River. Common fishing areas included the

lower stretches of the Melozitna River, Kalakaket Creek, and the Nulato River. Rod and reel was generally the means of harvest in many locations. In 1985-86, 2.6 percent of sampled households reported harvesting grayling. The few households harvesting grayling sometimes took up to 200 fish. The total community grayling harvest was about 770 fish, or about 0.7 pounds per capita, somewhat larger than the blackfish harvest.

### Trout

Trout were harvested from May to October by a few Galena residents in a variety of circumstances. One fisherman caught Dolly Varden trout near his fish camp south of Kaltag. Another caught lake trout at Walker Lake 175 miles north-northeast of Galena, which he accessed with his airplane. The total trout harvest in 1985-86 was about 268 fish, or about 0.5 pounds per capita.

### Longnose Sucker

Sucker harvests were mentioned primarily by those harvesting salmon commercially. Typically, they were an incidental catch and were processed for use as dog food. One man commented that he never counted the suckers he caught, but was able to estimate his take at 10 fish in 1985-86. At some fish camps people reported returning them to the river and not using them. Only 1.2 percent of households reported harvesting suckers in 1985-86, with a total community harvest of about 114 fish.

## CHAPTER 6. MOOSE HUNTING

Moose was an important subsistence resource for the community of Galena in 1985-86. Moose hunting by Galena residents in 1986 generally occurred within either the legal fall season in September or the legal winter season in February. Historical sources indicate Galena residents harvested moose throughout much of the year in the past. Current regulations allowed the taking of one moose per regulatory year (July 1 - June 30), which meant that if a hunter did not take a moose in September, he or she was eligible to hunt in February. The February 1986 hunt in the Galena area was closed for conservation reasons after aerial surveys showed a decline in calf production (Osborne 1987). Hunting during the two seasons are discussed below separately, since hunting practices differ by season. The majority of the harvest occurred during the fall hunt. A description of hunting activities, harvest levels, and distribution of moose in 1985-86 is followed by a section describing hunting regulations from 1964 through 1986.

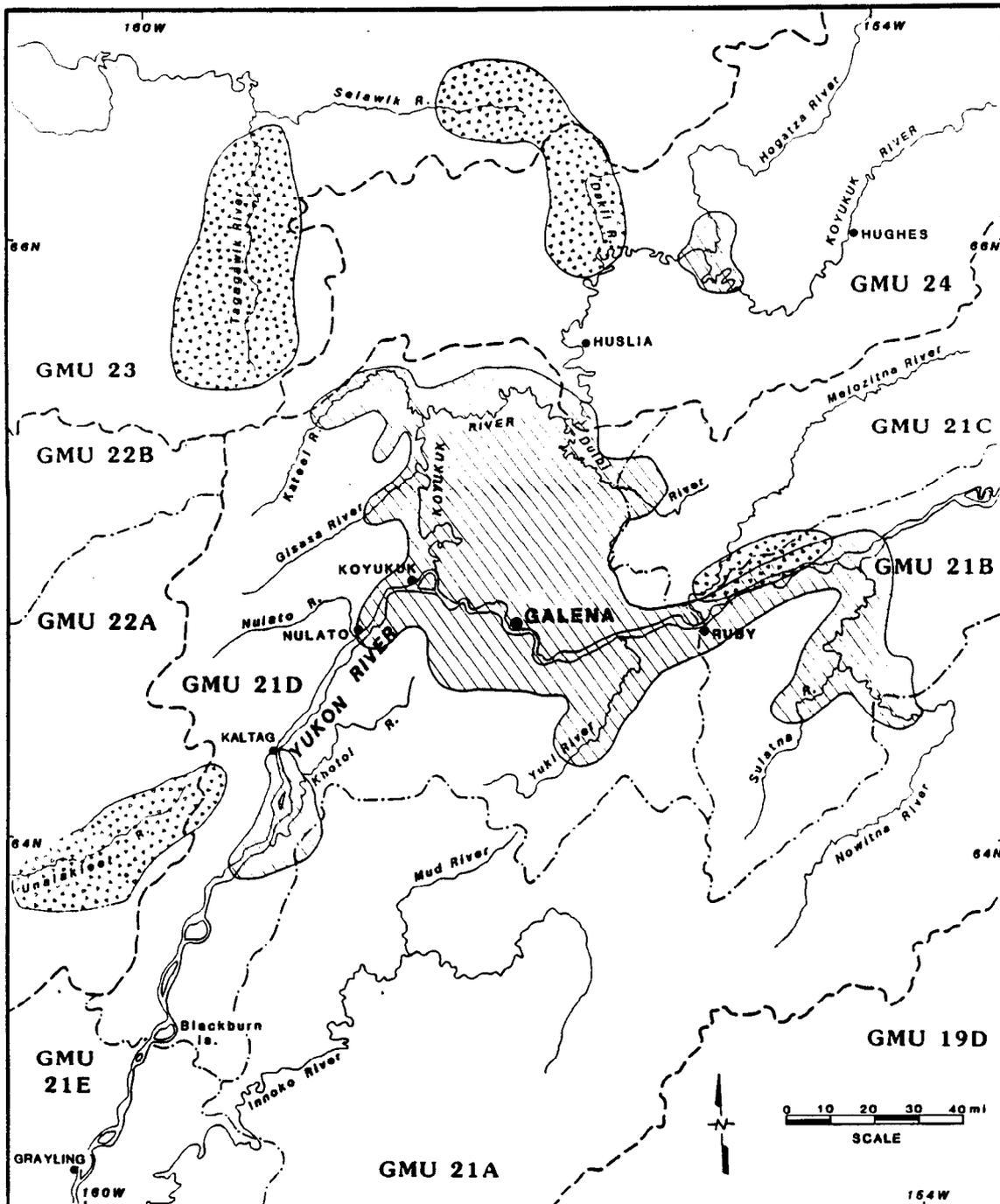
### FALL HUNTING

In 1985, the fall moose hunting season in Game Management Unit (GMU) 21D was from September 5 through 25. Most Galena hunters hunted in that subunit. Only one bull moose could be taken from September 5 through 20, or a moose of either sex from September 21

through 25. During early September, days can be warm and the thick foliage on the birch, alder, and willows makes spotting moose difficult. Near the end of September, falling leaves improve visibility and below freezing temperatures are common. Bull moose tend to move about more with the onset of rut. However, because of the rut, many local hunters preferred to take a cow moose rather than a bull in late September. In most years, many of the slow moving creeks and sloughs have frozen by the end of the month limiting river access into some areas.

During the fall hunt, boats were used to gain access to areas of known moose concentrations. Galena residents primarily used small riverboats, less than 24 feet in length, when moose hunting. Hunting practices do not depart significantly from those described for Huslia residents to the north (Nelson 1982:28-31) or for upper Kuskokwim River drainage hunters (Stokes 1985). Hunters searched along rivers, sloughs, and streams, to spot moose or recent signs of one. Clearings near boat access were also checked, but hunters tried to avoid taking moose more than a half mile from boat access.

Areas used for moose hunting are shown in Figure 10. Moose hunting areas used by community residents between 1971 and 1986 were included. Primary areas used were along the Yukon River upriver to near Ruby and downriver to Koyukuk; along the Yuki and Nowitna rivers; and along the Koyukuk River up to the upper end of Three Day Slough near the mouth of the Dulbi River. Other areas used by fewer hunters included tributaries of the Koyukuk River such as the Dulbi and Kateel rivers; and areas near where a hunter formerly resided, such as near Kaltag. Each year a few Galena hunters are



**FIG.10. GALENA MOOSE, BLACK BEAR, WATERFOWL, AND CARIBOU HUNTING AREAS, 1971-1986**

-  Moose, Black Bear, or Waterfowl Hunting Areas, 1971-1986
-  Caribou Hunting Areas, 1971-1986

Information from 7 key respondent interviews in 1986. Map based on USGS 1:1,584,000 scale Alaska map. See "Galena Subsistence Patterns, 1986" by James R. Marcotte, Division of Subsistence Technical Paper No. 155 for further information.

Because patterns of household resource use may change from year to year and in view of the specific time span represented here, this map can be considered only a partial representation of areas important to local residents.



successful along the eight-mile road extending east of Galena towards the old site of Louden.

Most of the community's moose hunting occurred within GMU 21D, although some also took place within GMU 21B in the vicinity of the Nowitna River, GMU 21C along the Dulbi River, and GMU 24 in the vicinity of Huslia and the Hogatza River (Fig. 10). Some fly-in hunting by non-local residents traveling through Galena took place in the Innoko and Mud River drainage, an area several Galena residents used at other times of the year for trapping.

The composition of moose hunting groups varied. In many cases, hunting groups consisted of members from two separate households who were closely related. In several cases, respondents described their hunting partners as friends or coworkers. Still others indicated that they hunted with only members from their household. Forty-five of 74 sampled households (60.8 percent) reported that they hunted moose as part of a group of individuals from made up of other households. The rest hunted with members of their own household. Group size ranged up to eight individuals representing four separate households. A discussion of work group composition for moose hunting and salmon fishing is in Chapter 10.

#### WINTER HUNTING

In 1986, the February winter moose hunting season was cancelled by emergency order of the Alaska Department of Fish and Game due to a concern with low moose recruitment in 1985. The season had been

scheduled for February 1 through 5 in the area near Galena, and February 1 through 10 in the area west of Bishop Mountain, and either sex moose could be taken. Since 1984, the February hunt in GMU 21D has been by registration permit which has allowed for more accurate harvest reporting. In 1984, 26 moose were taken by Galena residents; in 1985, 16 moose were taken; and in 1987, 20 moose were taken.

The February moose hunt was somewhat controversial among Galena residents. Some residents argued there should be no hunting of cow moose and that the winter hunt encouraged harvest that otherwise would not take place. Other residents pointed out that the hunt comes at a time of year when many Galena families have run out of food and that the harvest of moose during the winter was a traditional practice. Also, the winter hunt provided food for families which were not able to harvest a moose during the fall hunt.

Moose hunting in February by most Galena hunters took place by traveling to hunting areas by snowmachine. A few used snowshoes and walked from town to nearby hunting areas. An additional permit stipulation on the winter hunt implemented in 1982 restricted hunting within one-half mile of the Yukon River and its tributaries. This has encouraged hunters to harvest moose away from the Yukon River corridor, an area that received much of the hunting pressure during September. Most winter hunting occurred within a 20-mile radius of Galena. Hunters reported that during periods of extreme cold weather, it was very difficult to get within shooting range due to the acute hearing of moose and sound transfer in still cold conditions.

## PARTICIPATION AND HARVESTS

Moose hunting was one of the most common subsistence activities in Galena. One-half of the 74 sampled households harvested moose between June 1985 and May 1986 (Table 15). A total of 43 moose were harvested by the 74 sampled households, with an estimated total community harvest of 122 moose, or about 137.3 pounds per capita. As mentioned previously, an additional harvest of moose during February did not occur due to the closure of the legal winter (February) hunt in 1986. Of the households participating in the harvest during the fall season, harvests ranged between one moose to three moose per household, with an average of 1.2 moose for harvesting households. In practice, many residents hunted for a single moose cooperatively with members from other households with the intent of splitting the moose, along with the work in cutting the moose in the field, transporting it home, and storing it. In such cases, interviewed households reported that their harvest was less than a full moose for the purposes of the survey. Five of the 74 sampled households reported harvests of only a part of a moose.

The 1985-86 harvest of moose by Galena residents represented an overall average of .58 moose per household, a figure somewhat lower than the 1.5 moose per household recorded for Huslia for 1983 (Marcotte 1986). This harvest was equivalent to one moose for every 5.7 people. Single-year harvest figures commonly do not adequately reflect year-to-year variations in harvest effort, fluctuations in the moose population, weather patterns, and other factors. For instance, the emergency closure of the moose hunting season in

TABLE 15. MOOSE HARVESTS OF GALENA RESIDENTS, JUNE 1985 - MAY 1986

Resource Harvested	Percentage of Sample Households Harvesting (n=74)	Of Households Harvesting		Estimated Total Community Harvest (n=211)
		Range of Harvests	Mean Harvest	
Moose	50.0	1-3	1.2	121.5

February 1986 suggests that the study year may have been a low harvest year.

In 1985-86, 43 (58.1 percent) of the 74 sampled households reported that someone in the household attempted to harvest moose during the year, and 37 (50.0 percent) of 74 households reported a harvest. Thus 37 (86 percent) of 43 households attempting to harvest moose were successful. Of the six "unsuccessful" households, one included a man who made a point of expressing that he "went out to camp to look around a bit", but stopped short of specifically saying he was trying to get a moose. He added that he still had moose in his freezer. The other five households reported receiving an average of 145 pounds of moose from other households.

Alaska Department of Fish and Game harvest ticket data indicated that Air Force enlisted personnel stationed in Galena took a total of four moose in 1984 and three moose in 1985, a relatively small number compared with the estimated community harvest for Galena of 122 moose. Enlisted personnel sometimes hunted together using boats checked out from a military recreation program, and sometimes

hunted with local Galena residents since equipment, knowledge of the area, and moose meat could be shared. Additionally, personnel from Elmendorf Air Force Base in Anchorage often scheduled travel to Galena during the September moose hunting season to accompany those stationed in Galena on hunting trips.

#### DISTRIBUTION

Moose meat was widely shared throughout the community of Galena. Forty-nine (66.2 percent) of the 74 sampled households received moose meat from other households. Twenty-four (32.4 percent) of the 74 sampled households gave away a portion of their moose away to other households. The result was that 70 (94.6 percent) of 74 sampled households had moose meat available for their use. Expanded to the entire community, this suggests that only 11 of the total 211 Galena households did not use moose meat during the study year.

The harvest of moose reported by sampled households was estimated to weigh 33,228 pounds, based on a mean edible weight of 780 pounds per moose (Appendix 2). Moose are fully utilized in the Galena area, including heads, entrails, and forelimbs, which accounts for the relatively high mean edible product compared with other areas of the state. In addition to the amount harvested, sampled households reported receiving a total of 11,928 pounds of moose meat from others and giving to others 6,837 pounds. In total, sampled households reported using 38,406 pounds of moose.

The amount of moose reported as used by sampled households is shown in Table 16. It shows that 18 (24.3 percent) of 74 households used between 700 and 799 pounds of moose, approximately one moose per household. More than one moose was used by 16.2 percent of households. Average household use was 519 pounds. Moose accounted for 77.2 percent by edible weight of all game harvested.

#### REGULATORY HISTORY

Moose hunting has been regulated by the state primarily by restrictions on hunting times and harvest quotas in the Galena area. State regulation does not restrict the number of hunters. Local residents, non-local Alaska residents, and non-resident hunters have been allowed to hunt in the Galena area by state regulation. Moose hunting season dates and bag limits since 1964 are shown in Table 17. During the late 1960s and early 1970s, the hunting season was relatively long, 134 to 193 days, and there was a two moose bag limit. The bag limit was reduced to one moose in 1974, and season dates were reduced to 91 days in 1975. By 1979, hunting was limited to bulls only and to a 21-day season, the shortest season in the historic period. Galena residents requested more hunting opportunities in state regulations. In 1982, a winter hunt was reinstated and provisions were made for taking either sex moose during the last five days of the September hunt or during the winter hunt. From February 1985 through February 1987, the duration of the winter season differed between the eastern and western portions

TABLE 16. FREQUENCY OF EDIBLE POUNDS OF MOOSE USED BY  
SAMPLE HOUSEHOLDS, GALENA 1985

Range of Edible Pounds Used	Frequency of Households	Percentage of Households
0	4	5.4
1-99	15	20.3
100-199	8	10.8
200-299	4	5.4
300-399	9	12.2
400-499	0	0.0
500-599	1	1.4
600-699	3	4.0
700-799	18	24.3
800-899	3	4.0
900-999	2	2.7
1,000-1,499	2	2.7
1,500+	5	6.8
Total	74	100.0

of subunit 21D. The shorter five-day February hunt for the area nearest to Galena, a response to concern by some Galena residents that the winter harvest of cows be minimized, was applied to both portions of the subunit beginning in 1988.

Separate regulations for subsistence hunting and other hunting were implemented statewide in 1985. During the subsequent three hunting seasons, subsistence and resident moose hunting seasons in GMU 21D were the same, although non-resident (out-of-state) hunters were limited to the September hunt. Beginning in 1988, the resident hunters were also limited to the September hunt. The Board of Game

TABLE 17. MOOSE HUNTING SEASONS IN GAME MANAGEMENT  
UNITS 21 AND 21D, 1964-90<sup>a</sup>

Regulatory Year	Season Dates	Number of Days	Bag Limit
1964-65 to 1969-70	Aug. 20-Dec. 31	134	2 moose, only 1 antlerless.
1970-71 to 1973-74	Aug. 20-Feb. 28	193	2 moose, only 1 antlerless.
1974-75	Aug. 20-Dec. 31	134	1 moose, antlerless only after Oct. 1.
1975-76	Sep. 1-Nov. 30 <sup>b</sup>	91	1 moose, antlerless only after Oct. 1.
1976-77	Sep. 10-Nov. 30 <sup>b</sup>	82	1 moose.
1977-78	Sep. 10-30, Nov. 1-30 <sup>c</sup>	52	1 bull.
1978-79	Sep. 10-30, Nov. 1-30 <sup>c</sup>	52	1 bull.
1979-80	Sep. 10-30 <sup>d</sup>	21	1 bull.
1980-81	Sep. 5-25, Nov. 15-30	37	1 bull.
1981-82	Sep. 5-25, Mar. 1-10	32	1 moose; antlerless only Sep. 21-25, Mar. 1-10.
1982-83	Sep. 5-25, Jan. 15-Feb. 15	53	1 moose; antlerless only Sep. 21-25, Jan. 15-Feb. 15.
1983-84	Sep. 5-25, Feb. 1-10	32	1 moose; antlerless only Sep. 21-25, Feb. 1-10. Feb. 1-10 by registration permit.
1984-85	<i>east of Bishop Creek:</i> Sep. 5-25, Feb. 1-5	27	1 moose; antlerless only Sep. 21-25, Feb. 1-5. Feb. 1-5 by registration permit.
	<i>west of Bishop Creek:</i> Sep. 5-25, Feb. 1-10	32	1 moose; antlerless only Sep. 21-25, Feb. 1-10. Feb. 1-10 by registration permit.

Table 17. continued

Regulatory Year	Season Dates	Number of Days	Bag Limit
1985-86 <sup>e</sup> to 1986-87	<u>Subsistence and Resident seasons</u> <sup>f</sup> :		
	<i>east of Bishop Creek:</i>		
	Sep. 5-25, Feb. 1-5	27	1 moose; antlerless only Sep. 21-25, Feb. 1-5 only. Feb. 1-5 by registration permit.
	<i>west of Bishop Creek:</i>		
	Sep. 5-25, Feb. 1-10	32	1 moose; antlerless only Sep. 21-25, Feb. 1-10. Feb. 1-10 by registration permit.
1987-88	<u>Subsistence and Resident seasons:</u>		
	Sep. 5-25, Feb. 1-5	27	1 moose; antlerless only Sep. 21-25, Feb. 1-5 only.
1988-89 to 1989-90	<u>Subsistence season:</u>		
	Sep. 5-25, Feb. 1-5	27	1 moose; antlerless only Sep. 21-25, Feb. 1-5 only.
	<u>Resident season:</u>		
	Sep. 5-25	21	1 bull.

<sup>a</sup> Beginning in 1980, GMU 21 was divided into subunits. After this date, regulations are shown for subunit 21D.

<sup>b</sup> not including portion that became 21E.

<sup>c</sup> not including portion that became 21A.

<sup>d</sup> not including portion that became 21A, 21B.

<sup>e</sup> February season not open in 1986.

<sup>f</sup> beginning in 1985, subsistence seasons and bag limits were promulgated.

determined that the military base in Galena, where the Galena military population resided, was not rural thereby restricting its residents from the subsistence hunting seasons.

## CHAPTER 7. OTHER HUNTING

Galena residents harvested and used a variety of large and small game resources, including birds and migratory waterfowl. The harvest of game species other than moose helps diversify the diet and provides fresh meat throughout the year. The average Galena household harvested 88.6 pounds of game meat, not including moose or beaver, during the study year. Participation rates and average household harvests are shown in Table 18. Included are the range of household harvests, the mean household harvest for those households harvesting, and the estimated total harvest for the entire community.

Fifty (67.6 percent) of 74 sampled households participated in the harvest of small game including waterfowl, gamebirds, and small mammals. This compares with 42 (56.8 percent) of 74 sampled households which harvested large game including moose, black bear, and caribou.

### CARIBOU HUNTING

Caribou were harvested by a comparatively small proportion (6.8 percent) of sampled households. Caribou meat from those harvests was widely shared among other households in the community. As a result of this distribution, 25 (33.8 percent) of 74 sampled households used caribou meat in 1985-86. Only 7 (9.5 percent) of 74 sampled

TABLE 18. HARVESTS OF GAME SPECIES (EXCLUDING MOOSE) OF GALENA RESIDENTS, JUNE 1985 - MAY 1986

Resource Harvested	Percentage of Sample Households Harvesting (n=74)	Of Households Harvesting		Estimated Total Community Harvest (n=211)
		Range of Harvests	Mean Harvest	
Grouse	55.5 %	1-50	14.4	1,679.4
Ducks	44.6	1-100	14.6	1,374.4
Geese	31.1	1-20	6.0	390.6
Hare	28.4	1-30	8.0	481.9
Black bear	17.6	.5-1	1.0	35.6
Ptarmigan	17.6	1-20	5.8	216.7
Caribou	6.8	1-4	2.8	39.9
Crane	4.1	1-2	1.7	14.3
Muskrat	4.1	4-19	9.3	79.8
Porcupine	4.1	1-3	1.7	14.3

households attempted to harvest caribou and 5 (6.8 percent) of 74 were successful. Household harvests averaged 2.8 animals for successful households and ranged between 1 and 4. The estimated total harvest for the community was 39.9 caribou. Caribou comprised 6.8 percent of the total game harvest by weight. Caribou harvests ranked third, second to moose and beaver, in the amount of game meat provided.

Caribou were taken throughout fall and winter, but particularly when caribou are most accessible during the late winter months of February, March, and April. Winter access to hunting areas was by snowmachine or aircraft. Caribou availability near Galena is generally unpredictable from year to year. Since the early 1970s, they have not occurred in the lower Koyukuk River Valley in significant numbers (James 1987).

Caribou hunting areas are shown in Figure 10. Galena caribou hunters traveled overland to hunt in the Dakli River-Selawik River area 60 miles north of Huslia and along the Kaltag-Unalakleet portage southwest of Kaltag. Rugged hills and the lack of established trails precluded snowmachine access for hunting purposes in other areas of the Nulato Hills west of Galena where caribou also winter. Privately owned ski-equipped planes were used by some hunters to access a hunting area at the Tagagawik River 100 miles northwest of Galena. In 1985, there were about one dozen planes owned by Galena residents. Harvest of caribou in the Kokrine Hills northeast of Ruby was also reported.

#### BEAR HUNTING

Black bear were harvested by 13 (17.6 percent) of 74 sampled households, with an estimated community total harvest of 35.6 bears. This estimate includes only bears taken for subsistence purposes and excludes bears taken in defense of life or property. Residents preferred to harvest bear for consumption during times of the year other than during the salmon runs when bear feed upon fish and the flavor of the meat is considered poor.

Bear hunting generally occurred during moose hunting and took place in the same areas (Fig. 10). Hunting was in areas accessible by water, primarily along the Yukon River between Nulato and Ruby and the Koyukuk River downriver from the Dulbi River. Some areas were reached by aircraft also. Black bear meat was an item commonly served at potlatches, but it is eaten in homes as well.

There are no brown bear harvests reported during this survey. Brown bear populations in Game Management Unit 21 were considered moderate and hunting pressure was considered low. Brown bears were occasionally harvested in the Nulato Hills by non-resident hunters, or taken in defence of life or property near Yukon River fish camps by local residents.

#### GROUSE AND PTARMIGAN HUNTING

Grouse hunting was one of the most common small game hunting activities in Galena. Forty-one (55.4 percent) of 74 sampled households reported hunting grouse. In addition, 12.2 percent of households received grouse from others, resulting in about two-thirds (66.2 percent) of the households using grouse.

Spruce grouse (*Canachites canadensis*) was the primary species taken, although ruffed grouse (*Bonasa umbellus*) were also harvested. Both were taken primarily in fall from September through November. Of 41 sampled households reporting grouse harvests, 39 harvested only in the fall, 1 harvested only in the winter, and 1 harvested in both seasons. Of households who harvested grouse, the range was between 1 and 50 birds with an average of 14.4 grouse. The estimated community total harvest was 1,679.4 grouse.

Willow ptarmigan (*Lagopus lagopus*) were harvested by 13 (17.6 percent) of 74 sampled households. For the 13 households, harvests ranged from 1 to 20 birds and averaged 5.8 ptarmigan. The estimated community total was 216.7 ptarmigan. All 13 sampled households that harvested ptarmigan reported that they harvested them during the

winter. During the early 1980s, ptarmigan numbers were low and the birds were rarely sighted. However, by the mid-1980s their numbers had increased locally, according to local residents

#### WATERFOWL HUNTING

Waterfowl hunting has been an important component of the annual subsistence harvest cycle for local residents. Traditionally, waterfowl harvests during spring and summer months supplied a source of fresh meat otherwise not available (Nelson 1982:52; Sullivan 1942:36-55). During the study year, Galena residents continued this practice of taking waterfowl during spring and fall seasons. Hunting began as geese and ducks first arrived in late April and early May. Hunting activity tapered off through early summer as waterfowl began nesting but resumed in late August and early September before birds left for winter.

A majority of hunters hunted in spring. Of the 33 sampled households that harvested ducks, 51.5 percent hunted in spring and 48.5 percent hunted in September. Of the 23 sampled households that harvested geese, 87.0 percent hunted in the spring and 21.7 percent hunted in the fall. Nine percent of the households hunting geese hunted during both spring and fall. Waterfowl harvest seasons was a topic of concern addressed frequently in the comments section of the survey. Arguments both for and against the spring harvests were heard, reflecting to a large part the multi-cultural component of Galena's households. Spring hunting is part of Alaska Native

traditional practice, while fall hunting is part of non-Native practice.

Waterfowl harvesting was a common hunting activity in Galena, where 33 (44.6 percent) of 74 sampled households harvested ducks and 23 (31.1 percent) of 74 sampled households harvested geese. Only 3 (4.0 percent) of 74 households harvested crane. Individual households harvested up to 100 ducks and 20 geese each; however, the average household harvests among those who were successful were 14.6 ducks and 6.0 geese. The estimated community harvest was 1,374 ducks, 391 geese, and 14 cranes (Table 18).

In addition to the households harvesting these resources, 12 (16.2 percent) of 74 sampled households received ducks from other households, so that 60.8 percent used ducks in the study year. Similarly, 14 (18.9 percent) of 74 households received geese from others, resulting in one-half of the households having geese available for their use.

By edible weight, waterfowl contributed 3.2 percent of all game meat consumed. An average household consumed 18.6 pounds of waterfowl, and the per capita use was 5.7 pounds annually.

Areas used for waterfowl hunting are shown in Figure 10. The area included was the same as that used for moose hunting and black bear hunting, because waterfowl were often hunted incidental to other harvest activities in the fall. Fall harvests were generally opportunistic, whereas in the spring hunters went out specifically for waterfowl. Spring hunting areas were generally within 20 miles of Galena. Access to hunting areas was by boat, hunting canoe, snowmachine, or on foot.

## SMALL GAME HUNTING

Snowshoe hare, muskrat, and porcupine were harvested by several households. These resources provided diversity in the diet, although they represented only 1.0 percent of all game meat used.

Hare (*Lepus americanus*) were taken from October to March, either in snares or using a small caliber rifle. Most snaring and hunting took place within five miles of Galena according to respondents. Twenty-one (28.4 percent) of the 74 sampled households harvested hare. Harvests ranged between 1 and 30 animals; the average take was 8 hares. Hare were typically cooked fresh and skins were used in decorative sewing.

Muskrats were taken throughout April and May using small caliber rifles. Respondents indicated that much greater harvest activity had occurred in the past. They attributed the lower harvests of the 1980s to reduced use of spring camps and very low muskrat populations. Skins were used in sewing but low prices paid for muskrat pelts had reduced local demand. Three (4.1 percent) of 74 sampled households harvested muskrat and an additional 3 households received muskrat from others. The average age of those harvesting muskrat was 52.3 years while the average age of those receiving was 68.3 years. One woman reported receiving muskrat during the annual Denakkanaaga' Elders' Conference which was held in Fort Yukon in 1985.

Porcupine were harvested during fall along with the harvest of other species. Residents described porcupine as a "survival food,"

always available, but seldom used. Only three (4.1 percent) of 74 sampled households harvested porcupine during the study period. As with muskrat, porcupine were most often eaten by elderly residents.

## CHAPTER 8. TRAPPING

Trapping plays a prominent role in the annual harvest cycle in Galena. Thirty-one (41.9 percent) of the 74 sampled households actively participated in trapping during the 1985-86 season, although only 27 of these households actually reported successfully harvesting furbearers for this time period. Overall, 59.4 percent of all furs were sold while 40.6 percent were used locally for sewing hats, mittens, parka roughs and other clothing. The cash income from trapping was important to some households, particularly those with low rates of employment during winter. Beaver were trapped for both fur and meat, and beaver comprised 7.6 percent by weight of all game meat used by Galena residents, even more than caribou or black bear. There were significant cultural values attached to the use of trapping areas. These values also reinforced trapping efforts in spite of low returns in the short term. Trapping season for the winter of 1985-86 began November 1 and extended to February 28 for marten, mink, red fox, and lynx, to March 31 for wolf and wolverine, and to April 15 for beaver and land otter.

### SPECIES HARVESTED

Beaver (*Castor canadensis*), marten (*Martes americana*), and lynx (*Lynx canadensis*) were the most frequently harvested species and together represented 97.3 percent of the dollar value of all furs actually sold during the study year. Beaver were trapped most

heavily through February and March, whereas marten were trapped early in the season, primarily in November and December. Lynx were taken from November through late February. Wolf (*Canis lupus*) and wolverine (*Gulo gulo*) harvests occurred opportunistically from November through March. Wolves were also taken late in the season. Land otter (*Lutra canadensis*) were occasionally caught by those trapping beaver. Small numbers of red fox (*Vulpes fulva*) and mink (*Mustela vison*) were taken from November through February.

#### TRAPPING METHODS

Galena trappers harvested furbearers by methods characterized by efficiency and economy of effort. Marten were trapped using light leghold traps set in cubbies or on pole sets. Both traps and steel cable snares were used for lynx. These were usually set after the trapper observed lynx sign in the vicinity. Lynx were only rarely shot. To trap beaver, most Galena trappers used steel snares surrounding a birch stick set below the ice. Others preferred using traps, particularly when water levels had fallen leaving a shelf of ice and traps (grounding sets) could be set under the ice shelf.

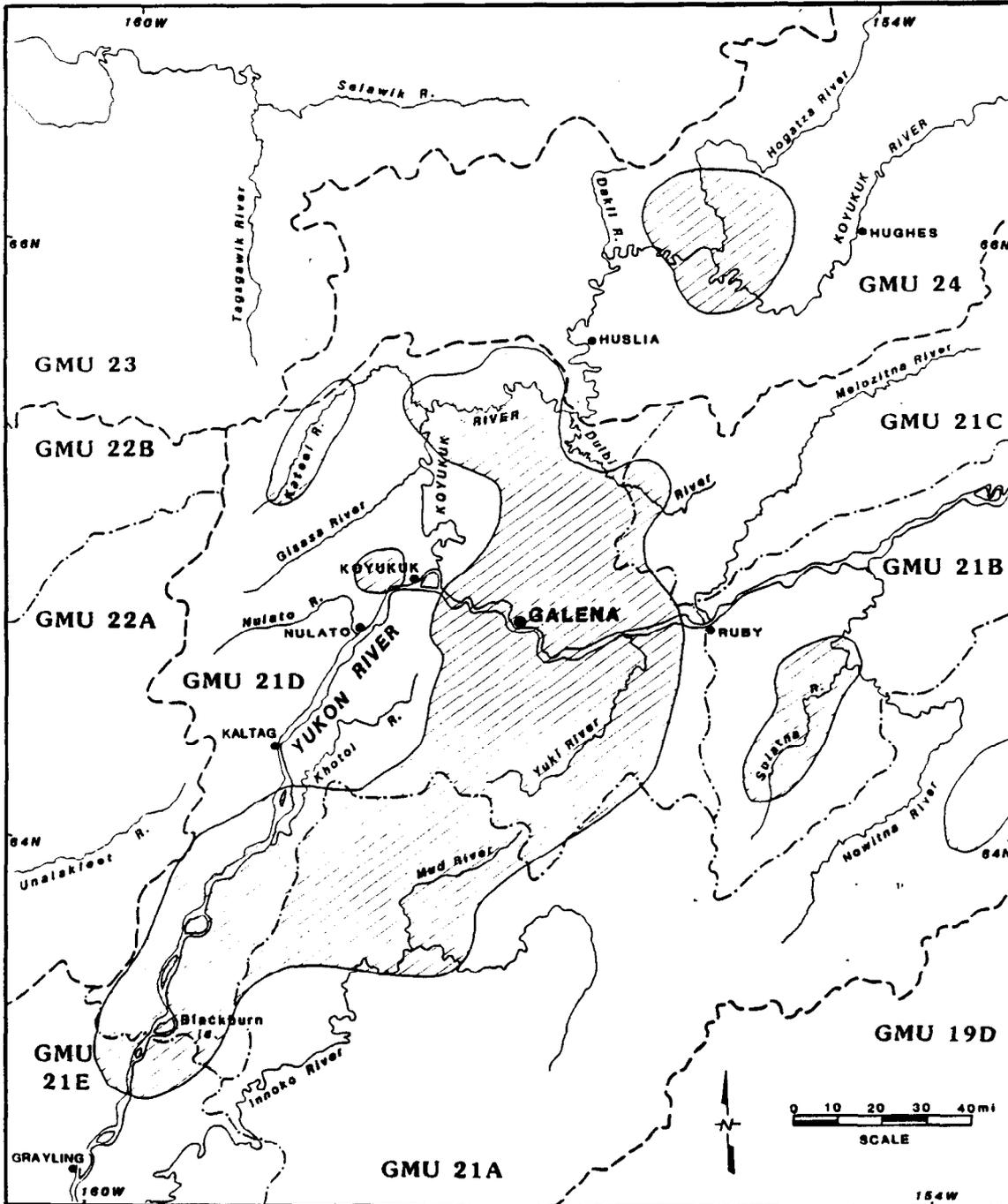
Land otter were taken with leghold or conibear traps along lakes, sloughs, and streams. Occasionally they were caught in snares set for beaver. Fox were taken in snares or traps set after tracks were found in the vicinity. Wolves were considered difficult to trap and many trappers with several years experience reported never having caught one. Heavy leghold traps were used successfully by some trappers, although most used snowmachines to chase wolves before

shooting them, particularly during periods of deep snow. A few residents employed the land-and-shoot method of taking wolves. A small number of non-local trappers also employed this wolf hunting method each spring in GMU 21. Historical use of aircraft in wolf hunting was described by Huntington (1985:62). Using aircraft, two Galena residents shot 100 to 150 wolves a season in the late 1950s.

#### THE TRAPLINE

The overall area used by Galena trappers between 1971 and 1986 is shown in Figure 11. Included here are areas used by trappers while living in Galena. Not included are those trapping areas which had been previously used by trappers, but have since been discontinued after the trapper moved to Galena.

Several residents described the area within a 20-mile radius of Galena as the common trapping area. In this area, most of the lines were less than 15 miles in length and were checked during single-day trips from the community. More distant trapping areas centered around the lower Hogatza River, Three Day Slough, Mud River, and Blackburn Island (Fig. 11). Users of these outlying areas had direct family ties to trappers in other communities who also used these areas for trapping. Other outlying areas such as those centered on the upper Kateel River or tributaries of the Nowitna River were used by Galena residents in the 1980s, but these areas had not historically been used by Galena residents. Specific trail and trapping locations have varied from year to year within the general area depicted.



**FIG.11. GALENA TRAPPING AREAS, 1971-1986**



**TRAPPING AREAS, 1971-1986**

Information from 7 key respondent interviews in 1986. Map based on USGS 1:1,584,000 scale Alaska map. See "Galena Subsistence Patterns, 1986" by James R. Marcotte, Division of Subsistence Technical Paper No. 156 for further information.

Because patterns of household resource use may change from year to year and in view of the specific time span represented here, this map can be considered only a partial representation of areas important to local residents.



**LOCATION MAP**

Community use areas inherently overlapped since there were several cases in which related individuals who resided in different communities in 1985 trapped together. Thus, the area depicted in Figure 11 used by Galena residents for trapping was not mutually exclusive of other community trapping areas. Areas beyond those used by Galena trappers were customarily used by residents of Huslia, Ruby, Kaltag, Nulato, or Koyukuk.

Thirty-one (41.9 percent) of 74 sampled households had used trapping areas from November 1985 to April 1986, although only 27 of the 31 households actually indicated harvests for that time period. One-half of the 31 trapping households set their closest traps within 24 miles of Galena. Distances to the closest trap from Galena ranged between 1 and 190 miles. Twenty-one (67.7 percent) of 31 trapping households traveled to trapping areas by snowmachine. An additional 5 (16.1 percent) of 31 traveled by aircraft, either personally owned or chartered. The remaining five households (16.1 percent) accessed nearby traps on foot or by using a road vehicle. Distant trapping areas were accessed by boat when traveling to the trapping camp at the beginning of the season.

The actual distance traveled on the trapline itself, exclusive of travel to the line, averaged 34.3 miles. Types of transportation used on the trap line were as follows: 22 (71.0 percent) of 31 households used snowmachines, 2 (6.4 percent) used dog teams, and 2 (6.4 percent) used some combination of snowmachines and dog teams. The remaining five households (16.1 percent) walked their traplines.

Trappers using areas more distant from Galena relied on either cabins or tents for shelter. Thirteen (41.9 percent) of 31 trapping

households utilized at least one cabin. One household used three. Tent camps were used by 7 (22.6 percent) households with as many as 3 used by a single household. Cabins and tents have customarily been used by members from more than one household while trapping.

The local rules guiding land tenure and use of trapping areas were relatively complex in Galena. Different rules and patterns of use commonly reflected differences in how long trappers lived in Galena and their former place of residence. For example, the more recent arriving families to Galena from outside the region generally did not use extensive trapping areas. The areas they used had not been acquired through kinship ties with the previous users of the trapping area. Larger outlying traplines were generally used by long-term Galena residents who had direct family ties to others who had used these specific areas.

Table 19 lists the relationship between current trapper and the previous trapper of the same trapline for 31 households. Direct kinship ties were identified in 16 (51.6 percent) of the 31 cases. Frequently these ties were through the female side of the family, such as mother or wife. The high number of cases (48.4 percent) where no kinship relationship existed between the current trapper and the previous trapper is indicative of a community where many of the residents have settle from outside the region. In Galena, 46.0 percent of the household heads had moved to Galena from outside the region. It is important to note that because a right to use a trapline may differ from a right to pass it on to the next generation, sequential use does not necessarily correspond to inheritance.

TABLE 19. RELATIONSHIP OF PREVIOUS TRAPPER TO CURRENT TRAPPER  
FOR TRAPPING AREAS USED BY GALENA TRAPPERS, 1985-86

Relationship to Current trapper	Frequency	Percentage
Mother	2	6.5 %
Mother and father	1	3.2
Mother's parents	1	3.2
Mother's brother	1	3.2
Mother's half brother	1	3.2
Mother's sister's husband	1	3.2
Wife	1	3.2
Wife's father	1	3.2
Father	4	12.9
Brother	1	3.2
Cousins (unspecified)	1	3.2
"Distant relatives"	1	3.2
Non-kinship relationship	15	48.4
Total	31	100.0

The number of years households in the sample had trapped a particular area averaged 13.3 years. The duration of use ranged between one and 70 years.

#### PARTICIPATION AND HARVESTS

Participation rates and average household harvest levels of furbearers are shown in Table 20. Also included are the range of household harvests and the estimated total harvest for the entire community. Marten and beaver were the most common species trapped followed by lynx, otter, fox, mink, wolf, and wolverine. Based on sealing records, marten harvests during the 1985-86 season were reported to be average compared to recent years, while beaver

TABLE 20. TRAPPING HARVESTS OF GALENA RESIDENTS,  
NOVEMBER 1985 - APRIL 1986

Resource Harvested	Percentage of Sample Households Harvesting (n=74)	Of Households Harvesting		Estimated Total Community Harvest (n=211)
		Range of Harvests	Mean Harvest	
Marten	27.0 %	1-45	11.4	650.1
Beaver	16.2	2-22	9.2	313.6
Lynx	8.1	1-4	2.5	42.8
Land otter	5.4	1-2	1.8	20.0
Red fox	5.4	1	1.0	11.4
Mink	1.4	2	2.0	5.7
Wolf	1.4	2	2.0	5.7
Wolverine	1.4	1	1.0	2.8

harvests for Unit 21 were the highest on record (Osborne 1988). The lynx population cycle was at a low point during the 1985-86 season. Land otter, red fox, and mink fur prices were lower than in recent years contributing to lower harvest effort. Wolverine harvests in Unit 21 were average, but sealing records suggest that the subsistence survey's estimated community total harvest of about three wolverine is low. The sample did not include two Galena trappers with large wolf harvests, thus these numbers underestimate wolf harvest and use.

The 74 sampled households included a total of 30 individual trappers (among 27 households) reporting harvests during the study period. The median age of trappers was 42 years and 93.3 percent were males. Of the 30 individuals, 11 (36.7 percent) were from

Galena, 10 (33.3 percent) were from the local region, and 9 (30.0 percent) were originally from elsewhere in the state or out of state.

Households with dependents 18 years of age or over were twice as likely to participate in trapping. The most productive households, as measured in potential dollar value of furbearers trapped, were those households headed by a husband-wife pair with dependents 18 or over.

Although only 16.2 percent of sampled households harvested beaver directly, 47.3 percent of sampled households reported having beaver meat available for their use. The amount of beaver meat used averaged 53.5 pounds per household (n=74), equivalent to 9.2 percent of all game meat consumed, more than either caribou or black bear.

#### USE OF FURS

Furs were used by Galena households for family use in sewing, sharing with other households, or sale. Table 21 shows how furs were acquired and distributed by sampled households. Furs were acquired by harvesting, receiving from others, or purchase. Once obtained, furs were used within the household, given away, or sold. The theoretical maximum number (max.n) of furs available to sampled households is listed for each resource. Both the source and distribution are shown since the way a fur was obtained by a household (by harvesting, receiving, or purchasing) may have bearing on how that fur is later used. Presumably households would tend not to resell furs which they had purchased or give away ones which they

TABLE 21. HOUSEHOLD ACQUISITION AND DISTRIBUTION  
OF FURS, GALENA 1985-86

Resource	Max. n <sup>a</sup>	Source of Furs Reported Used by Households			Disposition of Furs by Households		
		Harvest by HH	Received	Pur- chased	Used by HH	Given Away	Sold
Marten	268	85.1 %	6.3 %	8.6 %	39.9 %	9.7 %	50.4 %
Beaver fur	119	92.4	4.2	3.4	25.2	12.6	62.2
Beaver meat	179	61.4	36.9	1.7	73.7	26.2	0.0
Lynx	15	100.0	0.0	0.0	20.0	0.0	80.0
Land otter	8	87.5	12.5	0.0	50.0	0.0	50.0
Red fox	7	57.1	14.3	28.6	42.8	14.3	42.8
Mink	2	100.0	0.0	0.0	100.0	0.0	0.0
Wolf	2.5	80.0	20.0	0.0	20.0	80.0	0.0
Wolverine	2	50.0	50.0	0.0	50.0	0.0	50.0

<sup>a</sup> Theoretical maximum number harvested and used by the sample

had received. With some fur resources, such as wolf or wolverine, the number of furs reported in this study was too small to substantiate a definite pattern.

Table 22 shows the percentage of sampled households harvesting, receiving, purchasing, giving, selling, and using furbearers. Marten were harvested by the greatest proportion of households (27.0 percent). Beaver meat was the most widely shared, resulting in 47.3 percent of households using beaver meat.

Sale of some species was more prevalent than with others. For example, 50.4 percent of the marten and 80.0 percent of the lynx obtained were sold. In contrast, none of the beaver meat was sold. Beaver meat was either used within the household or given to others. This corresponds to the finding that a larger proportion (36.9

TABLE 22. FURBEARER HARVEST AND USE BY GALENA RESIDENTS, NOVEMBER 1985 - APRIL 1986

Resource	Percentage of Sample Households					
	Harvesting	Receiving	Purchasing	Giving	Selling	Using
Marten	27.0 %	5.4 %	6.8 %	2.7 %	10.8 %	28.4 %
Beaver meat	16.2	33.8	2.7	9.5	0.0	47.3
Beaver fur	16.2	4.1	4.1	2.7	9.5	14.9
Lynx	8.1	0.0	0.0	0.0	6.8	1.4
Land otter	5.4	1.4	0.0	0.0	2.7	4.1
Red fox	5.4	1.4	1.4	1.4	4.1	2.7
Mink	1.4	0.0	0.0	0.0	0.0	1.4
Wolf	1.4	1.4	0.0	1.4	0.0	1.4
Wolverine	1.4	1.4	0.0	0.0	1.4	1.4

percent) of the beaver carcasses were obtained by households through acquisition from others. A substantial proportion (39.9 percent) of the marten was used within the household, primarily in sewing hats. The 27 sampled households which harvested furbearers indicated that, overall, only 75.7 percent of their harvests (by dollar value) were actually sold. The remaining 24.3 percent was used for sharing or household use.

The potential dollar value of the Galena furbearer harvest for the 1985-86 season is shown in Table 23. The combined trapping harvest for the entire community is estimated at a value of \$71,094 based on average fur market prices and the estimated total community harvest for each species. The estimated average dollar value of the total harvest was \$924 per household for trapping households. The range of potential fur value varied from \$55 to \$3,175. Native household fur value averaged \$962 per household (n=19), slightly higher than those of non-Native households which averaged \$832 per households (n=8).

TABLE 23. POTENTIAL DOLLAR VALUE OF FURBEARER HARVESTS OF GALENA HOUSEHOLDS, 1985-86 SEASON

Resource	Average Market Price <sup>a</sup> (dollars)	Estimated Community Total Harvest (number)	Potential Value of Total Harvest (dollars)
Marten	\$ 55	650.1	\$ 35,756
Beaver	55	313.6	17,248
Lynx	350	42.8	14,980
Land otter	35	20.0	700
Red fox	35	11.4	399
Mink	30	5.7	171
Wolf	200	5.7	1,140
Wolverine	250	2.8	700
Total			\$ 71,094

<sup>a</sup> source: Timothy Osborne pers. comm., 1987.



## CHAPTER 9. PLANT GATHERING

Galena residents harvested a variety of wood and edible plant materials. Spruce logs commonly were used in residential and commercial construction. Spruce and birch were cut for firewood for home heating. Berry picking was the most common plant harvesting activity.

Most residents traveled by boat or road vehicle to berry picking areas within an hour's travel time of Galena. Popular areas reached by river included Bear Creek, Pilot Mountain Slough, Loudon Slough, and nearby family fish camps along the Yukon River. Sites close to town accessible by road, such as near Campion, were also regularly used. Knowledge of berry abundance and ripeness in specific locations was shared among residents. Either whole family groups or women, often accompanied by their children, gathered berries together. Berries were harvested when ripe beginning with bog blueberry (*Vaccinium uliginosum*) in early July and August. Highbush cranberry (*Viburnum edule*), lowbush cranberry (*Vaccinium vitis-idaea*), and raspberry (*Rubus idaeus*) were picked in August and early September. Salmonberries (*Rubus chamaemorus*) were received from residents of Nulato. Labrador tea (*Ledum groenlandicum*) and rose hips (*Rosa acicularis*) were picked by a few Galena residents.

Spruce and birch were cut for firewood to heat homes, although most sought-after wood for home heating was dry spruce. Dry standing cottonwood (*Populus balsamifera*) was used for drying and smoking fish. Wood cutters reported having to travel increasingly longer distances in order to reach stands of large spruce. Timber cutting

areas south of the river were reached by snowmachine and cordwood was hauled back to Galena by the sled load. This included both areas east and west of Kala Slough. Areas north of the Yukon River were reached in winter by either snowmachine or four wheeled drive truck.

In some years copious amounts of driftwood from the Yukon River became available on the north bank of the river. This often occurred after breakup when the rising river level washed trees into the river and a south wind pushes the drift along the river's north bank. Logs deposited along the bank and on a gravel bar directly west of town were easily accessed by truck after the water receded. Most of this wood was collected in June.

The availability of logs suitable for constructing houses improved with distance from town. Thus, most logs were cut upriver and floated down. The ideal time for harvesting these logs was when high water conditions, commonly in early summer, allowed for access to upper tributaries of the Nowitna and Yuki rivers.

#### PARTICIPATION AND HARVESTS

Berry picking and firewood cutting were the most common subsistence activities of Galena residents. Table 24 shows the proportion of sampled households participating in these harvests, the average household harvest, and the estimated total harvest for the community. The 67.6 percent participation rate for berry picking was the highest recorded in this survey for any harvest activity. Firewood was also cut by some residents for sale in Galena, but this harvest was not included in the survey.

TABLE 24. PLANT HARVESTS OF GALENA RESIDENTS, JUNE 1985 - MAY 1986

Resource Harvested	Percentage of Sample Households Harvesting (n=74)	Of Households Harvesting		Estimated Total Community Harvest (n=211)
		Range of Harvests	Mean Harvest	
Berries	67.6 %	.2-34 gal.	3.1 gal.	447.4 gal.
Firewood	52.7	1-11 cords	5.7 cords	633.0 cords
House logs	8.1	3-77 logs	29.0 logs	496.1 logs



## CHAPTER 10. COOPERATION IN HARVESTING AND SHARING

### HUNTING AND FISHING WORK GROUPS

Most harvest activities were conducted by groups of two or more residents who worked together to harvest, process, and share wild food and products. During the household survey, respondents were asked about cooperation for two major activities, moose hunting and salmon fishing. Thirty-two (43.2 percent) of 74 sampled households, or 71 percent of households who hunted moose, reported they hunted moose as part of a group made up of members of other households. Hunting group sizes ranged up to eight individuals, representing up to four separate households. Salmon fishing, which included fishing both with family members from fish camps and individually, showed a lower percentage of multi-household participation with 21 (28.3 percent) of 74 sampled households fishing with other households. Seventy-five percent of households who fished for salmon fished with other households. Reported fishing group size ranged up to 10 people. However, many more extended family members were present at fish camps and helped in some aspect of fish camp activities, as noted earlier.

Table 25 shows the relationship between the respondent and other work group members for both the 45 moose hunting and the 28 salmon fishing households in the sample. This information was collected using a survey question on the composition of the salmon fishing work group. Cooperative efforts among individuals related

TABLE 25. RELATIONSHIP OF HOUSEHOLD RESPONDENT TO OTHER MEMBERS OF  
MOOSE HUNTING AND SALMON FISHING WORK GROUPS,  
GALENA 1985-86

Relationship	Moose Hunting (n=45 households)	Salmon Fishing (n=28 households)
Head (worked individually)	43	25
Spouse	14	13
Brother	8	4
Sister	0	1
Son	18	8
Daughter	3	4
Father	3	2
Mother	0	1
Wife's sister	0	1
Wife's brother	2	0
Daughter's son	1	0
Daughter's husband	0	1
Father's brother	1	1
Father's half brother	0	1
Father's half brother's wife	0	1
Mother's sister's husband	1	0
Sister's son	1	0
Other relative	0	2
Friend	24	8
Coworker	11	13
Unknown	1	0
Total	131	76

through males were more common than through females for both activities. However, relationships through females were more prevalent in fishing than in moose hunting. Most frequently moose hunters hunted alone or with either their spouse, son, or friend (Table 25). Salmon fishing most often occurred alone, and secondarily with their spouse or a coworker.

## SHARING PATTERNS

### Within Galena

Considerable giving and receiving of resources took place between households within Galena. Many households obtained wild resources primarily by receiving them from other households and not from their own harvest activity. Overall, 70.3 percent of the sampled households (52 of 74) indicated that they used more wild resources than they harvested. The remaining 29.7 percent indicated the amount they harvested was greater than the amount they consumed.

Table 26 shows the percentage of households receiving and giving 24 different resources. For six of these, a greater proportion of households received resources than harvested them. These included moose, fall chum salmon, king salmon, beaver, whitefish, and caribou. Moose was given to other households with a greater frequency than any other resource. One result of this sharing was that, overall, many more households used wild food than harvested wild food. Moose, fall chum salmon, and king salmon were the most widely used resources overall. Nearly all households (94.6 percent) reported using moose.

The greatest differential between harvest and use was found with three resources: caribou, fall chum, and king salmon. These were all resources which required comparatively greater travel to hunting areas such as for caribou, or access to productive fishing sites, such as for salmon with set gill nets. In contrast, a much

TABLE 26. PERCENTAGE OF SAMPLE HOUSEHOLDS HARVESTING, RECEIVING, GIVING AWAY, AND USING RESOURCES

Resource	Percentage of Households			
	Harvesting	Receiving	Giving	Using
Moose	50.0 %	66.2 %	32.4 %	94.6 %
Fall chum salmon	21.6	45.9	10.8	85.1
King salmon	23.0	51.9	10.8	82.4
Berries	67.6	6.8	6.8	68.9
Grouse	55.4	12.2	9.5	66.2
Ducks	44.6	16.2	4.1	60.8
Geese	31.1	18.9	5.4	50.0
Beaver	16.2	33.8	9.5	47.3
Whitefish	18.9	25.7	5.4	44.6
Sheefish	24.3	17.6	1.4	41.9
Northern pike	32.4	8.1	2.7	35.1
Caribou	6.8	28.4	6.8	33.8
Hare	28.4	5.4	4.1	29.7
Black bear	17.6	14.9	6.8	28.4
Burbot	20.3	6.8	5.4	27.0
Summer chum salmon	13.5	9.5	4.1	21.6
Ptarmigan	17.6	4.1	0	21.6
Arctic grayling	10.8	5.4	0	16.2
Trout	6.8	1.4	0	9.5
Muskrat	4.1	4.1	0	8.1
Alaska blackfish	4.1	2.7	1.4	6.8
Porcupine	4.1	1.4	1.4	4.1
Crane	4.1	0	1.4	2.7
Longnose sucker	2.7	0	0	0

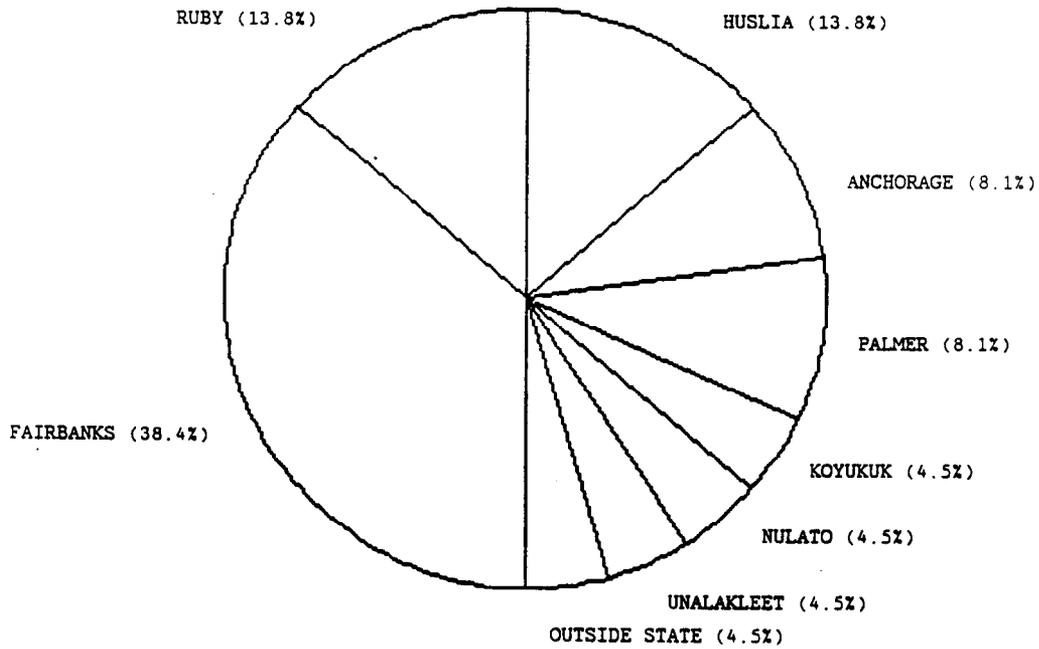
lower rate of sharing or exchange was found for berries, grouse, pike, or hare, all resources which were more readily obtained in terms of shorter travel distance, less equipment required for harvesting, and greater availability of harvest areas. Table 26 does not distinguish between exchanges taking place exclusively within Galena and those taking place with other communities.

### Between Galena and Other Communities

One purpose of this study was to examine the relationship between Galena and the neighboring communities in terms of land use, resource sharing, and social ties. In 1985-86, Galena served as a subregional center that had a population largely derived from the surrounding villages. For example, a majority of Galena household heads (54 percent) previously resided in communities elsewhere in the subregion. Thus, many Galena households had family ties to those other communities. A smaller percentage (39.2 percent) of household heads indicated their birthplace outside of the subregion.

Figure 12 shows the communities where Galena residents typically exchanged moose, caribou, and salmon with residents. Fairbanks (38.4 percent) was most frequently reported as the destination of wild foods originating from Galena households. Secondly, foods were sent to residents of Huslia (13.8 percent) and Ruby (13.8 percent). However, the distribution of wild food to Middle Yukon and Koyukuk River communities combined (36.6 percent) nearly equalled the distribution to relatives residing in Fairbanks. Most of this exchange was fish. Just over one-half of the giving (12 of 22 households) took place through family relatives while just under one-half (10 of 22 households) took place among non-kin, as indicated by survey respondents. Much of the salmon that Galena residents sent to other communities was dried summer chum salmon or king salmon strips.

DESTINATION TO OTHER COMMUNITIES  
BY PERCENTAGE OF EXCHANGES



SOURCE FROM OTHER COMMUNITIES  
BY PERCENTAGE OF EXCHANGES

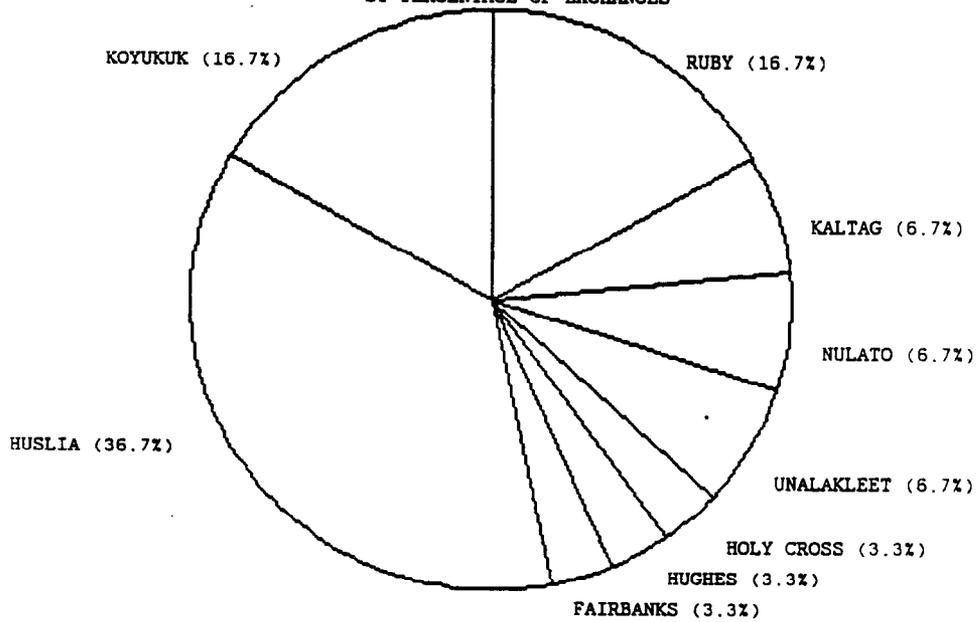


Fig. 12. Destination and source communities of moose, caribou, and salmon shared between residents of Galena and other communities, 1985-86.

Moose, caribou, and salmon were also received by Galena households from members of other communities, primarily relatives. The sources of these exchanges are also shown in Figure 12. Most often, wild food was received from residents of Huslia and secondarily from people in Koyukuk and Ruby. In total 83.5 percent of the reported exchanges of moose, caribou, and salmon received by Galena households came from the Middle Yukon and Koyukuk River communities combined. Most (23 of 30 households) of the receipt of wild foods took place through relatives, in contrast to giving food. Quantities of food shared ranged from small amounts such as a few pounds up to larger amounts such as one-half of a caribou or over 100 pounds of moose meat. Finally, it is noteworthy that the customary exchange of wild foods between Athabaskan Indians of this area and coastal Eskimos at Unalakleet continued in the 1980s.

Other resources commonly shared included food items served at potlatches, stick dance, and spring carnivals. One woman reported receiving crab and herring eggs from a daughter living in Yakutat. Others received tom cod and seal oil from friends and relatives living in Unalakleet. Berries were also shared between communities.



## CHAPTER 11. DISCUSSION

### OVERVIEW OF HARVEST PATTERNS

Subsistence uses of wild renewable resources play important roles in the life and economy of Galena. These resources satisfy a wide variety of economic and cultural needs, including food, shelter, fuel, clothing, tools, transportation, and customary trade.

Substantial quantities of fish and wildlife were harvested the year of the study. Galena residents harvested approximately 543,000 pounds of wild food between June 1985 and May 1986, according to the random survey. That amount corresponds to an estimated average household harvest of 2,574 pounds ( $\pm$  1418 pounds) and a per capita harvest of 787 pounds ( $\pm$  428 pounds).

Salmon accounted for 67.6 percent of the total harvest by weight, followed by large game (19.7 percent), and other fish (7.8 percent) (Table 27). Summer chum salmon fishing, an activity in which 13.5 percent of households participated, accounted for the largest proportion (50.5 percent) of the total subsistence harvest by weight (Table 27). Other subsistence resources which contributed substantial amounts to the total harvest were moose (17.4 percent) fall chum salmon (10.9 percent), king salmon (7.8 percent), and whitefish (5.7 percent).

Much of the overall subsistence harvest was made up of fish used to feed dogs. Dogs consumed 53.3 percent by weight of the overall subsistence harvest. This included 96.4 percent of the summer chum salmon harvest, 78.1 percent of the whitefish harvest,

TABLE 27. ESTIMATED SUBSISTENCE OUTPUT IN EDIBLE POUNDS BY RESOURCE CATEGORY FOR CALENA RESIDENTS, JUNE 1985 - MAY 1986

Resource Category	Percentage of Households Harvesting	Mean Household Harvest in Pounds (all HHS)	Per Capita Harvest in Pounds	Estimated Community Total (lbs)	Percentage of Total by Weight
Salmon	36.5 %	1,782.1 lbs	544.9 lbs	367,023 lbs	67.6 %
Other fish	51.4	201.2	61.5	42,443	7.8
Big game	56.8	506.0	154.7	106,764	19.7
Small game	36.5	50.4	15.4	10,645	2.0
Birds	62.2	25.7	7.9	5,429	1.0
Plants	67.6	8.5	2.6	1,789	.3
Total	90.5	2,573.9	787.1	543,093	100.0

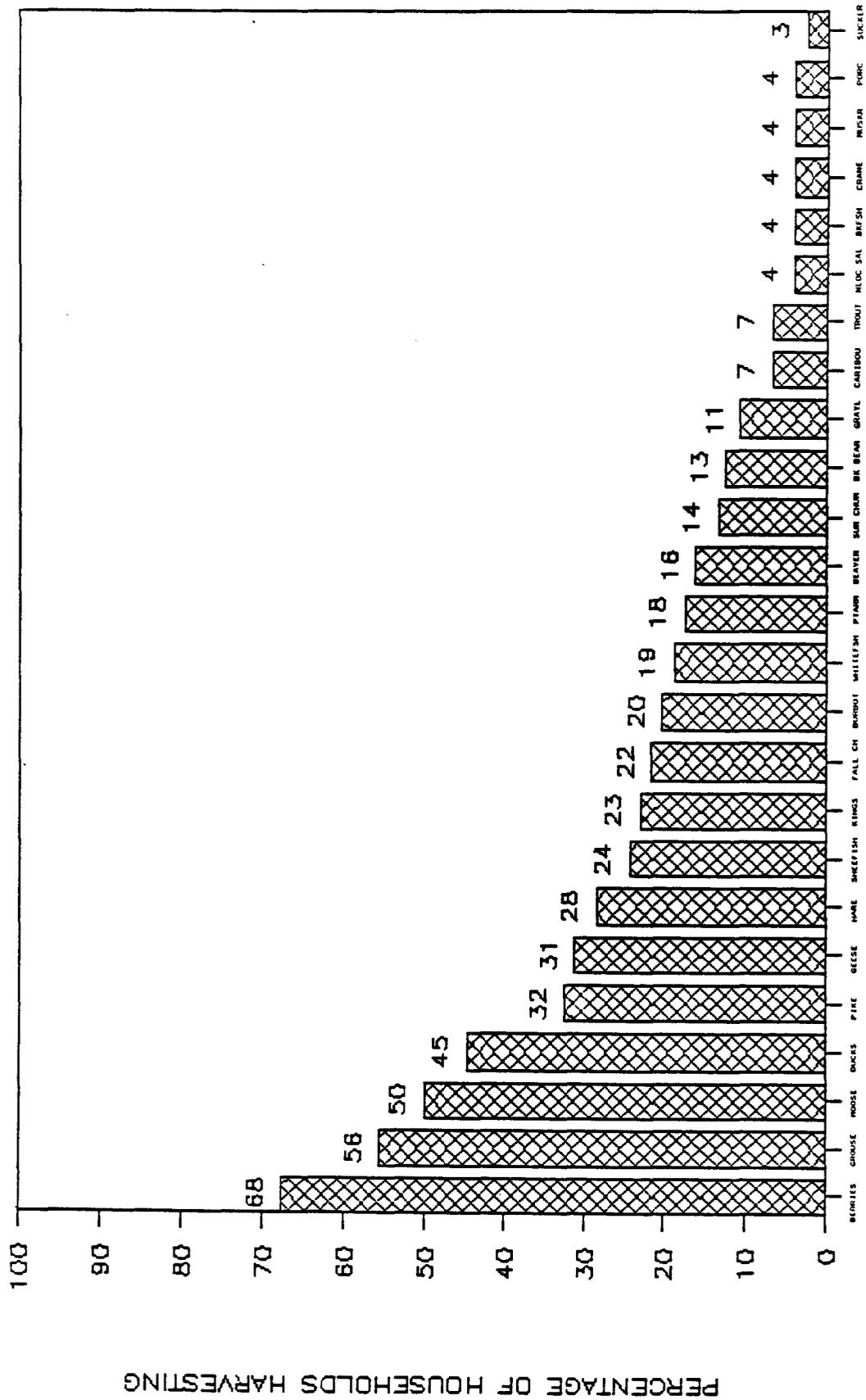
sucker harvest, and 20.0 percent of the pike harvest. When only the harvest for human consumption is considered, the average household harvest was 1,201.5 pounds and the per capita harvest was 367.4 pounds. Excluding fish used to feed dogs, the three major resources for human consumption were moose (37.4 percent of the total harvest), fall chum salmon (23.3 percent), and king salmon (16.6 percent). Together these three resources comprised 77.3 percent of the wild food used for human consumption.

Participation in harvest activities and amounts of edible food harvested varied among Galena households. Some Galena households in the study sample reported little or no participation in hunting, fishing, or trapping activity, while others reported year-round participation and taking up to 18 different resources. Table 28 displays the percentage of households harvesting and average harvests for each of 25 resources. At least one-half of the households participated in berry picking, grouse hunting, and moose hunting (Fig. 13, Table 28).

The amount of wild foods harvested by households varied widely, with some displaying low harvest levels and others reporting harvests over 10,000 pounds. In Galena, a small proportion of the households accounted for a majority of the total community harvest. This pattern is similar to that in other recent rural Alaska subsistence studies (Andrews 1988; Shinkwin and Case 1984; Sumida 1988; Wolfe 1987). Figure 14 shows the cumulative percentage of the harvest produced by the cumulative percentage of households. The shape of the curve is influenced by the few households with very substantial harvests. It shows that five percent of Galena's households all of

TABLE 28. GALENA SUBSISTENCE OUTPUT IN POUNDS DRESSED WEIGHT, JUNE 1985 - MAY 1986

Resource Category	Percentage of HHS Harvesting	Mean Household Harvest In Pounds (all HHS)	Per Capita Harvest In Pounds	Estimated Community Total (lbs)	Percentage of Total by Weight	Estimated Community Total (number)
King salmon	23.0 %	199.9 lbs	61.1 lbs	42,182 lbs	7.8 %	3,057
Summer chum salmon	13.5	1,299.8	397.4	274,260	50.5	59,622
Fall chum salmon	21.6	280.2	85.6	59,128	10.9	10,559
Non-local salmon	4.1	2.1	.6	453	.1	57
Whitefish	18.9.	147.9	45.2	31,205	5.7	10,402
Sheefish	24.3	18.4	5.6	3,892	.7	519
Pike	32.4	17.1	5.2	3,610	.7	602
Burbot	20.3	10.1	3.0	2,133	.4	627
Grayling	10.8	2.6	.7	539	.1	770
Trout	6.8	1.9	.5	402	.1	268
Blackfish	4.1	1.9	.5	411	.1	411 lbs.
Sucker	2.7	1.2	.3	251	.0	114
Moose	50.0	449.0	137.3	94,745	17.4	121
Caribou	6.8	39.7	12.1	8,383	1.5	40
Black bear	12.6	17.2	5.2	3,635	.7	36
Beaver	16.2	44.6	13.6	9,409	1.7	314
Hare	28.4	4.6	1.3	964	.2	482
Porcupine	4.1	.6	.1	137	.0	14
Muskrat	4.1	.6	.1	136	.0	80
Geese	31.1	11.1	3.3	2,344	.4	391
Ducks	44.6	7.2	2.1	1,512	.3	1,374
Crane	4.1	.4	.1	78	.0	14
Grouse	55.5	6.4	1.9	1,344	.2	1,679
Ptarmigan	17.6	.7	.2	152	.0	217
Berries	67.6	8.5	2.5	1,790	.3	448 gal.



WILDLIFE RESOURCE

Fig. 13. Household participation in wildlife harvests in Galena, 1985-86.

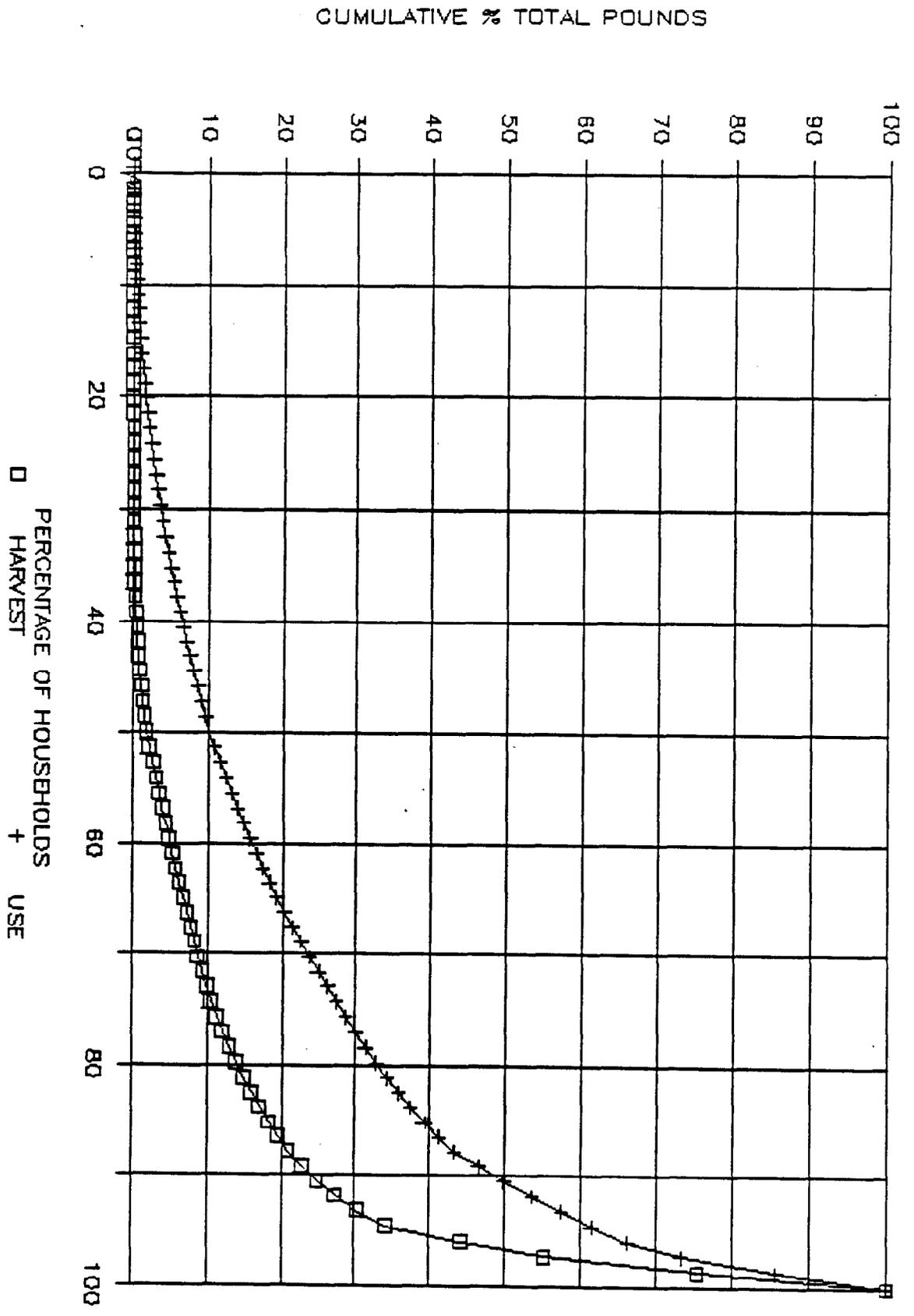


Fig. 14. Cumulative household subsistence harvest and use, Galena 1985-86.

the accounted for nearly two-thirds of the total harvest, largely on account of summer chum salmon harvests. In contrast, 70 percent of the households accounted for only 8.8 percent of the harvest. The contrast between these extremes in the Galena sample is particularly influenced by the inclusion of summer chum salmon which were used for both human consumption and for dogs.

The cumulative percentage of resource used by Galena residents is also shown in Figure 14. The pattern of use is more widespread than the pattern of harvest because sharing among households resulted in a wider distribution of resources than just those who harvested them. Seventy percent of Galena's households accounted for 30.6 percent of the total use, a much greater proportion than the 8.8 percent harvest noted above. One-half of the households reported using over 800 edible pounds of wild food and all of the surveyed households used over 50 pounds. How this variation in household harvest correlates with household social and demographic characteristics such as birthplace, age, ethnicity, and household composition is discussed below.

Figure 15 shows the cumulative harvests excluding dog food. It shows that 30 percent of Galena's households produced 80 percent of the food supply, excluding dog food.

CUMULATIVE % TOTAL POUNDS

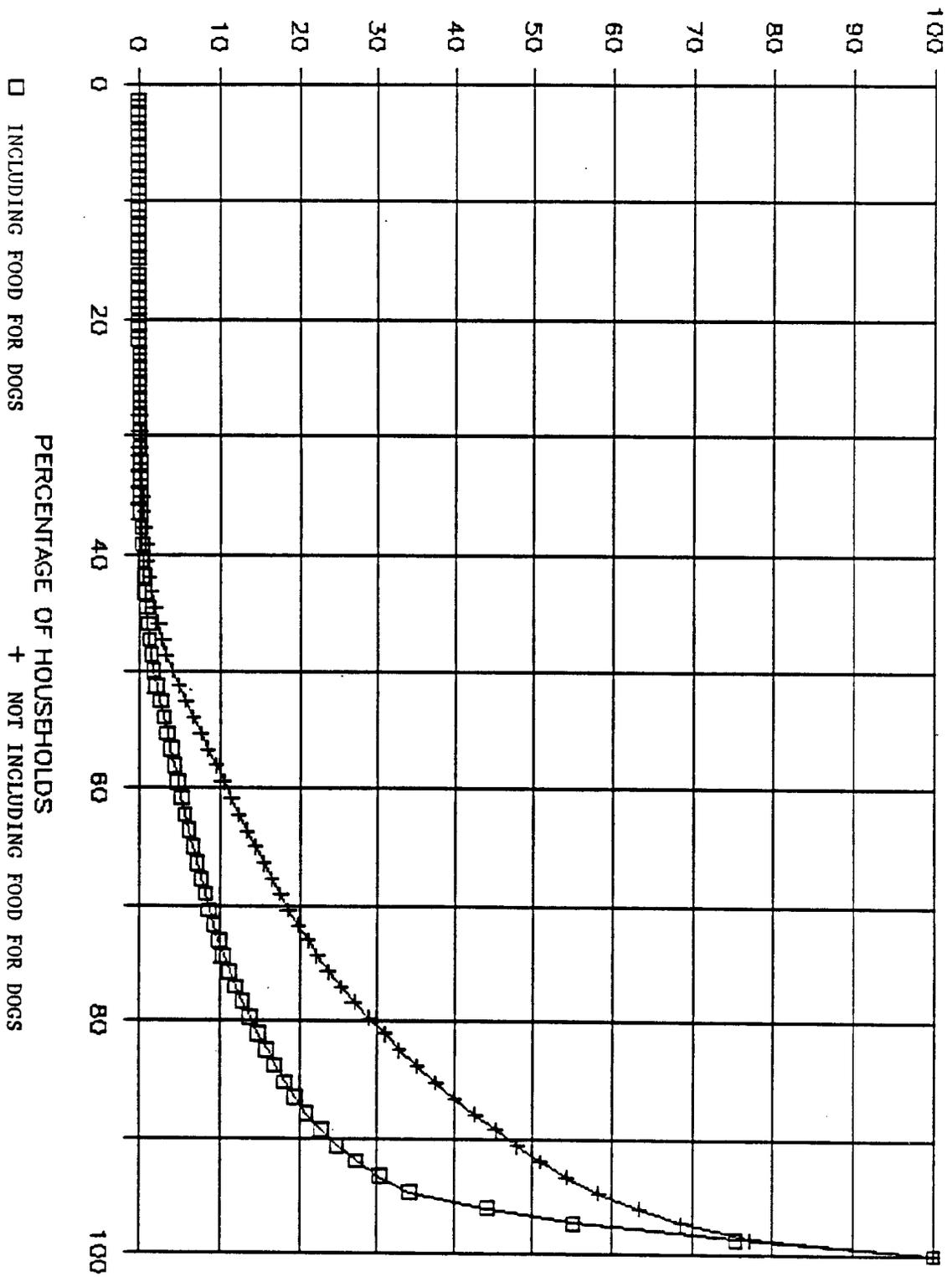


Fig. 15. Cumulative household subsistence harvest for human and dog consumption, Galena 1985-86.

RELATIONSHIP OF FISH AND WILDLIFE HARVESTS TO HOUSEHOLD  
SOCIAL AND DEMOGRAPHIC CHARACTERISTICS

Ethnicity

On the average, Native and non-Native harvest patterns differed. Native households, those which included at least one Native as head of household or spouse of head, harvested greater quantities of wild resources and showed a wider diversity of harvest activities, based on participation or use. Table 29 shows the household harvests for the 74 sampled households as a function of the ethnicity of the 49 households headed by a couple. Households headed by a couple, each of whom was Native, displayed per capita harvest levels 14 times greater than those headed by a non-Native couple. Households headed by couples which included only one Native harvested twice as much wild food as households with non-Native heads. Harvest diversity, as measured by the number of resource types, was the broadest among households headed by a Native couple. There was less diversity in subsistence activities for households headed by a couple with one or no Native person.

The per capita harvest and per capita use of edible resources is shown for these three types of households in Table 29 and Figure 16. The disparity of use among these household types is less than shown for harvests. However, use of fish and wildlife by households headed by a Native couple was four times greater than for non-Native headed households on a per capita basis (Fig. 16) Figure 16 also shows that households headed by a Native couple shared more resources than either non-Native or a combined headed household, because use

TABLE 29. MEAN HARVEST DIVERSITY, OUTPUT, AND USE, BY ETHNICITY OF HOUSEHOLD HEAD AND SPOUSE, GALENA 1986

Ethnicity of Household Head and Spouse	Mean Number of Resources Harvested	Mean Pounds Harvested		Mean Pounds Used in Household	
		Per Household	Per Person	Per Household	Per Person
Both Native (n=20)	9.9	8,087.1 lbs	1,777.4 lbs	3,596.1 lbs	790.4 lbs
One Native, One non-Native (n=9)	5.0	860.5	227.8	1,797.3	475.7
Both non-Native (n=20)	4.2	400.7	125.2	538.7	168.3
All pairs (n=49)	6.7	3,622.9	939.2	2,017.8	523.1
Single head (Native and non-Native) (n=25)	3.5	518.7	244.7	748.2	352.9

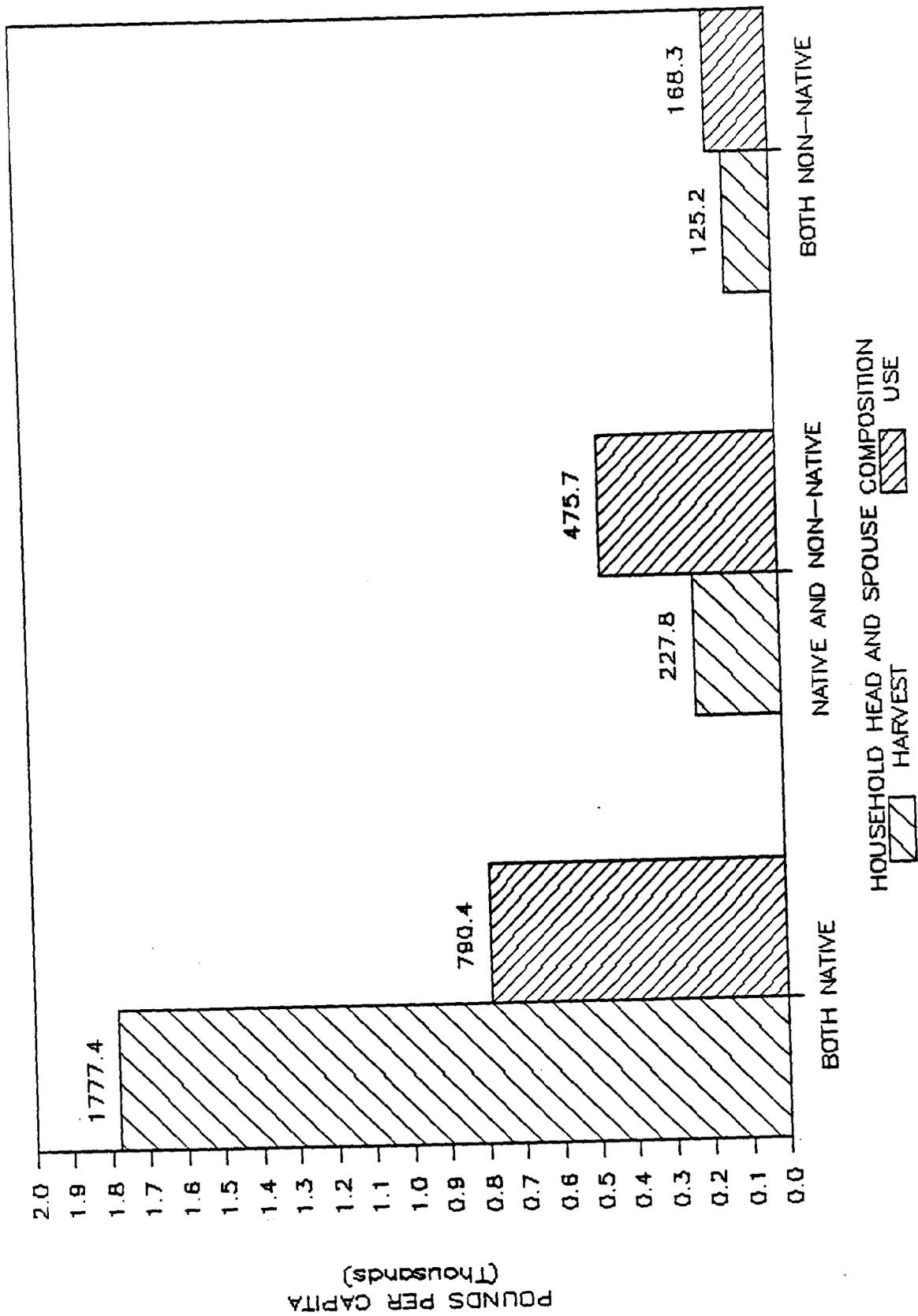


Fig. 16. Mean per capita fish and wildlife harvest and use by ethnicity of household head and spouse, Galena 1985-86.

was less than harvest for Native households. For non-Native households and households with one Native head, use exceeded harvest. For the 20 households headed by a Native couple, the amount used was about one-half of the amount harvested. For the nine households headed by one Native and one non-Native, the amount used was about twice the amount harvested. These disparities represent the source and destination of much of the sharing that occurred within the community.

#### Birthplace of Household Head

A mosaic pattern of diversity has developed in Galena where a majority of household heads have moved to the community from other locations, representing both different regional communities and different cultural patterns from outside the region. Only 18.9 percent of the sampled household heads were originally from Galena or Loudon. An additional 39.2 percent were originally from surrounding communities, primarily Nulato and Koyukuk but also including Hughes, Huslia, Ruby, Kaltag, or now abandoned family settlements near these communities. The remaining 41.9 percent were originally from outside the region, mostly from out of state.

The harvest diversity and quantity of wild food for these groups are shown in Table 30 and Figure 17. The group displaying the greatest amount of wild food harvested per capita was the group including those from the surrounding communities. On the average, households in this group harvested 1.6 times as much wild food per capita as those originally from Galena, although there was much less

TABLE 30. MEAN HARVEST DIVERSITY, OUTPUT, AND USE BY BIRTHPLACE OF HOUSEHOLD HEAD, GALENA 1986

Birthplace of Household Head	Mean Number of Resources Harvested	Mean Pounds Harvested		Mean Pounds Used in Household	
		Per Household	Per Person	Per Household	Per Person
Galena (n=14)	5.2	2,395.4 lbs.	762.2 lbs.	2,1128.9 lbs.	677.4 lbs.
Within the Region (n=29)	6.8	4,848.5	1,255.4	2,035.9	527.2
Outside the Region (n=31)	4.7	526.6	189.8	926.8	334.1
All households (n=74)	5.6	2,573.9	787.1	1,588.9	485.8

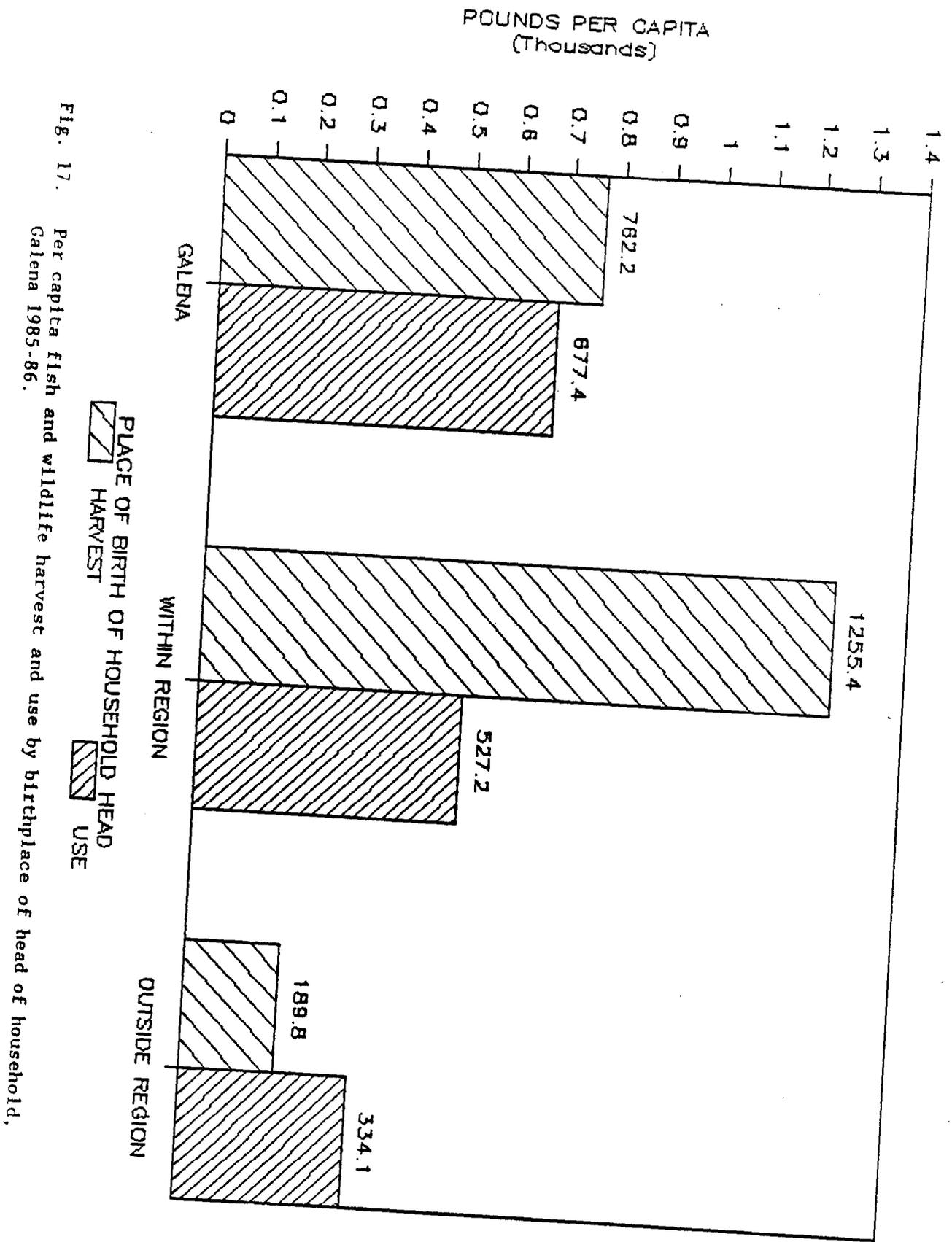


Fig. 17. Per capita fish and wildlife harvest and use by birthplace of head of household, Galena 1985-86.

difference in diversity of resources harvested. The group consisting of household heads from outside the region displayed an average harvest level per capita less than one quarter of those originally from Galena or the region.

Birthplace of household head was also examined as a possible influence on a household's involvement in different harvest activities. Surveyed households were asked about participation in seven major harvest activities. Figure 18 shows the percentage of households that participated in each activity for households headed by individuals from Galena, from the region, and from outside the region. Households headed by those born outside the region were about equally as likely to participate in berry picking as households headed by those born in the surrounding communities in the region or in Galena. Households from outside the region were less likely to participate in trapping and wood gathering, and far less likely to participate in commercial fishing. The Galena origin households were less likely to participate in activities than were households from the surrounding communities within the region, with the exception of berry picking.

#### Length of Residency

The number of years the household head had resided in Galena was compared with the household's subsistence harvest and use to see if new residents to Galena became more productive in harvesting wild foods with an increased number of years in the community. Table 31 shows a summary of average household harvest diversity, output,

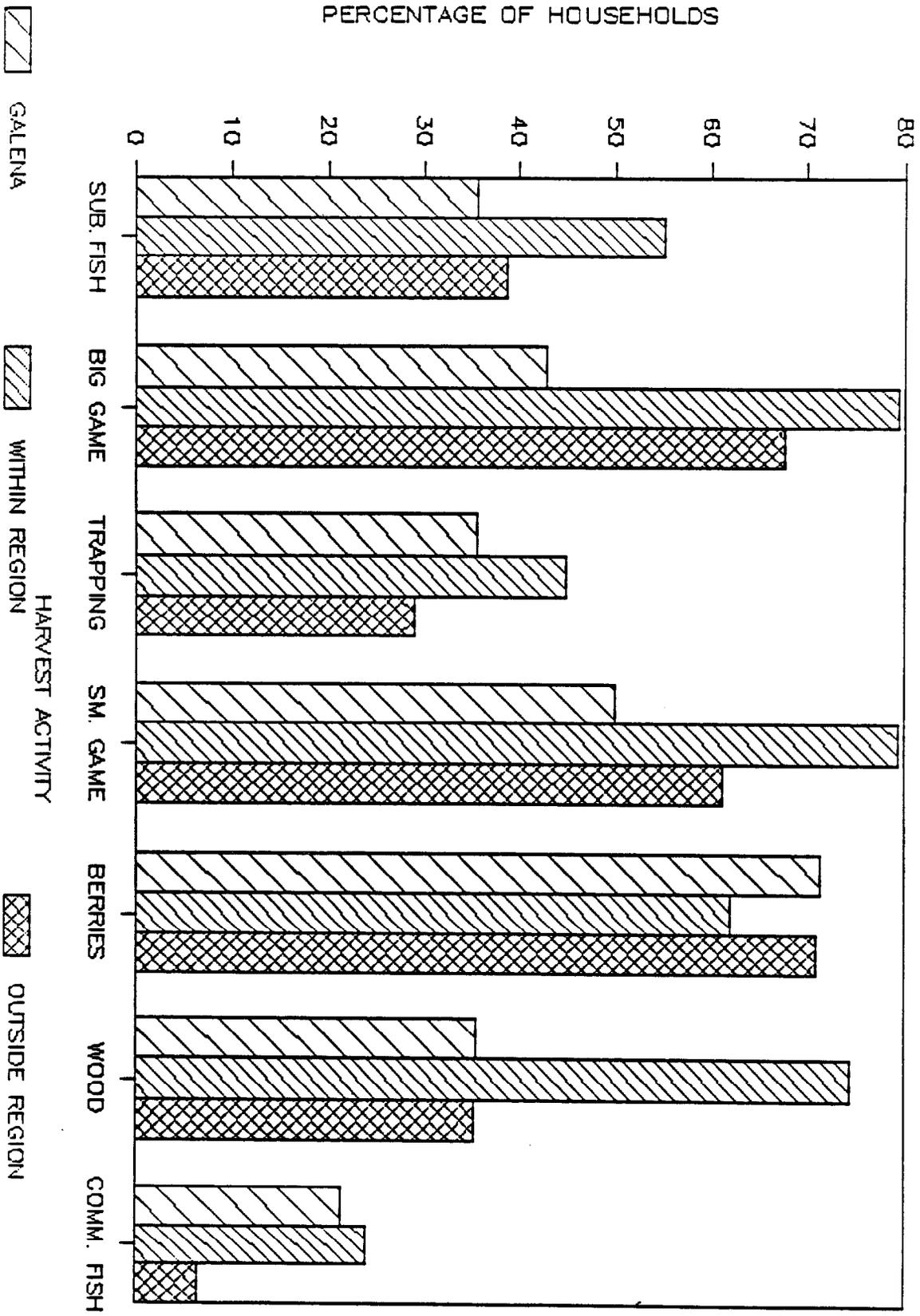


Fig. 18. Percentage of households participating in harvest activities by birthplace of household head, Galena 1985-86.

TABLE 31. MEAN HARVEST DIVERSITY, OUTPUT, AND USE BY LENGTH OF RESIDENCY OF HOUSEHOLD HEAD, GALENA 1986

Household Head Length of Residency (years)	Mean Number of Resources Harvested	Mean Pounds Harvested		Mean Pounds Used in Household	
		Per Household	Per Person	Per Household	Per Person
1-5 (n=22)	4.2	392.6 lbs	127.0 lbs	561.8 lbs	181.8 lbs
6-10 (n=11)	7.4	1,334.6	419.4	1,360.6	427.6
11-15 (n=7)	3.4	405.7	142.0	653.4	228.7
16-20 (n=7)	6.3	7,801.6	2,184.4	2,731.0	764.7
21-25 (n=6)	7.3	11,151.7	3,186.2	4,419.9	1,262.8
26+ (n=10)	6.8	1,668.7	505.7	1,571.9	476.3
All non-locally Born household Heads (n=63)	5.6	2,609.0	813.7	1,480.2	461.7
Locally born Household heads (n=11)	5.6	2,372.9	652.5	2,211.0	608.0
All households (n=74)	5.6	2,573.9	787.1	1,588.9	485.8

and use by length of residency of the household head. Overall, the 63 sampled households that moved to Galena harvested an average of 2,609.0 edible pounds annually, compared with an average of 2,379.2 edible pounds for the 11 sampled households that were headed by a lifetime Galena resident. Households in Galena five years or less displayed the lowest harvest and lowest use of resources (127.0 pounds and 181.8 pounds per capita respectively) in comparison with households in Galena longer than five years. A trend of progressively greater quantities of harvest or use was not apparent in households residing in Galena longer than six years. This may be because of the effect of other more important variables such as ethnicity and household composition.

#### Age of Head of Household

Harvest levels differed among sampled households depending upon the age of household head. Households headed by individuals 50 years and older harvested greater quantities of wild food than households with heads less than 50 years of age (Table 32). The sampled households over 60 years of age displayed the highest average pounds harvested per household and the highest average pounds harvested per person. Output of households with heads 40 to 49 was less than those heads 30 to 39. Harvest diversity increased with head of household age.

TABLE 32. MEAN HARVEST DIVERSITY, OUTPUT, AND USE BY AGE OF HEAD OF HOUSEHOLD, GALENA 1986

Household Head Age	Mean Number of Resources Harvested	Mean Pounds Harvested		Mean Pounds Used in Household	
		Per Household	Per Person	Per Household	Per Person
20-29 (n=11)	4.6	810.0 lbs	254.6 lbs	891.6 lbs	280.2 lbs
30-39 (n=23)	5.0	2,704.7	797.5	925.7	273.0
40-49 (n=16)	5.2	1,025.1	241.2	1,634.7	384.6
50-59 (n=13)	6.8	3,677.4	1,593.5	2,031.8	880.4
60+ (n=11)	7.0	5,013.0	1,778.8	3,082.8	1,093.9
All households (n=74)	5.6	2,573.9	787.1	1,588.9	485.8

## Household Composition

Members of extended family work groups shared in the harvest and processing of resources and in the subsequent distribution of those resources. Often family members resided in several households, each related to a "core household" which provided the basic social organization for many of the hunting, fishing, and trapping activities. The sampling unit used in this study was the household, and not extended family or subsistence production unit, which may account for the considerable variation was found among sampled households of different demographic configurations. The average harvest quantity for these different household types are shown in Table 33. Each sampled household was categorized on the basis of whether it was headed by a couple, single female, or single male, and whether it included dependents less than 18 years of age only, dependents 18 years or older, or no dependents at all. This table includes data for only Native households, since non-Native household members generally did not engage in hunting, and fishing with extended family members, given the pattern of settlement in Galena.

Above average per capita outputs were found with three household types: couples with no dependents, couples with dependents less than 18 years of age, and single males with no dependents (Table 33, Fig. 19). Above average harvest diversity, as measured by the number of resources harvested, was found with households headed by a couple, especially those with dependents 18 years and older, and single males with no dependents. Single female headed households, particularly those with no dependents or with only children present,

TABLE 33. MEAN HARVEST DIVERSITY, OUTPUT, AND USE BY HOUSEHOLD DEMOGRAPHIC TYPE,  
NATIVE HOUSEHOLDS ONLY, GALENA 1986

Household Demographic Type	Mean Number of Resources Harvested	Mean Pounds Harvested		Mean Pounds Used in Household	
		Per Household	Per Person	Per Household	Per Person
Couple, No dependents (n=5)	9.8	2,545.0 lbs	908.9 lbs	2,158.1 lbs	770.9 lbs
Couple, Dependents <18 (n=20)	7.2	7,189.8	1,691.7	3,142.6	739.4
Couple, Dependents ≥18 (n=4)	12.5	3,242.4	498.8	3,613.5	555.9
Single female No dependents (n=4)	1.0	20.1	20.1	308.1	308.1
Single female Dependents <18 (n=6)	1.0	142.6	47.5	554.8	184.9
Single female Dependents ≥18 (n=4)	5.2	665.4	204.7	1,079.9	332.3
Single male No Dependents (n=3)	7.0	1,498.4	1,498.4	1,964.7	1,964.7
Single male Dependents <18 (n=1)	5.0	525.4	105.1	401.4	80.3
Single male Dependents ≥18 (n=1)	5.0	1,647.4	549.1	1,007.0	335.7
Total (n=48)	6.4	3,744.8	1,051.2	2,172.5	609.8

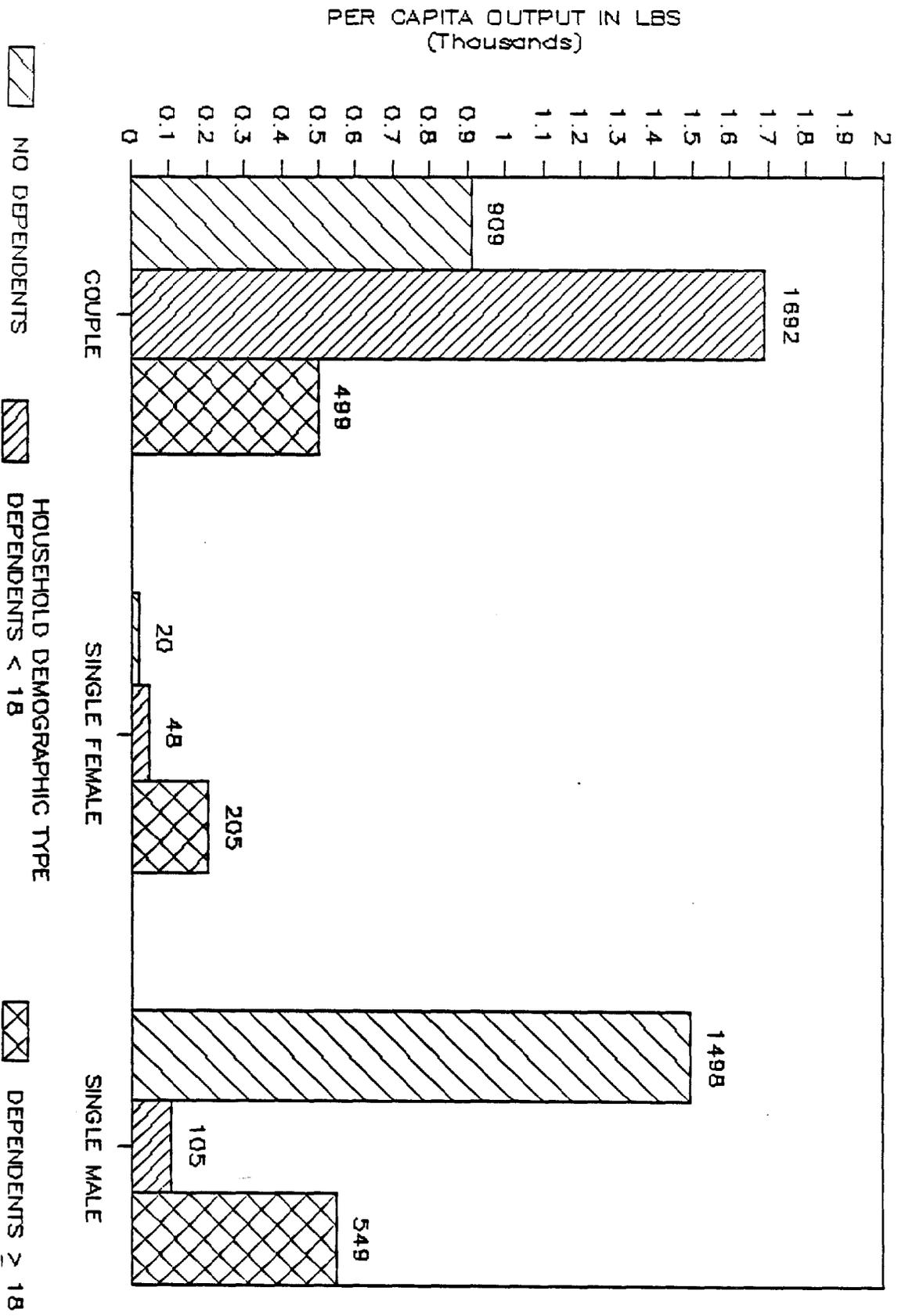


Fig. 19. Wildlife harvest by household demographic type, Native households only, Galena 1985-86.

displayed the lowest harvest amounts and the least number of resources harvested.

Household composition also appears to be a factor in influencing trapping activity. Only five of the nine household types participated in trapping during the study period. Table 34 shows the average household potential dollar value of furs harvested by the different household types for both Native and all households. Native couples with dependents 18 years of age or over averaged \$1,527.5, five times greater than the average value of furs taken by the remaining 44 Native households.

#### EMPLOYMENT AND HARVESTS

As in many other rural Alaska communities, the local economy of Galena is dependent upon both subsistence harvests and wage employment. Successful harvests in 1986 depended on access to wild resources and mobility. This includes having operational boats and snowmachines, money to purchase them, and fuel, which can require a substantial proportion of a household's annual budget.

Table 35 shows the relationship between subsistence harvest and reported total household income from wages and other sources for the 74 sampled households. Groups with incomes greater than \$40,000 annually had the lowest per capita harvests. Households with incomes between \$20,000 and \$39,999 had the highest average harvests as measured in edible pounds per household or per person. Differences in use per capita are less pronounced, however, than harvests. There are clear trends in use pattern by income group. These

TABLE 34. POTENTIAL DOLLAR VALUE OF FUR HARVEST BY HOUSEHOLD DEMOGRAPHIC TYPE, GALENA 1986

Household Demographic Type	Native Households only (n=48)		Non-Native Households only (n=26)		All Households (n=74)	
	Frequency	Average Value (dollars)	Frequency	Average Value (dollars)	Frequency	Average Value (dollars)
Couple, Dependents ≥18	4	\$ 1,527.5	2	55.0	6	\$ 1,036.7
Single female Dependents ≥18	4	578.8	0	0.0	4	578.8
Couple, No dependents	5	407.0	6	460.8	11	436.4
Single male, No dependents	3	385.0	5	361.0	8	370.0
Couple, Dependents <18	20	333.0	12	165.0	32	270.0
All others <sup>a</sup>	12	0.0	1	0.0	13	0.0
Total	48	380.7	26	256.2	74	337.0

<sup>a</sup> includes: single female with no dependents, single female with dependents <18, single males with dependents < 18, and single males with dependents ≥18.

TABLE 35. MEAN HARVEST DIVERSITY, OUTPUT, AND USE BY HOUSEHOLD INCOME GROUP, GALENA 1986

Household Income Group (Dollars)	Mean Number of Resources Harvested	Mean Pounds Harvested		Mean Pounds Used in Household	
		Per Household	Per Person	Per Household	Per Person
\$ 1-9,999 (n=8)	4.0	1,403.8 lbs	660.6 lbs	1,208.0 lbs	568.4 lbs
10,000-19,999 (n=11)	5.4	937.2	312.4	1,201.7	400.6
20,000-29,999 (n=13)	5.8	5,038.4	1,637.5	2,178.4	708.0
30,000-39,999 (n=11)	7.8	7,371.2	1,621.7	2,697.1	652.8
40,000-49,999 (n=16)	6.2	859.7	237.2	988.1	272.6
50,000-59,999 (n=4)	4.5	562.9	204.7	2,350.8	854.8
60,000+ (n=11)	4.2	576.4	192.1	775.0	258.4
All Households (n=74)	5.6	2,573.9	787.1	1,588.9	485.9

comparisons are complicated by cultural group membership. The lower harvests for the upper income groups may be related to the disproportionate number of non-Natives in these income groups. Over 80 percent of the households in these upper income groups were non-native.

Employment can influence the time available for harvest activities, so that different job scheduling arrangements can directly influence harvest opportunity. During moose hunting season, for example, people who were not employed or who could schedule several days of leave from work were able to engage in trips to more distant harvest areas. Hunters who were only able to hunt on weekends or in the evenings were more limited in the area they could cover. Generally, they hunted in areas close to Galena and were subject to greater competition by other hunters.

Subsistence salmon fishing was allowed by regulation on a "split-week" period of two 48-hour open periods each week as noted earlier. In 1985, these openings were from 6:00 p.m. Sunday to 6:00 p.m. Tuesday and from 6:00 p.m. Thursday to 6:00 p.m. Friday. Residents who were not engaged in wage employment potentially had time available to participate in fishing during the entire open fishing period. Residents working during regular daytime hours in Galena experienced unique scheduling considerations. They had to make a trip on Sunday evening to start the gear (set net or start fishwheel) and by Tuesday evening at 6:00 p.m. they had to return to remove the gear. Complying with the time for closure was especially difficult for someone who had regular wage employment because travel could be delayed due to dangerous river travel conditions which could

cause the fisherman to be late for the 6:00 p.m. closure. Therefore, many return to the fishing site the evening before, thereby having to reduce their fishing time. This pattern was repeated for the second weekly fishing period, with the effect of reducing the overall fishing time from four days to two days per week. These scheduling considerations were viewed as a factor in the increased interest of many Galena residents in using drift gill nets for king and fall chum salmon harvests, which was believed to make more efficient use of available fishing time to secure salmon for subsistence use.

Commercial fishing as a summer income source was more compatible with subsistence fishing than wage employment because of the shared equipment costs such as boats and gear and labor costs involved in setting up a fish camp, harvesting fish, and processing it. However, commercial fishing was limited by regulation to those who own a limited entry fishing permit.

#### SUMMARY

This report has described the importance of wild food to Galena residents. One-half of the 74 sampled households indicated using over 800 edible pounds of wild food, and all households indicated using at least 50 edible pounds. Key resources, used by at least one-half of sampled households included moose, fall chum salmon, berries, ducks, and grouse. The quantities of wild food harvested averaged 2,573.9 edible pounds per household, or 787.1 edible pounds per person. Of this, about 46.7 percent was used for food, and 53.3 percent for feeding dogs. The resources making the most largest

contribution to that total were summer chum salmon, moose, fall chum salmon, king salmon, and whitefish. King salmon, fall chum salmon, and moose accounted for 77.3 percent of the edible weight of food used for human consumption. Although the proportion of the total harvest represented by other resources was less, other resources played an important role in the annual harvest cycle. Typically, households harvested over 5 of the 25 resources asked about in the survey.

Galena households displayed considerable variation in the quantities of fish and game harvested and used. This variation represented a specialization between households and supported the pattern of "core households" of local families being the basic social organization of hunting and fishing activities.

Subsistence activity varied considerably between households in Galena. Households headed by a Native couple harvested over 14 times the amount taken by non-Native couples. Their use of resources, as measured on a per capita basis, was four times greater. Households headed by people originally from outside Galena or the region displayed a per capita harvest less than one quarter of those of local origin. Harvest quantity and diversity generally increased with the age of the household head. Finally, households with annual incomes between \$20,000 and 40,000 displayed the highest per capita harvests, yet the use of resources was more evenly distributed among income groups.

Galena's role as a subregional center has a number of manifestations. A large number of residents in 1986 were originally from the outlying communities along the middle Yukon and Koyukuk

rivers. There were examples of those residents continuing to use areas near those communities to harvest fish and wildlife. In addition, there was pronounced sharing which occurred between residents of Galena and those communities. Residents originally from outside the region displayed much lower harvest levels. However, all types of households, regardless of cultural group membership or origin, participated in harvest activities and used wild foods.



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APPENDIX 1.

Alaska Dept. of Fish and Game  
 Division of Subsistence  
 Box 155, Galena

GALENA RESOURCE USE SURVEY  
 June 1985 - May 1986

Interviewer \_\_\_\_\_

Date \_\_\_\_\_

1. Household Information

[To be completed for each person living in the household between June 1985 and May 1986.]

\* - Indicate Respondent

ID#	Relationship To HH Head	Sex		Birthdate (Year)	Birthplace	Year Moved To Galena	Previous Residence
		M	F				
1	Head of HH						
2	Co-Head						
3							
4							
5							
6							
7							
8							

a. Native (One Native Adult) or Non-Native Household?

Native \_\_\_\_\_

Non-Native \_\_\_\_\_

b. Are there other people living in Galena who are related to members of your household? Yes \_\_\_ No \_\_\_

APPENDIX 1. continued

2. Employment History

[Complete one line for each job held by a HH member from Jun 85 to May 86]

ID #	Job Title	Hrs Per Week	Months Per Year	Months Worked (Starting in June)												Salary Wage Scale	
				J	J	A	S	O	N	D	J	F	M	A	M		

a. Other Income Sources:

Commercial Fishing \_\_\_\_\_ Social Security \_\_\_\_\_  
 Transfer Payments \_\_\_\_\_ Other \_\_\_\_\_

b. Total Household Income: \_\_\_\_\_

3. Trapping

Which members of your household trapped during the winter of 1985/1986? \_\_\_\_\_

Species	Number	Number	Number	Number	Number	Number
	Harvested	Received	Purchased	Sold	Given Away	Used in HH
Beaver   fur						
meat						
Marten						
Fox						
Wolf						
Wolverine						
Otter						
Lynx						
Mink						
Other						

[USE means direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation. GIVEN AWAY or BARTER means sharing for personal or family consumption. SALE means sale of raw furs, tanned furs, craft items.]

APPENDIX 1. continued

3. Trapping. Cont.

- a. What transportation do you use when checking your trapline?  
 Travelling to trapline: \_\_\_\_\_ Checking trapline: \_\_\_\_\_
- b. How many miles is it from your house to your closest traps? \_\_\_\_\_
- c. How many miles long is your trapline roundtrip (from closest to farthest traps set)? \_\_\_\_\_
- d. How many years have you trapped that area? \_\_\_\_\_
- e. Who trapped there before you? (Specify Relationship) \_\_\_\_\_  
 ...Before that? (Specify Relationship) \_\_\_\_\_
- f. How many trapping cabins or tent camps are used by members of your household? cabins \_\_\_\_\_ tent camps \_\_\_\_\_
- g. Who else uses these cabins or tents? (Specify Relationship) \_\_\_\_\_  
 \_\_\_\_\_

4. Big Game Hunting

- a. Which members of your household hunted big game from Jun 85 - May 86? \_\_\_\_\_

Species	Try to Hvst		Amount Harvested	Amnt Recv		Amnt Givn Away	Amnt Used In HH
	Yes	No		Frm	Othrs		
Moose							
Caribou							
Black Bear							
Other							

APPENDIX 1. continued

5. Small Game and Bird Hunting

Which members of your household hunted small game or birds from Jun 85 - May 86?

Species	Number Harvested	# Received from Others	# Given Away	# Used In HH	Season	
					Spring	Fall
Grouse						
Ptarmigan						
Geese						
Ducks						
Cranes						
Swans						
Hare						
Porcupine						
Muskrat						
Other						

6. Commercial Fishing

- a. Which members of your household fished commercially last summer (1985)? \_\_\_\_\_  
(Includes "helpers")
- b. Did a member of your household have a limited entry fishing permit for 1985?  
yes \_\_\_ no \_\_\_
- c. Did you use a fish camp last summer for subsistence or commercial fishing(1985)? yes \_\_\_ no \_\_\_
- d. Location of fish camp used last summer (miles, direction): \_\_\_\_\_

7. Subsistence Fishing

Which members of your household fished for subsistence purposes in 1985? \_\_\_\_\_

APPENDIX 1. continued

a. Subsistence Salmon Harvest

Species	# Rmvd Frm This HHs Comm Catch For Home Use or Redistribution	# Harvested w/ Subsistence Gear		# Recvd Frm Othr HH's	Number Given Away	Number Used in HH
		Set	Drift			
Fall Chum/ Coho(slvrs)						
Summer Chum ("dogs")						
King Salmon						

b. Salmon Used for Dog Food

[Indicate the amounts of summer and fall chum listed above that were used for dog food.]

Of salmon harvested  
w/ commercial gear,  
\* used for dog food

Of salmon hrvstd  
w/ subsistence gear,  
\* used for dog food

Of salmon received  
from other HH's,  
\* used for dog food

Fall Chum \_\_\_\_\_

Summer Chum \_\_\_\_\_

c. Other Subsistence Fishing (June 1985 - May 1986)

Species	Number Harvested	Of those hrvstd # used for dogs	Number Received	Number Given Away	Number Used in HH
Sheefish					
Whitefish					
Pike					
Suckers					
Loche					
Grayling					
Trout					
Blackfish					
Other	(lbs.)				

APPENDIX 1. continued

8. Plant Gathering

a. Which members of your household gathered plants and berries last summer? \_\_\_\_\_

	# Gallons Harvested	# Gallons Received	# Gallons Given Away	# Gallons Used in HH
Berries				

b. Did HH harvest any other edible plants? (list) \_\_\_\_\_

c. Which members of your household cut wood last year (1985-86)? \_\_\_\_\_

	Amount Harvested For Household Use
Firewood	(cords)
House Logs	(logs)

d. Did HH harvest any other type of wood? (list) \_\_\_\_\_

9. Work Group Composition

We know subsistence is important to families, so I am asking the next two questions about people who hunt and fish together.

a. Moose Hunting Work Group Composition in 1985

ID# of Household Member OR relationship to HH head and age (for non-HH member)	Indicate Different Household	Own Boat	Own Motor	Hunted	Butchered	Store Meat

b. How many moose hunting trips were made by members of your household in 1985? \_\_\_\_\_ (Same work groups?)

APPENDIX 1. continued

c. Salmon Fishing Work Group Composition in 1985

ID# of HH Member OR relationship to HH head and age (for non-HH member)	Indicate Different Household	Own Boat	Own Mtr	Own Net	Own SmkHs	Drve Boat	Set& Pick Net	Cut Fsh	Tend Fire	Other Procssng	Stor Fish

10. Distribution

We know that subsistence resources are commonly shared, so I am asking the next questions about sharing among households and communities.

a. Moose, Caribou, and Salmon Distribution

[Fill out the chart below showing the location of the households that moose and caribou meat were given to, or received from (from June 85 to May 86.) Also indicate the principal relationship between households.]

Communities Moose Was Given To	Relationship of Receiver to You	Communities Moose Was Received From	Relationship of Giver to You
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

APPENDIX 1. continued

Communities Salmon Was Given To	Relationship of Receiver to You	Communities Salmon Was Received From	Relationship of Giver to You
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

11. Equipment Use

a. How many of the following types of equipment did your household own from June 85 to May 86?

EQUIPMENT	# OWND
3 or 4 wheeler	
Airplane	
Snowmachine	
Car or Truck	
Boats	

EQUIPMENT	# OWND
(# of Dogs	
Fish Camp	
Smoke House	
Other Camps	
Freezers	

b. Did you use equipment belonging to someone in other HH? Please explain.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

12. Use Area Question

a. When you moved to Galena from \_\_\_\_\_, did you stop using the local areas around that community? (Which activities? When last used? Frequency?)

N/A \_\_\_\_\_ Yes \_\_\_\_\_ No \_\_\_\_\_ Explain: \_\_\_\_\_

\_\_\_\_\_





APPENDIX 2.

EDIBLE WEIGHTS OF SELECTED RESOURCES

Resource	Live Weight	Conversion Factor	Edible Weight	Source
Moose	1,300 lbs <sup>a</sup>	.6	780.0 lbs	Tim Osborne
Caribou	350	.6	210.0	(pers. comm. 2/12/87)
Black bear	180	.6	102.0	"
Beaver	50	.6	30.0	"
Geese	10	.6	6.0	"
Ducks	1.8	.6	1.1	"
Grouse	1.3	.6	0.8	"
Hare	3.3	.6	2.0	"
Ptarmigan	1.2	.6	0.7	"
Muskrat	2.9	.6	1.7	"
Crane	9.1	.6	5.5	"
Porcupine	16	.6	9.6	"
Summer chum salmon	6.1	.75	4.6	Fred Andersen
Fall chum salmon	7.5	.75	5.6	(pers. comm. 2/12/87)
King salmon	18.4	.75	13.8	"
Sheefish	10	.75	7.5	Ken Alt
Whitefish <sup>b</sup>	4	.75	3.0	(pers. comm. 2/12/87)
Northern pike	8	.75	6.0	"
Burbot	4.5	.75	3.4	"
Trout	2	.75	1.5	"
Longnose sucker	3	.75	2.2	"
Arctic grayling	0.9	.75	0.7	"
Blackfish		(recorded in pounds)		
Berries		4 lbs. / gal.		(Marcotte 1986)

<sup>a</sup> Based on actual weight of five moose of known age, sex, and antler size

<sup>b</sup> Includes both humpback and broad whitefish



APPENDIX 3.

COMMON AND SCIENTIFIC NAMES OF  
MAJOR RESOURCES USED BY GALENA RESIDENTS

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COMMON NAME	SCIENTIFIC NAME
<u>Fish</u>	
King (Chinook) salmon	<i>Oncorhynchus tshawytscha</i>
Chum salmon	<i>Oncorhynchus keta</i>
Coho salmon	<i>Oncorhynchus kisutch</i>
Broad whitefish	<i>Coregonus nasus</i>
Humpback whitefish	<i>Coregonus pidschian</i>
Round whitefish	<i>Prosopium cylindraceum</i>
Least cisco	<i>Coregonus sardinella</i>
Bering cisco	<i>Coregonus laurettae</i>
Northern pike	<i>Esox lucius</i>
Sheefish	<i>Stenodus leucichthys</i>
Burbot	<i>Lota lota</i>
Longnose sucker	<i>Catostomus catostomus</i>
Arctic grayling	<i>Thymallus arcticus</i>
<u>Mammals</u>	
Moose	<i>Alces alces</i>
Caribou	<i>Rangifer tarandus</i>
Black bear	<i>Ursa americanus</i>
Snowshoe hare	<i>Lepus americanus</i>
Porcupine	<i>Erethizon dorsatum</i>
Muskrat	<i>Ondatra zibethicus</i>
Marten	<i>Martes americanus</i>
Mink	<i>Mustela vison</i>
Lynx	<i>Felis canadensis</i>
Red fox	<i>Vulpes vulpes</i>
Wolverine	<i>Gulo gulo</i>
Land otter	<i>Lutra canadensis</i>
Wolf	<i>Canis lupus</i>
Beaver	<i>Castor canadensis</i>

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APPENDIX 3. Continued

COMMON NAME	SCIENTIFIC NAME
<u>Birds</u>	
Mallard	<i>Anas platyrhynchos</i>
Northern pintail	<i>Anas acuta</i>
American wigeon	<i>Anas americana</i>
Canvasback	<i>Aythya valisineria</i>
Greater scaup	<i>Aythya marila</i>
Lesser scaup	<i>Aythya affinis</i>
Common goldeneye	<i>Bucephala clangula</i>
Green-winged teal	<i>Anas crecca</i>
Bufflehead	<i>Bucephala albeola</i>
Oldsquaw	<i>Clangula hyemalis</i>
White-winged scoter	<i>Melanitta fusca</i>
Surf scoter	<i>Melanitta perspicillata</i>
Northern shoveler	<i>Anas clypeata</i>
Greater white-fronted goose	<i>Anser albifrons</i>
Canada goose	<i>Branta canadensis</i>
Snow goose	<i>Chen caerulescens</i>
Sandhill crane	<i>Grus canadensis</i>
Spruce grouse	<i>Dendragapus canadensis</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Sharp-tailed grouse	<i>Tympanuchus phasianellus</i>
Willow ptarmigan	<i>Lagopus lagopus</i>
<u>Plants</u>	
White spruce	<i>Picea glauca</i>
Paper birch	<i>Betula papyrifera</i>
Balsam poplar	<i>Populus balsamifera</i>
Willow (sp.)	<i>Salix (sp.)</i>
Bog blueberry	<i>Vaccinium uliginosum</i>
Bog (lowbush) cranberry	<i>Vaccinium vitis-idaea</i>
Highbush cranberry	<i>Viburnum edule</i>
Raspberry	<i>Rubus idaeus</i>
Salmonberry	<i>Rubus chamaemorus</i>
Labrador or Hudson Bay tea	<i>Ledum groenlandicum</i>
Rosehips	<i>Rosa acicularis</i>