THE HARVEST AND USE OF FISH, GAME, AND PLANT RESOURCES BY THE RESIDENTS OF CHASE, GOLD CREEK - CHULITNA, AND HURRICANE - BROAD PASS, SOUTHCENTRAL ALASKA

by

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ERRATA

Page 19. The statement on this page regarding hunting regulations for Denali State Park is incorrect. According to regulations adopted by the Alaska Department of Natural Resources for Denali State Park (11 AAC 20.400):

> The use and discharge of a weapon for the purpose of lawful hunting or trapping is allowed in Denali State Park, except within one-half mile of a developed facility or the trail around the shoreline of Byers lake, or within a quarter mile of the Parks Highway between mile 132 - 170.

ABSTRACT

This report summarizes the results of research by the Division of Subsistence, Alaska Department of Fish and Game, on the patterns of fish and game harvest and use in three study areas in the Matanuska-Susitna Borough in Game Management Unit 13E in 1986. The first area, Chase, is located within the Alaska Railroad corridor north of Talkeetna and is non-highway connected. Division researchers interviewed 17 (56.7 percent) of the approximately 30 year-round households in the Chase area during the research. The second study area, called Gold Creek - Chulitna in the report, is also located along the Alaska Railroad, directly north of Chase. Five (83.3 percent) of the six year-round households were interviewed. Finally, the third area is along the Parks Highway from Milepost 132.8 (the GMU 14/13 boundary) to Milepost 202.1 (the borough boundary). Eight (66.7 percent) of the 12 year-round households in this area, called Hurricane - Broad Pass in the report, were interviewed. In addition to administering the survey instrument, division researchers also mapped resource harvest areas with each household. This research is part of a larger project which is investigating the developing patterns of wild resource uses in communities that have been settled as a result of state and federal land disposal programs.

The 17 interviewed Chase households had a total population of 78. The average length of residency of these households in the Chase area was 11.4 years, with a maximum of 18 years. Wage employment among these households was mostly seasonal, with adults working an average of 6.4 months in 1986. Most Chase residents had obtained their land through state settlement entry programs, and had opted to live in this relatively remote area in order to live a particular lifestyle based in part on local hunting and fishing.

On average, the five sampled Gold Creek - Chulitna households had lived in that area for 20.2 years, with a maximum of about 40 years. Sixty percent of the adults worked year-round, with an average of 10.0 months of employment per adult in 1986. Household heads in the Hurricane - Broad Pass sample had an average length of residency of 16.5 years in the area. The average number of months employed for adults in this sample was 8.9, with 61.5 percent of the adults holding year-round jobs.

All of the 17 sampled Chase households harvested and used wild resources in 1986. On average, these households used 11.7 categories and harvested 10.0 categories. The mean household harvest was 553.8 pounds edible weight and the per capita harvest was 209.2 pounds. Land mammals made up 54.9 percent of the total harvest, followed by salmon with 23.7 percent. Most harvests occurred in Game Management Unit 13E relatively near the community.

Horticultural production (small scale farming) was a notable part of the Chase community's economic system in 1986. On average, households grew 12.2 kinds of vegetable foods for a mean household production of 579.6 pounds, 227.7 pounds per capita.

Resource harvest and use patterns in the other two study areas were similar to those in Chase in 1986. All of the Gold Creek - Chulitna households used and harvested wild resources in 1986. The mean number of resource categories used was 11.2 and the mean number harvested was 9.4. The mean household harvest of wild foods for these five households was 347.9 pounds, 174.0 pounds per capita. As at Chase, land mammals was the dominant resource category, providing 44.2 percent of the total harvest weight.

Participation in the harvest and use of wild foods was also universal in the Hurricane - Broad Pass sample. These eight households used a mean of 10.1 categories of wild foods and harvested a mean of 7.8 categories in 1986. The

mean household harvest was 600.5 pounds and the per capita harvest was 177.9 pounds. Land mammals made up 66.9 percent of this harvest by weight.

In conclusion, the research found that the harvest and use of wild fish, game, and plant resources played a large role in the socioeconomic systems of all three study areas in 1986. Resource harvests were high in comparison with urban, more densely populated areas of southcentral Alaska. Patterns of wild resource use in Chase, Gold Creek - Chulitna, and Hurricane - Broad Pass most closely resemble those documented by earlier division research in Skwentna and Cantwell. The characteristic socioeconomic pattern in the three study areas, which combines seasonal employment, fishing and hunting, and (in the case of Chase) horticultural production, is a product of the availability of wild resources, a low population density, a marginal cash economy, and a value orientation conducive to living in a relatively remote area.

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CHAPTER ONE

INTRODUCTION

STUDY BACKGROUND

Under the provisions of Alaska's subsistence statute, the Division of Subsistence of the Department of Fish and Game is responsible for collecting and publishing information on all aspects of subsistence hunting and fishing by rural Alaska residents. Until recently, most of the division's research has focused on the subsistence activities of villages and discrete communities. Little work had been undertaken on the resource use patterns of dispersed settlements, especially in areas that had been settled relatively recently by in-migrants. Some information about these kinds of communities became available with the completion of a research project in the upper Yentna River area of the western Matanuska-Susitna Borough, a non-road connected area (Fall, Foster, and Stanek 1983; Stanek 1987). That research found substantial levels of fish and game harvests by the study population relative to urban populations.

Since 1979, the Alaska Department of Natural Resources has made land available to individuals for private ownership through a variety of land disposal programs, including home sites, subdivisions, homesteads, and remote parcels. The majority of these offerings have been in the Susitna and Tanana river basins, areas relatively close and accessible to Alaska's urban population centers. For example, from December 1981 to November 1982, 62.2 percent of the 40,326 acres of land offered by the state in three disposal programs was within the Matanuska-Susitna

Borough, including 65.6 percent of the subdivision land, 68.9 percent of the homesite parcels, and 56.7 percent of the remote parcels (Rainery and Byington 1984:39). The current land disposal program replaced the open-to-entry program of the 1960s and early 1970s which allowed individuals to claim selected state lands for a variety of purposes. The open-to-entry program was repealed by the state legislature in 1974.

The current land disposal program often leads to relatively concentrated settlements of new land owners in previously sparsely inhabited areas (Rainery and Byington 1984:83-87). Although popular among the public, the land disposal program has generated certain controversies over issues of access, limited resources, and land management policy (e.g. Durr 1974, Rainery and Byington 1984). The impacts of these disposals on existing hunting and fishing patterns are not documented, nor has there been documentation of the hunting and fishing patterns of the new settlers.

Consequently, in 1986, the division began a research project called "Resource Uses in New Communities: Settlement Entry and Fish and Wildlife Harvests." This project is being conducted in three phases. Phase One, completed in 1987, examined the hunting and fishing patterns of residents of Game Management Units 14B and 16A, which includes Talkeetna, the Parks Highway from north of Willow to the Chulitna River bridge (including Trapper Creek), and the Petersville Road (Fall and Foster 1987). This area generally has a dispersed settlement pattern and has been the location of land disposals since about 1970. The results of a survey of 134 randomly selected households in this study area revealed high levels of involvement in the use of fish and game resources, but relatively low harvest levels as measured in pounds

edible weight. The economy of the area was found to center upon providing services to Parks Highway travelers and to tourists.

Phase Two of the project is the subject of this technical paper. This phase took place in 1987 and focused on the resource use patterns, demography, and cash economy of the portion of GMU 13E north of Talkeetna and south of Cantwell. Much of the population of this area lives along the Alaska Railroad corridor on the east side of the Susitna River, an area not accessible by highway. Most residents of this area obtained their land through state land disposals within the last 20 years. The study area was divided into three subareas (Fig. 1). The first, Subarea A, contains the communities of Chase and Sherman and had a year-round population of about 78 people during the study year of 1986. Subarea B is the Gold Creek - Chulitna River area, also on the railroad corridor, with 11 people in 1986. The third subarea, C, is the Parks Highway corridor between the Parks Highway bridge over the Chulitna River at Milepost 132.8 and the Matanuska-Susitna Borough boundary just south of Cantwell (Milepost 202.1). This area, called "Hurricane - Broad Pass" in this report, had about 12 year-round households with approximately 41 people during the study period.

Phase Three of the project is scheduled to begin in the summer of 1988. It will focus on two disposals near Slana in the Copper River Basin which occurred on federal lands.

PURPOSES AND OBJECTIVES

The project had three major purposes. The first was to document the hunting and fishing patterns of residents of a portion of Game

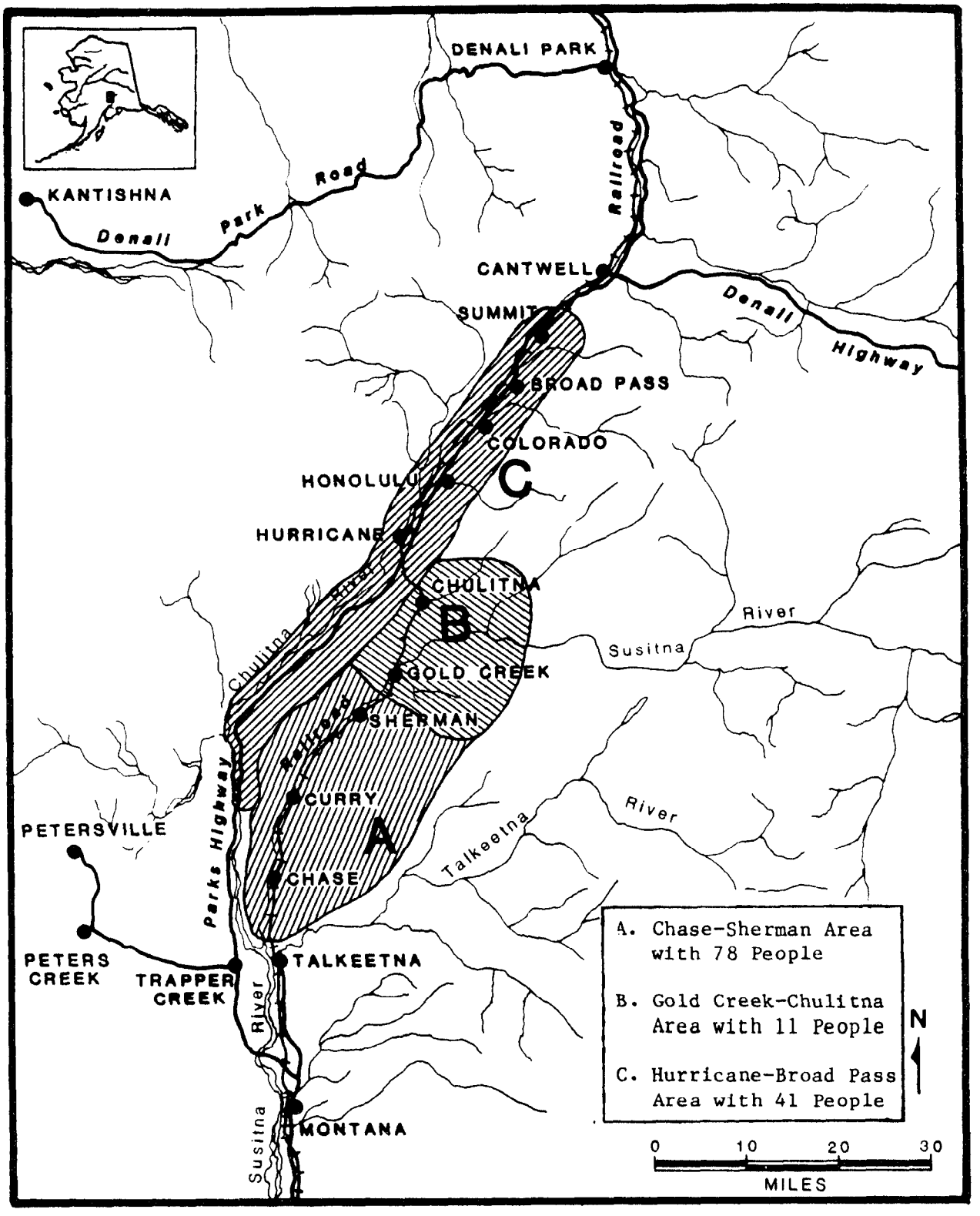

Figure 1. The Three Study Areas in Southcentral Alaska for Phase Two of the "Resource Uses in New Communities" Project.

Management Unit 13E. The second purpose was to understand the demography and patterns of cash employment in this study area. Finally, the third purpose was to collect mapped information on areas used for hunting and fishing by residents of the Chase and Sherman area for the development of a Chase community plan.

Research objectives included:

1. For each subarea within the study area:
    a. Estimates of population size;
    b. Maps of population distribution;
    c. Estimates of the number of businesses and employment opportunities within the study area.
2. For all households with year-round residents in the study area:
    a. Estimates of fish and game harvests for a 12 month study period of January 1986 through December 1986;
    b. Estimates of the level of participation in hunting and fishing activities of household members;
    c. Demographic data on household size, ethnicity, age, and length of residency in the study area;
    d. Employment patterns for each adult in the sample, including number of months employed by job during the study period and the location of cash employment;
    e. Estimates of household monetary income provided by each job;
    f. Maps of resource harvest areas used while residing in the study area.

DATA COLLECTION METHODS

Literature Review

Before the field work began, the researchers examined published and unpublished sources on the history, population, and economy of the study area (e.g. Matanuska-Susitna Borough 1985, Kari and Fall 1987). These included records of the Matanuska-Susitna Borough such as plat maps and tax assessor lists which provided information on the location of households.

Household Survey

The primary method of data collection for resource harvest and use information was a survey of households using a questionnaire (Appendix A). For each subarea, the researchers developed lists of households and mapped household locations with the assistance of local residents and borough records. A community meeting in Chase on February 21, 1987 provided additional information, as well as review of the study design. The researchers administered the questionnaires in person, for the most part in the homes of community residents. Interviewing took place in the Chase and Sherman areas during February and March 1987, in the Gold Creek - Chulitna Areas during July 1987, and along the Parks Highway (Hurricane - Broad Pass) during July and August 1987.

The goal of the survey was to interview 100 percent of the year round households in each subarea. Upon completion of the field work, 17 of the 30 year-round households in the Chase - Sherman area (Subarea A)

had been interviewed, for a success rate of 56.7 percent (Table 1). In Subarea B, five interviews were completed, representing 83.3 percent of the six year-round households. In Subarea C, Hurricane - Broad Pass, eight households were interviewed, 66.7 percent of the 12 households living in the area year-round.

For purposes of data analysis and comparisons, harvests in numbers of animals and fish were converted into pounds edible weight using standard conversion factors (Appendix B). ("Edible" means the portion of the harvest brought into the kitchen, including some bones, similar to meat and fish purchased in stores.) Employer types and occupations were classified in accordance with categories used by the Alaska Department of Labor (Appendix C).

Resource Use Area Mapping

In addition to answering the survey questions, each interviewed household indicated their resource harvest areas on clear mylar overlays on USGS maps at a scale of 1:250,000. First, each household drew circles around areas used for hunting, fishing, and gathering since they began living in the study area. Mapping categories included:

1. Moose;
2. Caribou;
3. Black Bear;
4. Sheep;
5. Furbearers;
6. Salmon;
7. Other fish;

TABLE 1. SURVEYED HOUSEHOLDS, CHASE, GOLD CREEK - CHULITNA, AND HURRICANE - BROAD PASS, 1987

Study Area	Estimated No. of Households	Number of Households Surveyed	Percentage of Total Surveyed
A. Chase[a]	30	17	56.7%
B. Gold Creek - Chulitna	6	5	83.3%
C. Hurricane - Broad Pass (Mileposts 132.8 to 202.1 on the Parks Highway)	12	8	66.7%

[a] Includes Sherman

8. Birds;

9. Plants and berries; and

10. Wood.

Second, each household indicated which areas have been the most reliable for each resource harvesting activity over time. Third, households circled the areas they used for each harvest activity in 1986.

For each subarea, all the household maps were combined into a series of community harvest area maps. These maps depict the total area used by community residents for each harvest activity for the period they have been living in the community. A second series, not included in this report, shows those areas that have been most reliable hunting and fishing areas for community residents over time. This second set of maps is available for inspection at the office of the Division of Subsistence, Alaska Department of Fish and Game, in Anchorage.

CHAPTER TWO

BACKGROUND

NATURAL ENVIRONMENT AND CLIMATE

The entire study area is within the Susitna River drainage. In addition to the Susitna River itself, two of its major tributaries, the Talkeetna River and the Chulitna River, flow through portions of the study area. Other notable streams include Chunilna Creek, Portage Creek, and the Indian River. The Talkeetna Mountains form the eastern boundary of the area, with the Alaska Range on the north and west. Elevation rises gradually from Talkeetna (346 feet above sea level) to Broad Pass (2,300 feet). The climate of the southern portions of the study area is still in a transitional zone between those of the coast and of interior Alaska, with relatively milder winters than those north of the Alaska Range, but higher elevations in the northern portions experience more extreme temperatures.

The dominant plant community in the lower elevations of the study area is a mixed forest of spruce, birch, and poplar (Selkregg 1974). The understory includes such shrubs as alder, high bush and low bush cranberry, blueberry, and labrador tea. The Broad Pass area has a high brush vegetation type, with dwarf birch, alders, and scattered spruce trees. Higher elevations are characterized by alpine tundra.

The study area supports a range of wild fish and game species typical of southcentral Alaska. Moose are relatively common, and the Nelchina caribou herd is present seasonally in portions of the Talkeetna Mountains. Other large game includes black bear, brown bear, and Dall

sheep. There is also a variety of small game and furbearers such as snowshoe hare, porcupine, beaver, land otter, mink, marten, weasel, coyote, and red fox, among others. Spruce grouse and ptarmigan are very common.

Five species of Pacific salmon pass through much of the middle Susitna, Talkeetna, and Chulitna river drainages on spawning runs. These runs begin in June with king (chinook) salmon and sockeye (red) salmon, and continue into September and early October with pink (humpy), chum (dog), and silver (coho). Resident species of fish include rainbow trout, grayling, burbot, and whitefish.

HISTORY

Prehistory and Historical Ethnography

The drainage area of the middle Susitna River from its confluence with the Talkeetna River to Devil Canyon was the traditional territory of two regional bands of Athabaskan Indians in the 19th and early 20th centuries (Kari and Fall 1987). The first, the Ahtna-speaking *Dghelay Teht'ana* ("Mountain People") lived in the Talkeetna Mountains and used the Susitna River drainage for salmon fishing and for hunting. The other group, the Dena'ina (Tanaina)-speaking *Dashq'eht'ana* ("On the Bar People") lived in winter villages along the Deshka River (Kroto Creek) and the middle Susitna River below present-day Talkeetna. They also hunted in the Talkeetna Mountains and Susitna River and Chulitna River drainages within the study area. There was intermarriage between these two bands. In the late 19th century, there was a small year-round

Indian population at *Chuqikaq'*, the mouth of the Indian River, although these people moved to Knik sometime before 1900 (Kari and Fall 1987:187).

With the construction of the Alaska Railroad in the 1910s and the founding of Talkeetna as a construction camp and trade center, most of the *Dghelay Teht'ana* and many of the *Dashq'eht'ana* moved to Talkeetna. Others lived at Montana Creek, just to the south of the study area. In 1918, this Native population was severely reduced by an influenza epidemic (Fall 1987). Nevertheless, there continued to be seasonal use of the railroad corridor north of Talkeetna and the Chulitna and Talkeetna River drainages by Indians living in Talkeetna, Kroto Creek, Susitna Station, and elsewhere, through much of the early 20th century.

Alaska Railroad

The construction of the Alaska Railroad through the Susitna Basin from 1915 through 1923 radically changed settlement patterns in the study area. Talkeetna, established about 1915 as a railroad construction camp (at Alaska Railroad Milepost 226.7), replaced Susitna Station as the main supply center for the Susitna River Basin. Most of the localities named along the railroad within the study area originated as construction camps, stations, or flag stops. As listed in the railroad's first official timetable in 1922 (Orth 1967), these localities were spaced about five to ten miles apart. From south to north these places included Chase (Milepost 236.2), Lane (Milepost 242.0), Curry (Milepost 248.5), Sherman (Milepost 258.3), Gold Creek (Milepost 263.2), Canyon (Milepost 268.4), Chulitna (Milepost 273.8),

Hurricane (Milepost 281.4), Honolulu (Milepost 288.7), Colorado (Milepost 297.1), Broad Pass (Milepost 304.3), and Summit (Milepost 312.5).

Only one of these places, Curry, had a sizable population before statehood. Curry was at the approximate half-way point on the rail line between Fairbanks and Seward. Travel by train between these two cities, and between Fairbanks and Anchorage, required several days until diesel locomotives began replacing steam engines in the late 1940s (Prince 1964:817, Fitch 1967:30). Consequently, the railroad developed tourist facilities at Curry, where the trains discharged their passengers in the evening for an overnight stay at the hotel operated by the railroad. Curry's population was 91 in 1930, 45 in 1939, 183 in 1950, and 44 in 1958 (Rollins 1978, Orth 1967). By the early 1950s, one day train travel between Fairbanks and Anchorage was the norm, and the McKinley Park Hotel outstripped Curry as a tourist destination. When the Curry Hotel burned to the ground in April 1957, it was not rebuilt (Prince 1964:55-60, 869; Fitch 1967:30, 92). The railroad closed the remainder of its Curry facilities in 1959, and by 1960, only three people remained at the locality (Orth 1967:252).

During much of the early period of railroad operation, the railroad operated section houses near many of the named stops along the route. Many of the people living between Talkeetna and Cantwell along the railroad corridor were associated with these section houses as maintenance crews for the line. Over time, the number of separate maintenance facilities along the railroad decreased (Fitch 1967:30).

Talkeetna was connected by road to Anchorage by 1964, and the Denali Highway (open in summers only) linked Cantwell to Alaska's

highway system by 1957. However, the railroad remained the only means of motorized ground access to the entire study area until the completion of the Parks Highway in 1971. This highway crosses the Susitna River south of Talkeetna (Milepost 104.3), and does not intersect the Alaska Railroad again until Milepost 194.3. The highway and the railroad share a common alignment from Hurricane to Cantwell. Consequently, following the construction of the Parks Highway, Study Areas A and B, including Chase, Sherman, Gold Creek, and Chulitna, remained accessible only by railroad. A section of Study Area C along the Parks highway from the Chulitna River bridge at Milepost 132.8 to Hurricane became open by motorized ground transportation for the first time, while the remainder of Study Area C, from Hurricane to Cantwell, is now within both the highway and railroad corridors.

Settlement Entry Programs

Since Alaska's statehood in 1959, much of the land in the study areas has passed into private ownership through several land disposal or settlement entry programs. For example, over 52,000 acres (over 10 percent of the total acreage) in the South Parks Highway Subregion of the Susitna Area Plan (Alaska Department of Natural Resources 1985:87-88), which includes the Chase area, has been offered for settlement by the state or the Matanuska-Susitna Borough, mostly in five acre tracts. This acreage includes much of the most desirable lands for settlement in lower elevations with proximity to road access and established communities. The state's Susitna Area Plan recommended that 10,330 acres in the South Parks Highway Subregion be offered to the public for

settlement over a 20 year period. In addition, the plan recommended an offering of 22,000 acres in the North Parks Highway Subregion, including the Hurricane - Broad Pass area included in this study (Alaska Department of Natural Resources 1985:71-72). Table 2 provides a list of the major settlement programs that have occurred in the study area and their general locations.

Individuals have acquired land through these state programs for, basically, three different reasons. For some, acquisition of the land is an investment, speculating that land values will increase in the future with the demand for recreational and settlement sites (Durr 1974:33). Another reason, not exclusive of the first, has been to obtain land for seasonal recreational use. The owners do not intend to occupy the land year-round, but rather visit periodically for fishing, hunting, or simply relaxing.

The third reason for obtaining land through the state settlement entry program characterizes the majority of the people interviewed during this study, especially those living in the Chase area. These people obtained their land in order to live full-time on the parcel. As characterized by Durr (1974:13-20) in the mid 1970s, the motivations leading people to settle in the Chase area included a desire to live a life with a slower pace than that of a city, to live "close to nature," and to seek a "healthier lifestyle" removed from the "pollution of industrialization." These settlers sought a perceived self-reliant way of life based on hunting, fishing, and growing their own foods. Additionally, the settlers believed that living in an area of low population density promoted cooperative social relationships. Durr (1974:35) found that there was a concern among Chase area residents that

TABLE 2. SUMMARY OF LAND DISPOSALS IN THE STUDY AREA.

Year	Entry Program	Location
1968-73	Open-to-Entry	Chase
June 1980	Chase I Open-to-Entry	Chase
1980-84	Chase II Remote Remote Parcel	Chase
1980-84	State Remote Parcel	Colorado Chulitna
December 1982	State Subdivision	Indian River
1985	Chase III Agricultural Offering (Halted by Court Order)	Chase
1985	State Homestead and Remote Disposal	Sherman, Curry McKenzie Creek
1986	State Homestead	Hurricane Pass Creek

Sources: Alaska Department of Natural Resources 1985; D. Bader, ADF&G, personal communication, 1988; M. Sullivan, ADNR, personal communication, 1988.

further land disposals near their lands would unacceptably increase population densities, resulting in crowding and pressure on the area's resources. Their recommendations included closing the area to further entry, increasing the size of settlement parcels, establishing "green belts" around areas of high settlement, and prohibiting land speculation (Durr 1974:35-38).

In 1987, when asked why they moved to the study areas, most respondents in the division's survey cited reasons similar to those which Durr documented in the mid 1970s. Typical responses included:

> I moved to Chase to pursue a bush way of life, to enjoy the quiet of the area, the wildlife, and having nature close by.
>
> I moved to this area to be able to hunt and fish, for the high quality environment, and the relatively low population density.
>
> We wanted to live a subsistence lifestyle and enjoy the peace and quiet and beauty of the area.
>
> We wanted to live a simple natural lifestyle.
>
> We wanted to get away from all the regulations in the city, and love the land.
>
> I have lived a rural lifestyle most of my life. We found land we like and decided to move here. This is a healthy lifestyle.

In summary, during the study period, residents of the study area cited the desire to live a particular lifestyle, to enjoy a peaceful and beautiful area, and the availability of good land, as reasons for living in the study area. These points of view were most notable in the Chase area, and are consistent with earlier findings for the 1970s.

CHAPTER THREE

COMMUNITY DESCRIPTIONS

SETTLEMENT PATTERNS

All three study areas are within the Matanuska-Susitna Borough. In the Chase area in 1986, all households were located east of the Alaska Railroad right-of-way and the Susitna River, which parallel each other. The majority of households were located within two miles of the railroad, while about five households were located about ten miles to the east along Clear Creek. Many households oriented the locations of their property in terms of the named rail line departure point to their property (e.g. Chase) or by a railroad milepost marker. Other households used other place names such as Lane Creek, "the Ridge," or Back Lake to describe the locations of their homes.

Particular locations of homes within the Chase study area were determined by land availability (in Open-to-Entry disposal programs or private sales), access, suitability for building, availability of wood, and individual preferences. Most people selected their land based on their own set of personal needs tempered by the physical characteristics of the land. Many people mentioned desirable homesite qualities to be relative ease of access, open space, an adequate wood supply, ground for gardening, and desirable building conditions. An adequate wood supply was one of the major factors cited for making a particular choice of property.

Five of the six year-round households in the Gold Creek - Chulitna study area lived along the railroad, while the other lived about six

miles up a Susitna River tributary and was accessible by an unimproved trail from the railroad. Additionally, there were several other cabins that belonged to part-time residents or were used for recreation. There was a concentration of households near the railroad section house at Gold Creek. Also, there were short, unpaved airstrips at Gold Creek and Chulitna. There was no highway access to this area.

Households in the Hurricane - Broad Pass study area were scattered along the Parks Highway, with a small concentration near the Chulitna River bridge near the southern end of the area (Milepost 132.8). Most year-round homes were within a mile or two of the highway, but there were many recreational cabins more distant from the road that were reached by unimproved trails or by airplane. Examples include state land disposal areas near Milepost 169 just south of Hurricane Gulch and at Colorado. Most of the area along the Parks Highway from just south of the study area (Milepost 132.5) to Milepost 169 (five miles south of Hurricane Gulch) is within the 421,120 acre Denali State Park. No discharge of firearms is allowed within the park and the park is closed to the use of motorized vehicles, including snowmachines, except on specified roads.

DEMOGRAPHY

During the study period in 1986, there were approximately 30 households living year-round in the Chase and Sherman areas, with an estimated population of 78 persons (Table 3). Of these, 17 households (56.7 percent) with a population of 45 people were interviewed. Figure 2 shows the age and sex structure of the study population. This

TABLE 3. DEMOGRAPHIC CHARACTERISTICS OF SAMPLED HOUSEHOLDS, 1986

	CHASE	GOLD CREEK-CHULITNA	HURRICANE-BROAD PASS
Number of sampled households	17	5	8
% of total households	56.7%	83.3%	66.7%
Average household size	2.65	2.00	3.38
Total sample population	45	10	27
Estimated total year-round population	78	11	41
% male	51.1%	50.0%	40.7%
% female	48.9%	50.0%	59.3%
% of household heads or spouse, AK Native	0	40.0%	25.0%
% of hh's population AK Native ancestry	0	30.0%	25.9%
% of hh's with head or spouse born in Alaska	11.8%	40.0%	25.0%
% of hh's with head or spouse born outside Alaska	88.2%	60.0%	75.0%
% of sample total population born in Alaska	26.7%	50.0%	51.9%
% of total population born outside Alaska	73.3%	50.0%	48.1%
Mean length of residency, hh head or spouse	11.4 yrs.	20.2 yrs.	16.5 yrs.

Source: Division of Subsistence, ADF&G, Survey 1987.

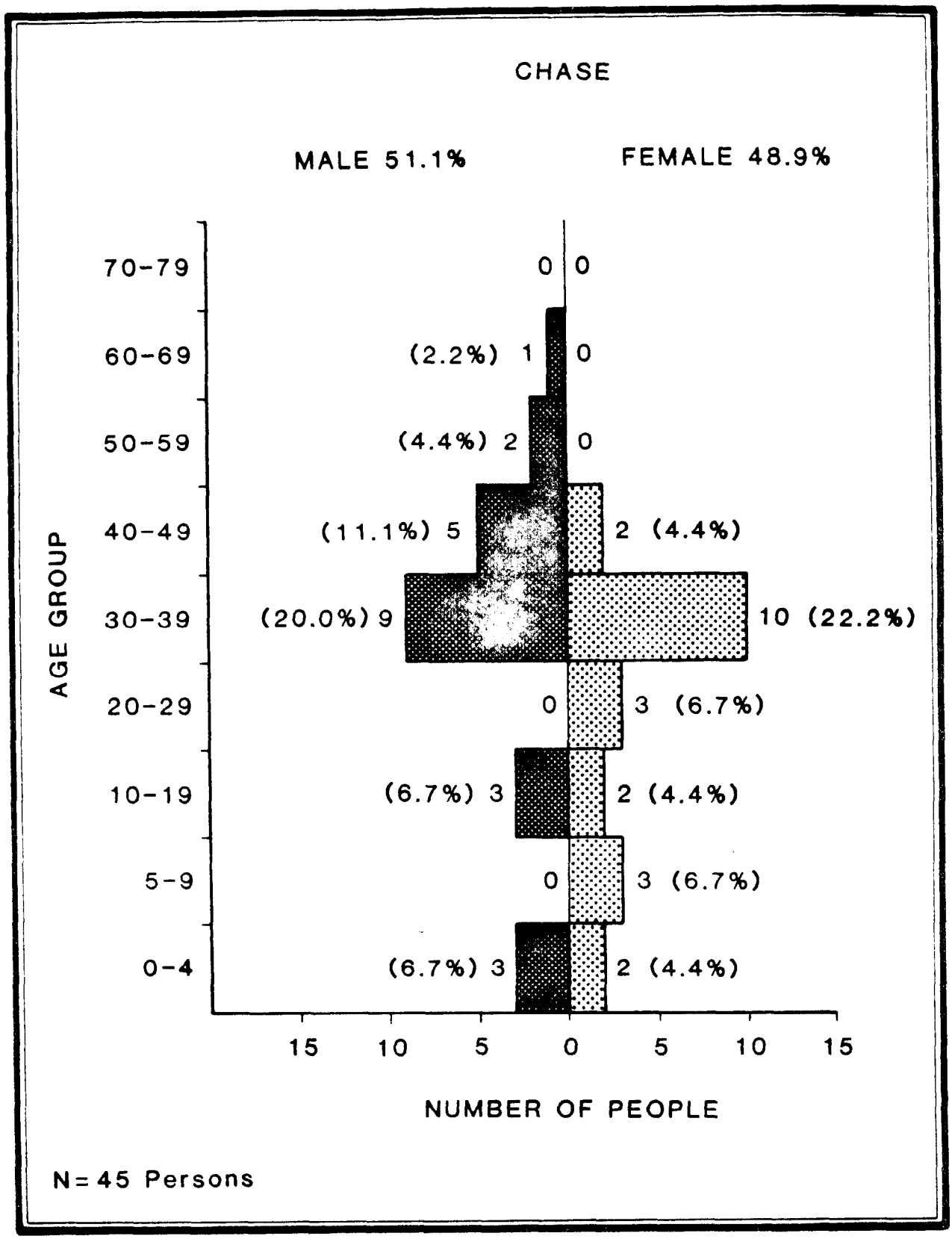

Figure 2. Population Profile, Chase, 1986.

population contained 51.1 percent males and 48.9 percent females. There was a preponderance of the population in the 30-39 year age class (42.2 percent of the people). There were 13 individuals less than 18 years of age, representing 28.8 percent of the total population. There were no Alaska Natives within the Chase study population.

As shown in Table 3, the average length of residency in the Chase - Sherman area for sampled households was 11.4 years. Eight household heads (or spouses) (47.1 percent) had lived in the Chase area ten years or less, while nine (52.9 percent) had been there more than ten years (Fig. 3). About 12 percent of the households had a head or spouse born in Alaska. Of the total study population, 26.7 percent had been born in the state.

The Gold Creek - Chulitna area contained six year-round households during the study period with a population of about 11 people. Five of these households (83.3 percent) were interviewed during the research (Table 3). The average length of residency for the heads of these households was 20.2 years, and Alaska Natives made up 30 percent of this study population. As shown in Figure 3, only one of these households (20 percent) did not have a head or spouse who had lived in the area for at least ten years.

The division identified 12 year-round households living in the Hurricane - Broad Pass study area, with an estimated population of 41. Of these, eight (66.7 percent) were interviewed (Table 3). The average length of residency of household heads in this sample was 16.5 years, and 25.9 percent of the sample's population was Alaska Native. Three of these households (37.5 percent) had lived in the study area less than

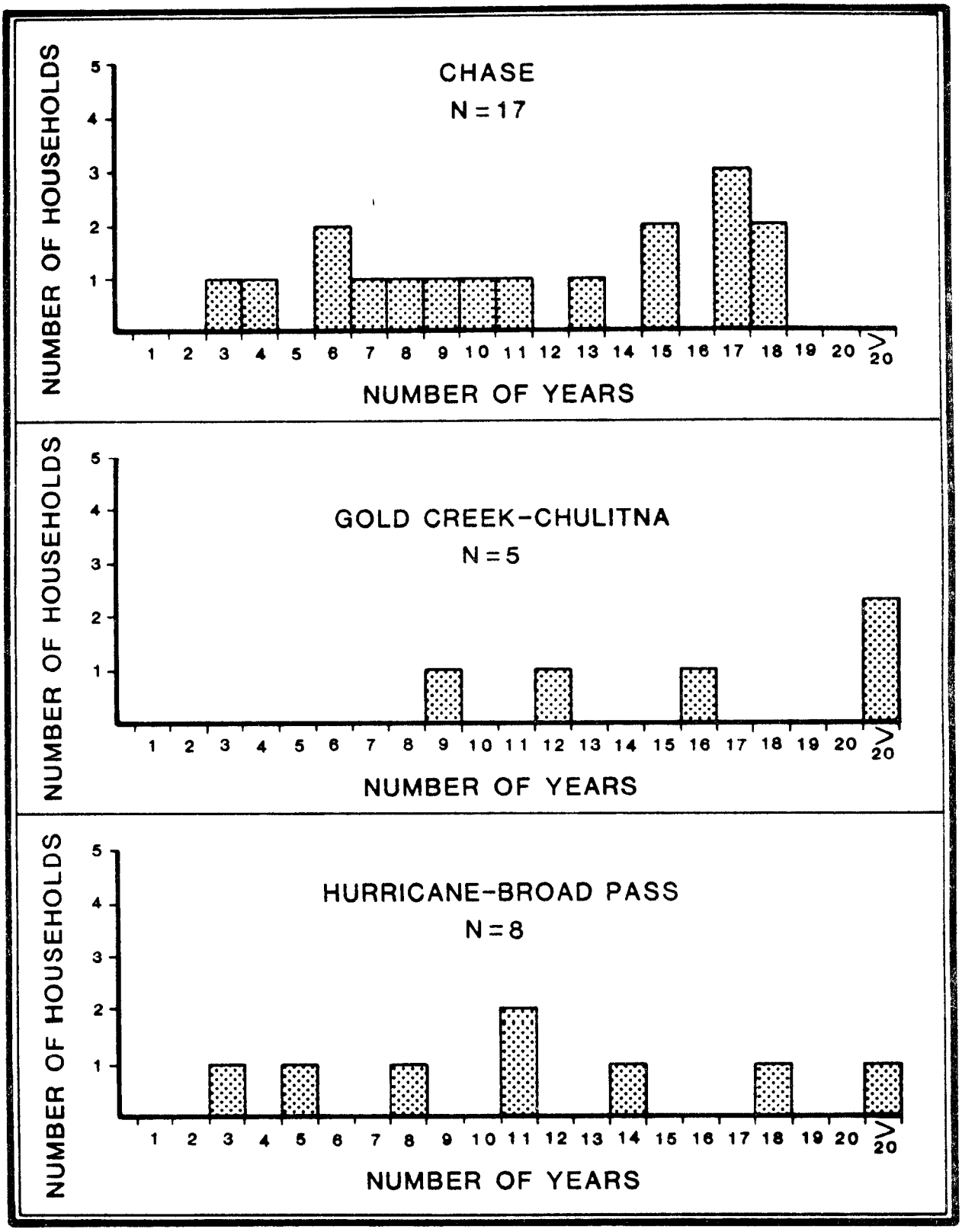

Figure 3. Number of Years of Residence in the Study Communities, Household Head or Spouse, Chase, Gold Creek-Chulitna, and Hurricane-Broad Pass, 1986.

ten years, while five (62.5 percent) had been there for 11 years or more (Fig. 3).

Figure 4 presents a profile of the age and sex structure of the combined Gold Creek - Chulitna and Hurricane - Broad Pass samples. Similar to Chase, there was a large percentage of the population (37.8 percent) in the 30-39 year age class. There were 11 individuals (29.7 percent) in these samples under 18 years of age, and only two (5.4 percent) 50 years old or older.

SERVICES AND FACILITIES

Chase

In the Chase area there were two primary means of transportation during the study period. The Alaska Railroad, which borders the western edge of the area, provided the only scheduled commercial passenger transportation, a flag stop service using a rail diesel car. In 1987 the railroad implemented, on an experimental basis, a special freight delivery service for large quantities of fuel and other freight. Other transportation means included snowmachines, all-terrain vehicles, and walking, snowshoeing, and skiing. Since there were no roads in the area, residents utilized a network of unmarked trails and paths to reach home sites. Many people used Talkeetna as a jumping off point to the Chase area, a distance of about ten miles. Talkeetna is also a center for mail (there is no local mail delivery service), shopping, social events, and part-time employment for Chase residents.

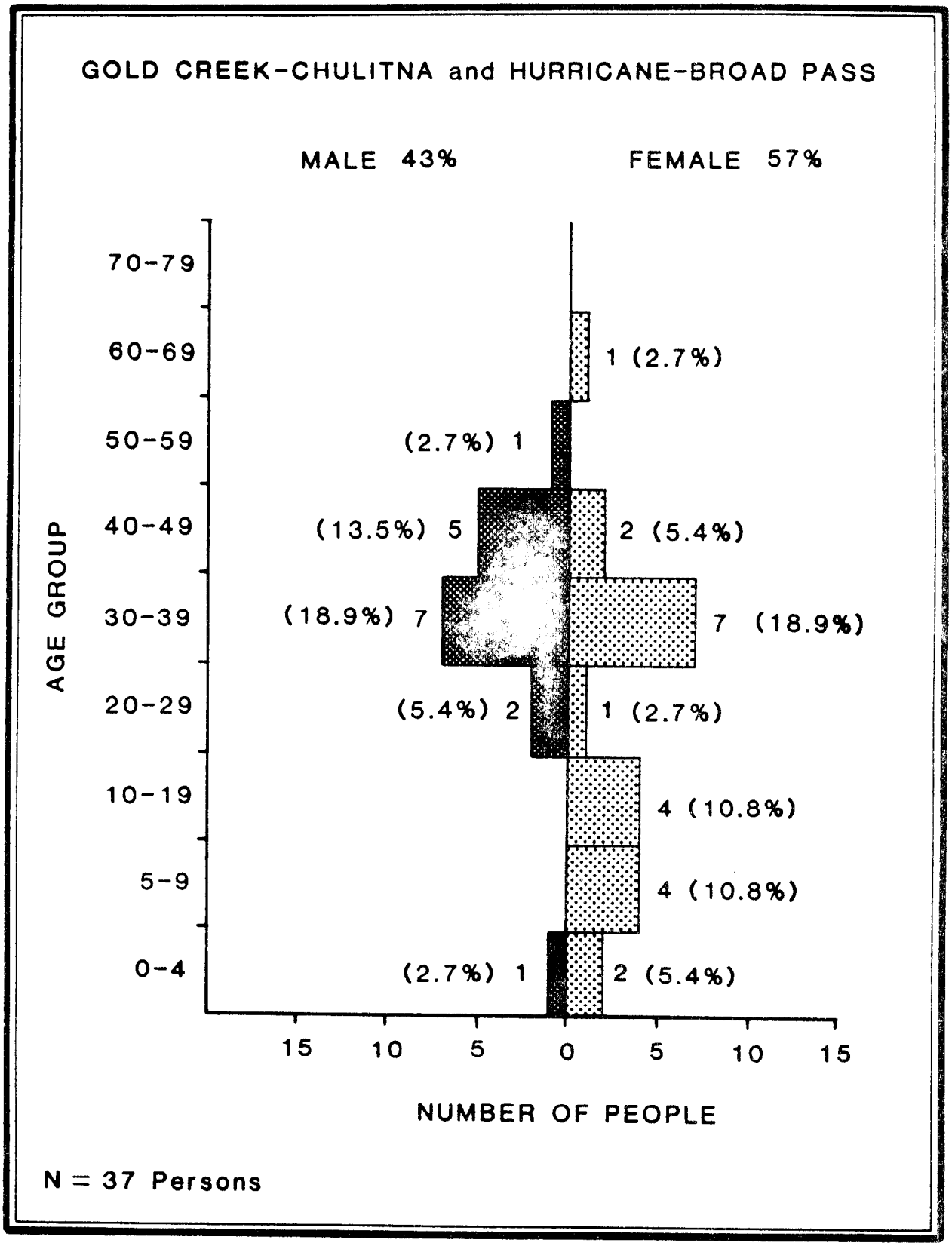

Figure 4. Population Profile, Gold Creek-Chulitna and Hurricane-Broad Pass, 1986.

There were few other formal services in the immediate Chase area. A few homes close to Talkeetna had telephones, but the majority of households were without phone hookups. Communication was by commercial radio stations; KSKA (Anchorage) had a local transmitter in the area, and several other Anchorage stations could be received. Citizens band (CB) radios also were used by some households. There was no community electrical supply to the area. Most homes had small, portable generators for running small appliances, limited lighting, charging batteries, and running small refrigerators during warm periods. The closest schools available to Chase residents were in Talkeetna. One household transported their child into Talkeetna on a daily basis. Several other households utilized home study correspondence courses, but most people found it necessary for their older children to move to a community with formal school programs.

Residents of Chase were organized politically into the Chase Community Council. This group has recently been active in developing a community plan with the Matanuska-Susitna Borough, working with the railroad on scheduling passenger services, and pursuing a variety of other community concerns.

Gold Creek - Chulitna

There were no commercial facilities in the Gold Creek - Chulitna area during the study period. Gold Creek was the location of the Alaska Railroad's section maintenance station. The Alaska Railroad delivers mail to the Gold Creek - Chulitna area. Households operated their own electric generators. Local residents had to travel to Talkeetna (a

distance of about 40 to 50 miles) or further south to Wasilla to purchase supplies. Travel was usually by train to Talkeetna and then by highway vehicle to other locations. Some households kept vehicles parked at the Talkeetna train depot.

Hurricane - Broad Pass

The few commercial facilities in the Hurricane - Broad Pass study area were oriented towards providing services to Parks Highway travelers. There were three such facilities in operation in 1986 and 1987. The first provided lodging, meals, and gasoline, and ran a small gift shop. The second contained a restaurant, gift shop, and service station. The third sold gasoline and provided minor automobile repair services. In addition, the state operated a road maintenance facility at Milepost 185 (the East Fork camp). Generally, residents of this study area traveled to Cantwell (36 miles from Hurricane) or Wasilla (about 130 miles from Hurricane) for food supplies, building supplies, and medical services. Most picked up their mail at boxes in Cantwell. Households ran their own electric generators.

EMPLOYMENT CHARACTERISTICS

As shown in Table 4, 22 adults in the Chase sample (68.8 percent of all adults in the sampled households) were employed in cash-earning jobs during at least part of the study period in 1986. These adults held a total of 31 jobs, for an average of 1.4 per person. Only 18.2 percent of the adults were employed year round, however, and the average length

TABLE 4. EMPLOYMENT CHARACTERISTICS OF SAMPLED HOUSEHOLDS, 1986

	Chase	Gold Creek-Chulitna	Hurricane-Broad Pass
NUMBER OF ADULTS EMPLOYED DURING PART OF STUDY YEAR[a]	22	5	13
TOTAL NUMBER OF ADULTS	32	7	19
PERCENT OF TOTAL ADULTS EMPLOYED DURING STUDY YEAR	68.8%	71.4%	68.4%
NUMBER OF JOBS HELD BY EMPLOYED ADULTS	31	7	16
AVERAGE NUMBER OF JOBS HELD PER EMPLOYED ADULT	1.4	1.4	1.2
PERCENT OF EMPLOYED THAT WERE EMPLOYED YEAR-ROUND	18.2%	60.0%	61.5%
AVERAGE NUMBER OF MONTHS EMPLOYED, WORKING ADULTS	6.4	10.0	8.9
AVERAGE NUMBER OF MONTHS EMPLOYED, ALL HOUSEHOLD HEADS	4.4	10.0	9.6
AVERAGE HOUSEHOLD INCOME FROM ALL JOBS	$16,023	$19,420	$16,520

[a] Excluding those classed as disabled, homemakers, students, or retired for the entire 12 month period. Includes any adult working for at least one month during the study period. An adult was defined as any person 18 years of age or older.

Source: Division of Subsistence, ADF&G, Survey 1987.

of employment for all employed adults was 6.4 months. Household heads worked an average of 4.4 months.

Table 5 reports the kinds of jobs held by Chase households by employer type and occupational type. With 25.8 percent of the jobs, construction was the most common employer type, followed by services (22.6 percent), fisheries (19.4 percent), and state and local government (13 percent). The most common occupational type was the professional, technical, and managers category (29.0 percent), followed by fisheries (19.4 percent), clerical and sales (16.1 percent), and structural (12.9 percent).

As shown in Table 6, only 22.6 percent of the jobs held by Chase residents occurred within the study area. "Other Alaska " (including seasonal commercial fishing jobs in Norton Sound and Bristol Bay) was the most common location of employment, with 25.8 percent of the jobs. Employment in Anchorage accounted for 22.6 percent of the jobs. Other employment occurred on the North Slope (12.9 percent), other Matanuska-Susitna Borough communities (9.7 percent), and "statewide" (6.5 percent).

Five adults in the Gold Creek - Chulitna area held a total of seven jobs in 1986 (Table 4). Sixty percent of these adults were employed year-round, and the average number of months employed was 10.0. Two of these jobs (28.5 percent) were with state government (the Alaska Railroad) and two (28.5 percent) were in services (Table 7). The remaining employer types were mining (14.3 percent), construction (14.3 percent), and transportation, communications, and utilities (14.3 percent). The structural occupational type accounted for 42.8 percent of the jobs held by Gold Creek - Chulitna residents in 1986, and the

TABLE 5. PERCENTAGE OF JOBS HELD BY ADULTS IN SAMPLED CHASE HOUSEHOLDS BY EMPLOYER TYPE AND OCCUPATIONAL TYPE, 1986

Employer Type	Number of Jobs	% of Jobs
Agriculture, Fisheries, Forestry[a]	6	19.4%
Mining	1	3.2%
Construction	8	25.8%
Manufacturing	0	0
Transportation, Communications, Utilities	1	3.2%
Retail Trade	1	3.2%
Finance, Insurance	1	3.2%
Services	7	22.6%
Federal Government	0	0
State Government	2	6.5%
Local Government	2	6.5%
Self-Craft, Artist	2	6.5%
Total	31	100.0%

Occupational Type	Number of Jobs	% of Jobs
Professional, Technical, Managers	9	29.0%
Clerical & Sales	5	16.1%
Services Worker	1	3.2%
Agriculture Fisheries, Forestry[a]	6	19.4%
Processing	0	0
Machine Trades	0	0
Structural	4	12.9%
Motor Freight & Transport	0	0
Recreation-Based Occupations	2	6.5%
Packaging & Materials Handling	1	3.2%
Mining	1	3.2%
Miscellanous Labor	0	0
Craft, Artist	2	6.5%
Total	31	100.0%

[a] Because much of the furbearer harvests was not sold, but was used in local craft production, trapping was not included as a separate job or occupation type.

Source: Division of Subsistence, ADF&G, Survey 1987.

TABLE 6. LOCATION OF JOBS HELD BY ADULTS IN SAMPLED HOUSEHOLDS, 1986

Location	Chase (N=17 hh) # of Jobs	Chase (N=17 hh) % of total Jobs	Gold Creek-Chulitna (N=5 hh) # of Jobs	Gold Creek-Chulitna (N=5 hh) % of total Jobs	Hurricane Broad Pass N=8 hh) # of Jobs	Hurricane Broad Pass N=8 hh) % of total Jobs
Study Area	7	22.6%	5	71.4%	9	64.3%
Other Mat-Su Borough	3	9.7%	0	0	2	14.3%
Anchorage	7	22.6%	2	28.6%	1	7.1%
North Slope	4	12.9%	0	0	0	0
Other Alaska [a]	8	25.8%	0	0	2	14.3%
"Statewide" [b]	2	6.5%	0	0	0	0
Total	31	100.0%	7	100.0%	14	100.0%

[a] Other Alaska included seasonal commercial fishing in Norton Sound and Bristol Bay, and other seasonal work in lower Cook Inlet, Kodiak Island, and Prince William Sound.

[b] "Statewide" meant a job with varying short-term assignments in several parts of the state.

Source: Division of Subsistence, ADF&G, Survey 1987.

TABLE 7. PERCENTAGE OF JOBS HELD BY ADULTS IN SAMPLED GOLD CREEK - CHULITNA HOUSEHOLDS BY EMPLOYER TYPE AND OCCUPATIONAL TYPE, 1986

Employer Type	Number of Jobs	% of Jobs
Agriculture, Fisheries, Forestry[a]	0	0
Mining	1	14.3%
Construction	1	14.3%
Manufacturing	0	0
Transportation, Communications, Utilities	1	14.3%
Retail Trade	0	
Finance, Insurance	0	0
Services	2	28.5%
Federal Government	0	0
State Government	2	28.5%
Local Government	0	
Self-Craft, Artist	0	0
Total	7	100.0%

Occupational Type	Number of Jobs	% of Jobs
Professional, Technical, Managers	2	28.5%
Clerical & Sales	1	14.3%
Services Worker	1	14.3%
Agriculture Fisheries, Forestry[a]	0	0
Processing	0	0
Machine Trades	0	0
Structural	3	42.8%
Motor Freight & Transport	0	0
Recreation-Based Occupations	0	0
Packaging & Materials Handling	0	0
Mining	0	0
Miscellanous Labor	0	0
Craft, Artist	0	0
Total	7	100.0%

[a] Because much of the furbearer harvests was not sold, but was used in local craft production, trapping was not included as a separate job or occupation type.

Source: Division of Subsistence, ADF&G, Survey 1987.

professional, technical, and managers category added two more (28.5 percent). Two other categories provided one job each (14.3 percent). These were clerical and sales, and services worker. Most of these jobs (71.4 percent) were within the study area (in part, because of the railroad and mine jobs), and the rest (two jobs; 28.6 percent) were in Anchorage (Table 6).

Within the eight sampled households in the Hurricane - Broad Pass area, 13 adults held 16 jobs during the study year (Table 4). The largest employer category for these adults was self employment as craftsmen and artists (25.0 percent) (Table 8). Retail sales and services each employed three people (18.7 percent each). State government employed two people (14.3 percent), while fisheries (7.1 percent), transportation, communications, and utilities (7.1 percent), and construction (7.1 percent) employed one each. The most common occupational type was professional, technical, and managers, with six jobs (37.5 percent), followed by craftsmen and artists with four jobs (25.0 percent). Six other types were represented by one job (6.3 percent) each. These were services worker, agriculture, fisheries, and forestry, machine trades, structural, motor freight and transport, and recreation-based occupations. As in Gold Creek - Chulitna, most of the jobs (64.3 percent) held by Hurricane - Broad Pass residents in 1986 occurred within the study area (Table 6). This was due mainly to the area's location along the highway corridor and the presence of facilities providing services to motorists. Two (14.3 percent) other jobs were in other Matanuska - Susitna Borough communities, two were in "other Alaska," and one (7.1 percent) was in Anchorage.

TABLE 8. PERCENTAGE OF JOBS HELD BY ADULTS IN SAMPLED HURRICANE - BROAD PASS HOUSEHOLDS BY EMPLOYER TYPE AND OCCUPATIONAL TYPE, 1986

Employer Type	Number of Jobs	% of Jobs
Agriculture, Fisheries, Forestry[a]	1	6.3%
Mining	0	0
Construction	1	6.3%
Manufacturing	0	0
Transportation, Communications, Utilities	1	6.3%
Retail Trade	3	18.7%
Finance, Insurance	0	0
Services	3	18.7%
Federal Government	1	6.3%
State Government	2	12.5%
Local Government	0	0
Self-Crafts, Artist	4	25.0%
Total	16	100.0%

Occupational Type	Number of Jobs	% of Jobs
Professional, Technical, Managers	6	37.5%
Clerical & Sales	0	0
Services Worker	1	6.3%
Agriculture Fisheries, Forestry[a]	1	6.3%
Processing	0	0
Machine Trades	1	6.3%
Structural	1	6.3%
Motor Freight & Transport	1	6.3%
Recreation-Based Occupations	1	6.3%
Packaging & Materials Handling	0	0
Mining	0	0
Miscellanous Labor	0	0
Craft, Artist	4	25.0%
Total	16	100.0%

[a] Because much of the furbearer harvests was not sold, but was used in local craft production, trapping was not included as a separate job or occupation type.

Source: Division of Subsistence, ADF&G, Survey 1987.

MONETARY INCOMES

Information on monetary incomes of Chase, Gold Creek - Chulitna, and Hurricane - Broad Pass residents was obtained in the division's 1987 survey. The sampled households were asked to report their incomes from each job held by adults during 1986. The incomes by jobs have been summed to provide an estimate of total household income. The average household monetary income from these sources for the Chase sample was $16,023 (Table 4). The average earned income of the five Gold Creek - Chulitna households was $19,420 during the study year, and the average for the eight Hurricane - Broad Pass households was $16,520. These estimates do not include the potential value of furbearer harvests, which are discussed in later sections of this report. There are no other sources reporting incomes for this area with which to compare the 1986 year.

CHAPTER FOUR

RESOURCE HARVEST AND USE PATTERNS: CHASE

SPECIES USED AND SEASONAL ROUND OF HARVEST ACTIVITIES

Table 9 lists the fish, game, and wild plant resources which households in Chase harvested or used during the study period in 1986. The total includes 69 resources, with 14 species or categories of fish, 5 species of marine invertebrates, 18 species of game and furbearers, 10 types of birds, and 22 kinds of edible wild plants. On average, households in the sample used 11.7 categories of wild resources, attempted to harvest 11.5 categories, and harvested 10.0 categories (Table 10).

Figure 5 depicts the seasonal round of resource harvest activities in the three study areas, including Chase. For the most part, resource harvests occurred within regulated seasons. Early spring resources, taken in late April and May, included several species of freshwater fish, such as trout, grayling, and Dolly Varden. Black bear were also hunted in the spring months. Summer harvest activities included fishing for various species of salmon, as well as other fish species in fresh water. Berry picking began in August, as did caribou hunting. Other fall activities included hunting for moose, black bear, ptarmigan, grouse, and ducks, as well as fishing for silver salmon. Resource harvests in winter included hunting for ptarmigan and grouse, furbearer trapping, and fishing through the ice for trout and burbot. There was also a winter season for caribou scheduled for January and February,

TABLE 9. WILD RESOURCES HARVESTED OR USED BY SAMPLED HOUSEHOLDS IN CHASE, GOLD CREEK - CHULITNA, AND HURRICANE - BROAD PASS, 1986

Resource	Scientific Name	Used and/or Harvested in 1986		
		Chase	Gold Creek-Chulitna	Hurricane-Broad Pass
SALMON				
King Salmon	*Oncorhynchus tshawytscha*	X	X	X
Sockeye Salmon	*Oncorhynchus nerka*	X	X	X
Chum Salmon	*Oncorhynchus keta*	X	X	
Pink Salmon	*Oncorhynchus gorbuscha*	X	X	X
Silver Salmon	*Oncorhynchus kisutch*	X	X	X
FRESHWATER FISH				
Rainbow Trout	*Salmo gairdneri*	X	X	X
Lake Trout	*Salvelinus namaycush*			X
Dolly Varden	*Salvelinus malma*	X	X	
Arctic Grayling	*Thymallus arcticus*	X	X	X
Burbot	*Lota lota*	X	X	X
Whitefish	*Coregonus* spp.	X	X	
MARINE FISH				
Halibut	*Hippoglossus stenolepis*	X	X	X
Pacific Cod	*Gadus macrocephalus*			X
Hooligan	*Hypomesus pretiosus*	X		
Herring	*Clupea harengus pallasi*	X		
Herring Spawn-on-Kelp		X		X
MARINE INVERTEBRATES				
Razor Clams	*Siliqua patula*	X	X	X
Butter Clams	*Saxidomus giganteus*	X		
King Crab	*Paralithodes camtschatica*	X		
Dungeness Crab	*Cancer magister*	X		
Shrimp	*Pandalus* spp.	X		
MARINE MAMMALS				
Harbor Seal	*Phoca vitulina richardsi*	X		
Belukha	*Delphinapterus leucas*	X		
LAND MAMMALS				
Moose	*Alces alces gigas*	X	X	X
Caribou	*Rangifer tarandus*	X	X	X
Dall Sheep	*Ovis dalli dalli*	X		
Mountain Goat	*Oreamnos americanus*	X		
Black Bear	*Ursus americanus*	X	X	X

TABLE 9. (continued) WILD RESOURCES HARVESTED OR USED BY SAMPLED HOUSEHOLDS IN CHASE, GOLD CREEK - CHULITNA, AND HURRICANE - BROAD PASS, 1986

Resource	Scientific Name	Used and/or Harvested in 1986		
		Chase	Gold Creek-Chulitna	Hurricane-Broad Pass
Brown Bear	*Ursus arctos*	X		
Elk	*Cervus elaphus roosevelti*			X
Sitka Black-tailed Deer	*Odocoileus hemionus sitkensis*	X		
Porcupine	*Erethizon dorsatum*	X		X
Snowshoe Hare	*Lepus americanus*	X	X	X
BIRDS				
Ptarmigan	*Lagopus* spp.	X	X	X
Spruce Grouse	*Canachites canadensis*	X	X	X
Canada Geese	*Branta canadensis*	X		
Ducks	a	X	X	X
FURBEARERS				
Beaver	*Castor canadensis*	X		X
Land Otter	*Lutra canadensis*	X		
Mink	*Mustela vison*	X		X
Marten	*Martes americana*	X		X
Wolverine	*Gula gulo*			X
Wolf	*Canis lupus*			X
Red Fox	*Vulpes vulpes*	X		X
Red Squirrel	*Tamia sciurus hudzonicus*	X	X	
Short-tailed Weasel	*Mustela erminea*	X		X
EDIBLE PLANTS				
Berries	b	X	X	X
Other Plants	c	X	X	X

[a] Types of ducks included mallards (*Anas platyrhynchos*), green-winged teals (*Anas crecca carolinensis*), pintails (*Anas acuta*), northern schovelers (*Anas clypeata*), buffleheads (*Bucephala albeola*), common goldeneyes (*Bucephala clangula americana*), and red-breasted mergansers (*Mergus serrator*).

[b] Types of berries included blueberries, currents, high bush cranberries, low bush cranberries, raspberries, cloudberries, crowberries, watermelon berries, salmon berries, nagoon berries, and trailing strawberries.

[c] Other plants included fiddlehead fern, rosehips, wild celery, wild cucumber, fireweed, and labrador tea.

Source: Division of Subsistence, Alaska Department of Fish and Game, Resource Harvest Survey 1987

TABLE 10. RESOURCE HARVEST AND USE CHARACTERISTICS OF STUDY COMMUNITIES

	Chase N=17	Gold Creek-Chulitna N=5	Hurricane-Broad Pass N=8
MEAN NUMBER OF RESOURCE CATEGORIES[a] USED PER HOUSEHOLD	11.7	11.2	10.1
MEAN NUMBER OF RESOURCE CATEGORIES[a] ATTEMPED TO HARVEST HOUSEHOLD	11.5	9.8	9.4
MEAN NUMBER OF RESOURCE CATEGORIES[a] HARVESTED PER HOUSEHOLD	10.0	9.0	7.8
MEAN NUMBER OF RESOURCE CATEGORIES[a] RECEIVED	2.9	3.2	3.1
MEAN NUMBER RESOURCE CATEGORIES[a] GIVEN AWAY	2.4	2.4	1.9
MEAN HOUSEHOLD HARVEST, POUNDS EDIBLE WEIGHT	553.8 lbs.	347.9 lbs.	600.5 lbs.
COMMUNITY PER CAPITA HARVEST[b] IN POUNDS EDIBLE WEIGHT	209.2 lbs.	174.0 lbs.	177.9 lbs.
HOUSEHOLD PER CAPITA HARVEST[b] IN POUNDS EDIBLE WEIGHT	224.5 lbs.	158.9 lbs.	203.5 lbs.
PERCENT USING ANY RESOURCE	100.0%	100.0%	100.0%
PERCENT ATTEMPTING HARVEST OF ANY RESOURCE	100.0%	100.0%	100.0%
PERCENT HARVESTING ANY RESOURCE	100.0%	100.0%	100.0%
PERCENT RECEIVING ANY RESOURCE	70.6%	100.0%	75.0%
PERCENT GIVING AWAY ANY RESOURCE	58.8%	40.0%	62.5%

[a] Categories are those which appear as 'resources' on Tables 11, 19, and 20

[b] Community per capita harvest equals the total resource harvest in pounds edible weight divided by the number of people in each sample. Household per capita harvest is computed by dividing each household's harvest by its size, and then averaging across households for each sample.

Source: Division of Subsistence, ADF&G, Survey 1987.

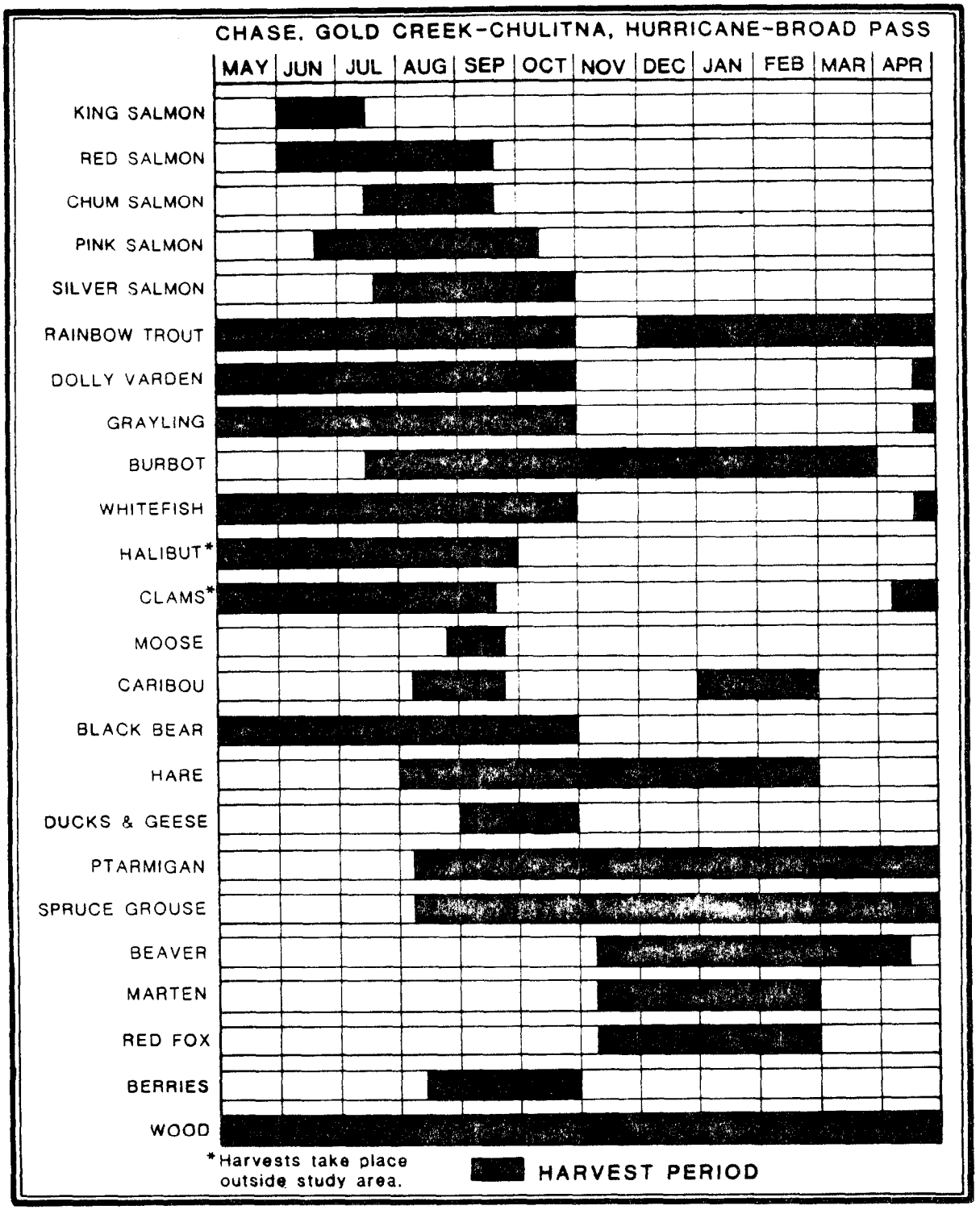

Figure 5. Seasonal Round of Resource Harvest Activities, Chase, Gold Creek-Chulitna, and Hurricane-Broad Pass.

although caribou were generally not available near Chase during this season. Finally, wood harvests occurred year-round.

TOTAL HARVEST AREA

Figure 6 depicts the area used for the harvest of all resources by sampled residents of Chase during the period of time they have lived in the community. Areas used for specific resources or resource categories are discussed below in other sections of the report. The time period depicted on the map is 1968 - 1986, because the maximum length of use of the area by households was 18 years. Excluded from the map are non-local areas that have been used, including areas where some households engage in commercial fishing (e.g Norton Sound and Bristol Bay) or recreational fishing and shellfish gathering (e.g. Cook Inlet). As shown in the figure, the local harvest area is relatively small, and includes portions of the middle Susitna and Talkeetna river drainages, mostly in Game Management Unit 13E, including a major portion of the Chunilna Creek (Clear Creek) drainage. Most of the area used is off the highway system, but portions are accessible along the railroad corridor or by river boat.

LEVELS OF PARTICIPATION IN THE USE AND HARVEST OF WILD RESOURCES

All 17 of the sampled Chase households used and harvested at least one type of wild resource in 1986 (Table 10). Excluding wood, 100 percent of the households used wild foods and 94.1 percent harvested one or more kinds of game, fish, or edible wild plants. All of the sample

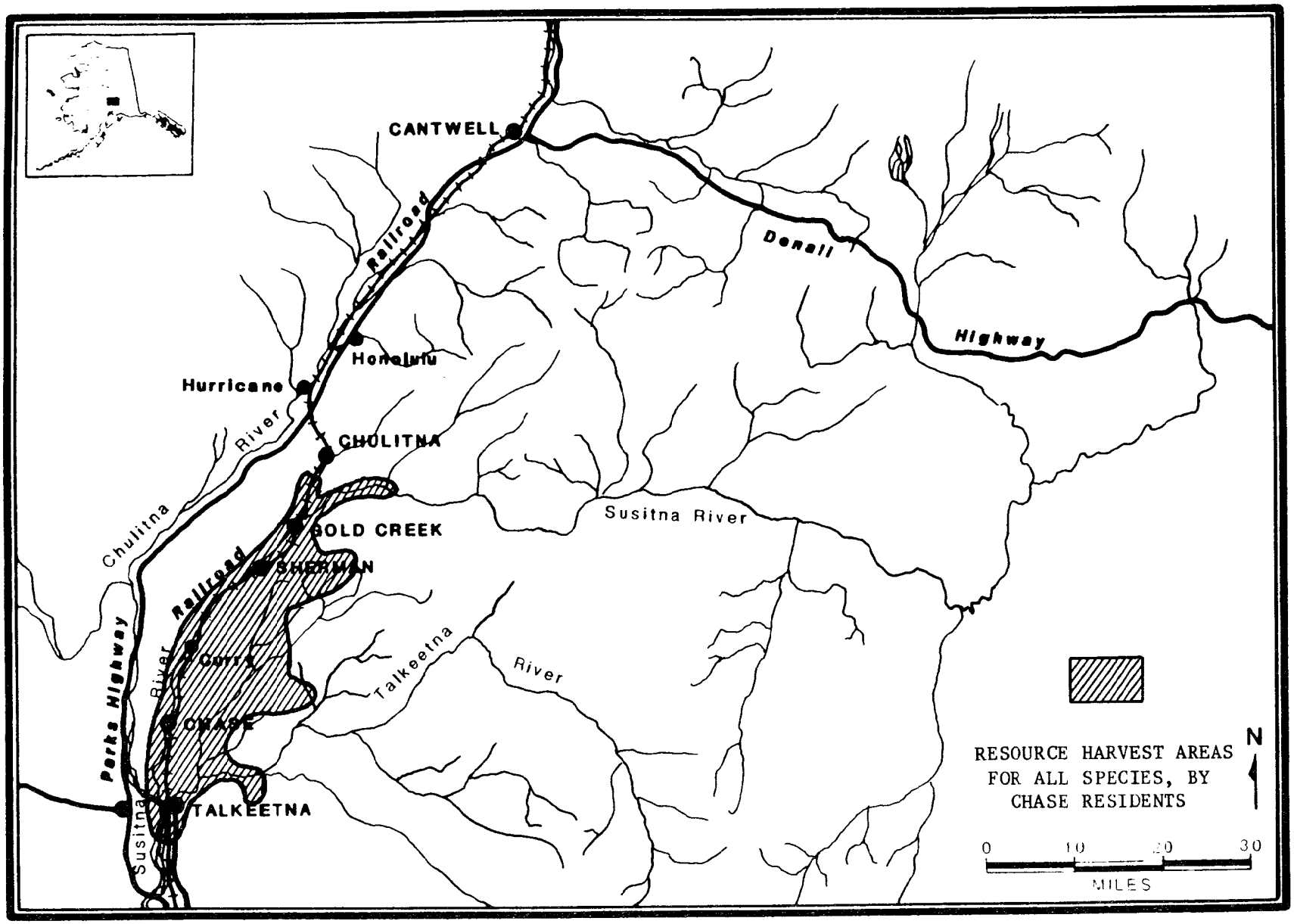

Figure 6. Areas Used for Resource Harvests, Chase, 1968-1986.

used wood, 94.1 percent used edible plants, 82.4 percent used salmon, 82.4 percent used game, 76.5 percent used freshwater fish other than salmon, 76.5 percent used birds, 52.9 percent used marine fish, 41.2 percent used marine invertebrates, 29.4 percent used furbearers, and 5.9 percent (one household) used marine mammals (Table 11, Figure 7). All 17 households used cordwood to heat their homes. Other specific resources used by over half the households during the study period included berries (88.2 percent), other plants (82.4 percent), moose (76.5 percent), rainbow trout (76.5 percent), spruce grouse (70.6 percent), silver salmon (64.7 percent), grayling (64.7 percent), Dolly Varden (52.9 percent), and house logs (52.9 percent) (Table 11).

More Chase households, 94.1 percent, attempted to harvest edible plants than any other category of edible wild foods. In descending order, the percentage of the sample that attempted to harvest other resource categories was: land mammals, 82.4 percent; birds, 76.5 percent; freshwater fish, 76.5 percent; salmon, 70.6 percent; marine invertebrates, 35.3 percent; furbearers, 35.3 percent; and marine fish, 29.4 percent. None of the sampled households hunted marine mammals in 1986 (Table 11, Fig. 7). Excluding edible plants and wood, more households attempted to harvest rainbow trout (76.5 percent) than any other resource. In addition, 70.6 percent hunted spruce grouse, 64.7 percent fished for grayling, 52.9 percent hunted moose, and 52.9 percent fished for Dolly Varden (Table 11).

The resource category harvested by the most households was wood (100 percent), followed by edible plants (94.1 percent), freshwater fish (76.5 percent), birds (76.5 percent), salmon (70.6 percent), land mammals (70.6 percent), marine invertebrates (35.3 percent), furbearers

TABLE 11. LEVELS OF HOUSEHOLD HARVEST AND USE OF WILD FISH, GAME, AND PLANT RESOURCES, CHASE, 1986 (N=17 households)

Resource	% HH Used	% HH Attempt Harvest	% HH Harvested	% HH Received	% HH Gave Away	Mean HH Harvest, Lbs	Total Sample Harvest, Numbers*
SALMON	82.4	70.6	70.6	23.5	35.3	131.2	374
King Salmon	47.1	47.1	41.2	11.8	11.8	33.9	32
Red Salmon	47.1	41.2	41.2	11.8	17.6	25.4	108
Chum Salmon	29.4	29.4	29.4	5.9	17.6	27.9	79
Pink Salmon	29.4	29.4	29.4	0	5.9	5.2	44
Silver Salmon	64.7	52.9	52.9	17.6	11.8	38.8	110
FRESHWATER FISH	76.5	76.5	76.5	5.9	17.6	42.0	--
Rainbow Trout	76.5	76.5	76.5	5.9	5.9	11.7	133
Lake Trout	0	5.9	0	0	0	0	0
Dolly Varden	52.9	52.9	52.9	5.9	0	12.3	209
Grayling	64.7	64.7	64.7	5.9	11.8	16.2	344
Burbot	11.8	11.8	11.8	0	0	.7	5
Whitefish	11.8	11.8	11.8	0	0	1.1	18
MARINE FISH	52.9	29.4	17.6	41.2	11.8	4.4	--
Halibut	47.1	17.6	5.9	41.2	0	.7	1
Cod	0	0	0	0	0	0	0
Hooligan	5.9	5.9	5.9	0	5.9	.9	5g
Herring	5.9	5.9	5.9	5.9	5.9	2.4	100
Herring Roe-on -kelp	5.9	5.9	5.9	5.9	0	.4	1
MARINE INVERTE-BRATES	41.2	35.3	35.3	17.6	11.8	3.8	--
Razor Clams	5.9	5.9	5.9	0	0	1.3	90
Butter Clams	11.8	11.8	11.8	0	5.9	.7	NA
King Crab	17.6	11.8	11.8	11.8	5.9	.7	5
Dungeness Crab	11.8	5.9	5.9	5.9	0	.2	6
Shrimp	11.8	11.8	5.9	5.9	0	.9	NA
MARINE MAMMALS	5.9	0	0	5.9	0	0	0
Harbor Seal	5.9	0	0	5.9	0	0	0
Belukha	5.9	0	0	5.9	0	0	0
LAND MAMMALS	82.4	82.4	70.6	52.9	52.9	303.8	--
Moose	76.5	70.6	52.9	41.2	47.1	264.7	9
Caribou	17.6	17.6	11.8	5.9	5.9	22.9	3
Sheep	5.9	5.9	5.9	5.9	0	3.8	1
Goat	5.9	0	0	5.9	0	0	0
Black Bear	23.5	23.5	11.8	11.8	5.9	6.8	2
Brown Bear	5.9	5.9	0	5.9	0	0	0
Elk	0	0	0	0	0	0	0
Deer	17.6	5.9	5.9	11.8	0	2.5	1
Porcupine	5.9	5.9	5.9	0	0	.5	2
Hare	41.2	47.1	41.2	0	0	2.6	30

TABLE 11. (Continued) LEVELS OF HOUSEHOLD HARVEST AND USE OF WILD FISH, GAME, AND PLANT RESOURCES, CHASE, 1986 (N=17 households)

Resource	% HH Used	% HH Attempt Harvest	% HH Harvested	% HH Received	%HH Gave Away	Mean HH Harvest, Lbs	Total Sample Harvest, Numbers*
BIRDS	76.5	76.5	76.5	17.6	11.8	12.2	--
Ducks	11.8	23.5	11.8	0	0	1.1	12
Geese	5.9	5.9	5.9	0	0	.2	1
Spruce Grouse	70.6	70.6	70.6	11.8	11.8	8.6	293
Ptarmigan	47.1	47.1	41.2	11.8	5.9	2.3	77
FURBEARERS	29.4	35.3	29.4	11.8	5.9	7.2	--
Beaver	17.6	23.5	17.6	0	5.9	7.2	14
Muskrat	0	0	0	0	0	0	0
Land Otter	5.9	11.8	5.9	0	0	0	1
Mink	11.8	11.8	11.8	0	5.9	0	3
Marten	17.6	29.4	17.6	0	5.9	0	11
Wolverine	0	5.9	0	0	0	0	0
Wolf	0	5.9	0	0	0	0	0
Coyote	0	17.6	0	0	0	0	0
Red Fox	11.8	11.8	5.9	5.9	0	0	4
Red Squirrel	17.6	17.6	17.6	5.9	5.9	0	18
Weasel	11.8	11.8	11.8	5.9	5.9	0	6
EDIBLE PLANTS**	94.1	94.1	94.1	5.9	17.6	49.2	--
Berries	88.2	88.2	88.2	5.9	17.6	34.4	584 q
Other Plants	82.4	82.4	82.4	5.9	5.9	14.8	251 q
WOOD	100.0	100.0	100.0	0	5.9	--	--
Cordwood	100.0	100.0	100.0	0	5.9	--	95 c
House Logs	52.9	52.9	52.9	0	0	--	449
ALL EDIBLE WILD RESOURCES***	100.0	94.1	94.1	70.6	58.8	553.8	--
ALL RESOURCES	100.0	100.0	100.0	70.6	58.8	--	--

* Harvests are reported in numbers of fish or animals, except resources marked by "b" (five gallon bucket), "g" (gallons), "qt" (quarts), or "c" (cords).

** Does not include garden-grown produce.

*** Deleting cordwood and house logs

Source: Division of Subsistence, ADF&G, Survey 1987

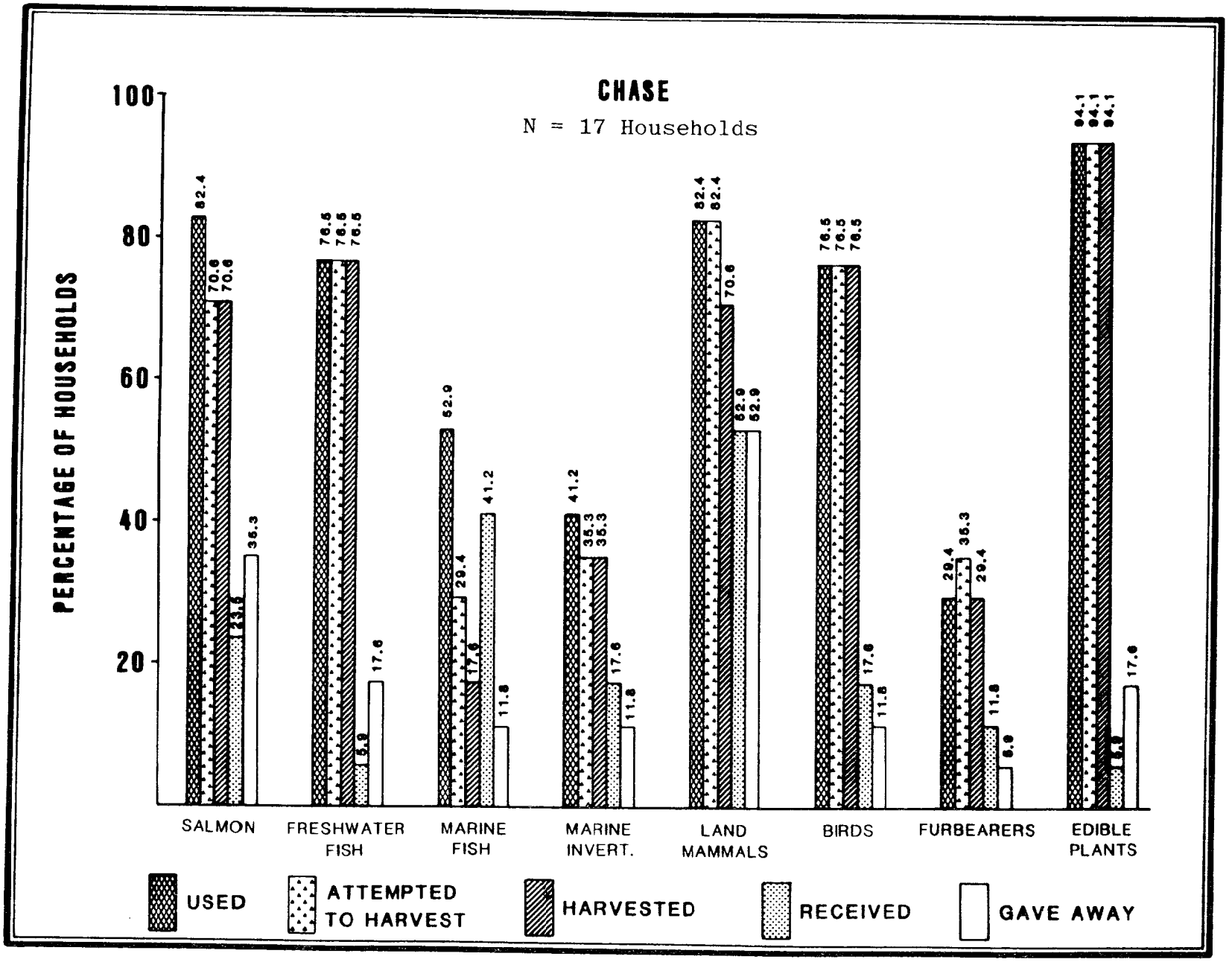

Figure 7. Percentage of Sampled Chase Households Using, Attempting to Harvest, Harvesting, Receiving, and Giving Away Eight Categories of Wild Resources, 1986.

(29.4 percent), and marine fish (17.6 percent). There were no harvesters of marine mammals among the sampled households (Table 11, Fig. 7). Regarding specific resources, all of the households harvested cordwood, 88.2 percent picked berries, and 82.4 percent harvested other wild plants. Other resources harvested by more than half the sample were rainbow trout (76.5 percent), spruce grouse (70.6 percent), grayling (64.7 percent), silver salmon (52.9 percent), Dolly Varden (52.9 percent), moose (52.9 percent), and house logs (52.9 percent) (Table 11).

HARVEST QUANTITIES

The mean household harvest of wild resources by the Chase sample in 1986 was 553.8 pounds edible weight. The community per capita harvest was 209.2 pounds (Table 10). This compares to a United States mean of 222 pounds per capita of meat, fish, and poultry purchased and brought into the kitchen for home use in 1978 (U.S. Department of Agriculture 1983). By far, land mammals, mostly moose, contributed the largest share of community's resource harvest as measured by edible weight (Table 11, Fig. 8). The sample's households harvested a mean of 303.8 pounds of land mammals, 114.8 pounds per capita. This category represents 54.9 percent of all resources harvested during the study year of 1986. Salmon ranked second in terms of harvest weight, with a mean household harvest of 131.2 pounds, 49.6 pounds per capita, for 23.7 percent of the total harvest. Edible plants were next, with 49.2 pounds per household, 18.6 pounds per capita, for 8.9 percent of the total, followed by freshwater fish (42 pounds per household, 15.9 pounds per

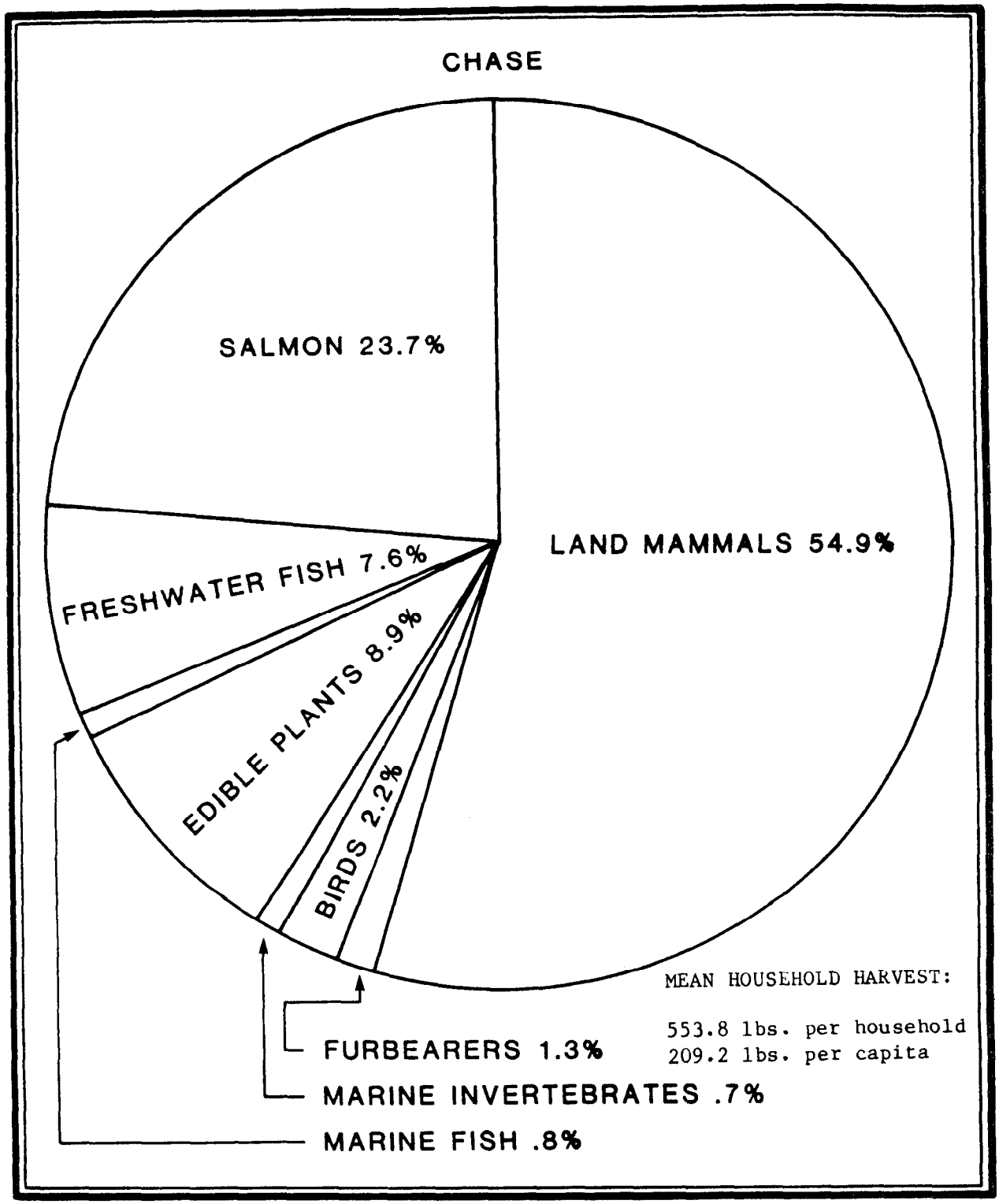

Figure 8. Composition of Wild Resource Harvest by Resource Category, Chase, 1986.

capita, 7.6 percent of the total), birds (12.2 pounds per household, 4.6 pounds per capita, 2.2 percent of the total), edible furbearers (7.2 pounds per household, 2.7 pounds per capita, 1.3 percent of the total), marine fish (4.4 pounds per household, 1.7 pounds per capita, .8 percent of the total), and marine invertebrates (3.8 pounds per household, 1.4 pounds per capita, .7 percent of the total). No Chase household harvested marine mammals in 1986.

In terms of specific resources, moose was the most notable component of the sample's resource harvests as measured by edible weight. The sample's households harvested an average of 264.7 pounds of moose in 1986. This was 87.1 percent of all land mammals harvested, and 47.8 percent of all harvests during the study year. Silver salmon ranked second in terms of harvest weight with 38.8 pounds per household. Other resources with a mean household harvest of 20 pounds or more during 1986 were berries (34.4 pounds), king salmon (33.9 pounds), chum salmon (27.9 pounds), red salmon (33.9 pounds), and caribou (22.9 pounds) (Table 11).

SHARING AND RECEIVING WILD RESOURCES

Most households in the Chase sample gave away portions of their resource harvests to other households during 1986, or received fish, game, and wild plants from successful harvesters living in other households. Of the 17 households in the sample, 58.8 percent gave away portions of their resource harvests, and 70.6 percent received resources from other households (Table 10). The average number of resource categories given away was 2.4, and the average number received was 2.9.

During the study year, it was most common for households to give away game, with 52.9 percent of the sample doing so (Table 11, Fig. 7). Over one third of the sample (35.3 percent) gave away salmon, 17.6 percent gave away edible plant harvests, and 17.6 percent gave away freshwater fish. Very few households gave away marine invertebrates (11.8 percent), marine fish (11.8 percent), birds (11.8 percent), furbearers (5.9 percent), or wood (5.9 percent). By far, moose was the resource that the most households (47.1 percent) gave away. Also, 17.6 percent gave away red salmon, chum salmon, or berries (Table 11).

A large percentage of the sample (52.9 percent) received game from other households in 1986 (Table 11, Fig. 7). In addition, 41.2 percent received marine fish, 23.5 percent received salmon, 17.6 percent received freshwater fish, 17.6 percent received birds, 17.6 percent received marine invertebrates, 11.8 percent received furbearers, and 5.9 received edible plants, freshwater fish, or marine mammals. No households received cordwood or house logs from other families in 1986. Not surprisingly, moose meat was received by the most households, 41.2 percent. One unexpected finding was that 41.2 percent of the households also received gifts of halibut from others who had fished in lower Cook Inlet. Silver salmon ranked third, with 17.6 percent of the sample receiving this resource as gifts during the study year (Table 11).

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

Salmon

Species Used and Harvest Quantities

During the study year of 1986, 82.4 percent of the sampled Chase households used at least one species of salmon, while 70.6 percent of the households fished for and harvested salmon. Additionally, 35.3 percent of the sample gave away portions of their salmon harvests, and 23.5 percent received gifts of salmon from others (Fig. 7). With a mean household harvest of 131.2 pounds edible weight (49.6 pounds per capita), salmon made up 23.7 percent of the total wild resource harvest by the community of Chase during 1986 (Fig. 8).

In 1986, Chase households used and harvested all five Alaskan species of salmon (Table 11). The most households used (64.7 percent) and harvested (52.9 percent) silver salmon. The average household take was 6.5 fish. This represents a mean household harvest of 38.8 pounds, more than any other salmon species. King salmon ranked second to silvers in terms of use and harvest, with 47.1 percent of the sample using kings and 41.2 percent harvesting them. The mean household harvest was about two king salmon for 33.9 pounds edible weight. The Chase sample harvested 108 sockeye (red) salmon in 1986, 6.4 fish per household. This represents a mean of 25.4 pounds per household. About half the sample (47.1 percent) used reds, and 41.2 percent harvested them. Fewer sampled households used (29.4 percent) or harvested (29.4 percent) chum salmon. The average household harvest of this species was

4.6 fish, for 27.9 pounds edible weight. Finally, 29.4 percent of the sample used pink salmon, and 29.4 percent harvested this species. The average household catch was 2.6 pink salmon, for 5.2 pounds edible weight.

Figure 9 depicts the areas that interviewed Chase households have fished for salmon since 1968. This area includes the lower portion of the Talkeetna River below its confluence with the Sheep River, most of Chunilna (Clear) Creek, and the Susitna River from Talkeetna upstream to the mouth of the Indian River.

Salmon Fishing Regulations and Harvests by Gear Type

During the study period, under regulations adopted by the Alaska Board of Fisheries, there were no subsistence or personal use salmon fisheries in the study area. Consequently, all fishing for salmon in the Chase, Gold Creek - Chulitna, and Hurricane - Broad Pass areas was with rod and reel gear under sport fishing regulations. These regulations are summarized in Table 12. Table 13 reports salmon harvests by Chase households by gear type. Not surprisingly, rod and reel gear accounted for most of the salmon harvest. All of the pink and chum salmon, 89.1 percent of the silver salmon, 87.5 percent of the king salmon, and 42.3 percent of the sockeye salmon were taken with rod and reel. One household brought home king, sockeye, and silver salmon that had been removed from their nonlocal commercial harvest. Finally, one household harvested sockeye salmon with a noncommercial set gill net, accounting for 46.3 percent of the total sample's take of this species.

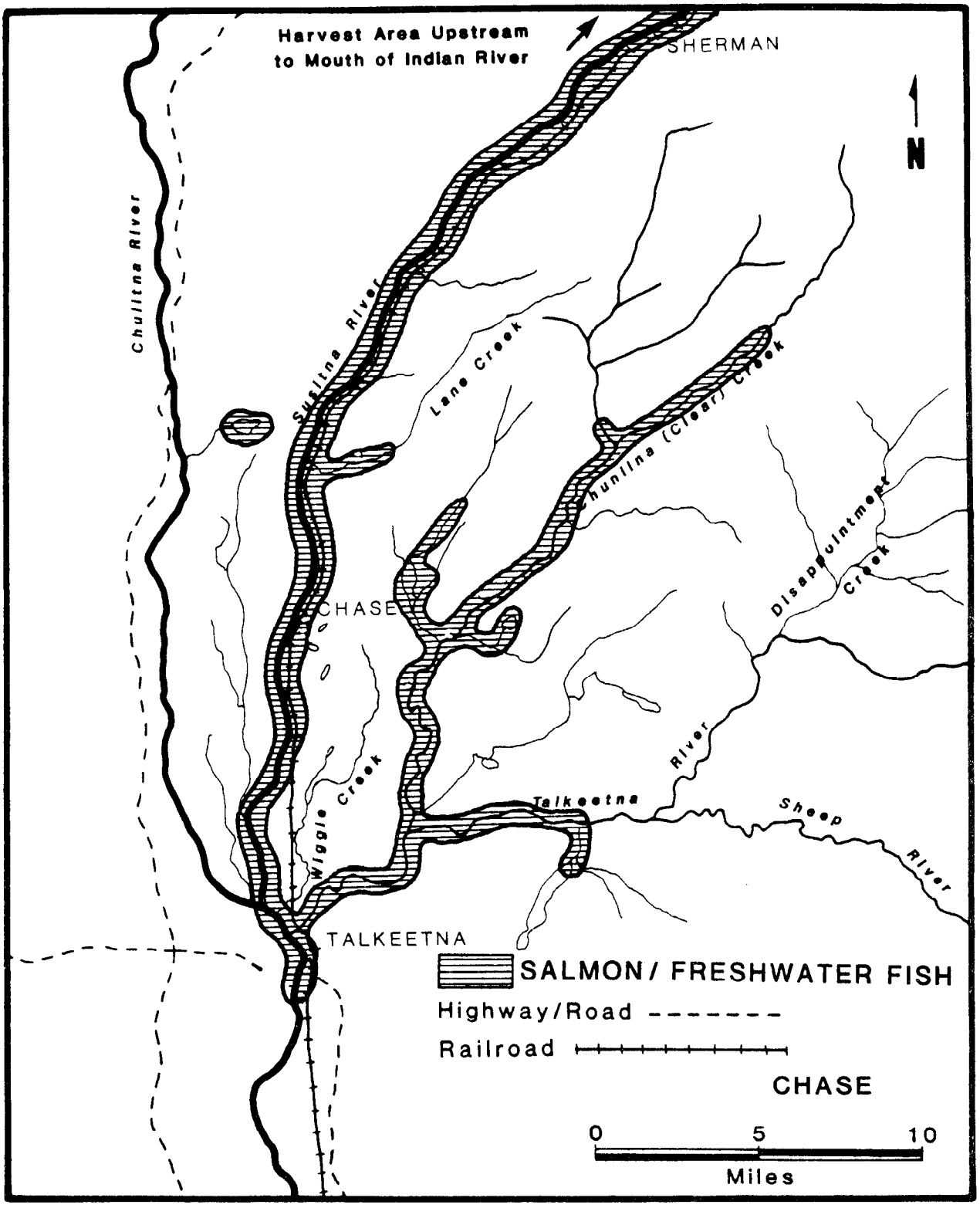

Figure 9. Harvest Areas for Salmon and Other Freshwater Fish, Chase, 1968-1986.

TABLE 12. SUMMARY OF SPORT FISHING REGULATIONS FOR SALMON AND OTHER FISH IN THE STUDY AREA

Species	Season	Bag, Possession, and Size Limits
King Salmon, 16 inches or more:		
Talkeetna River and Chunilna (Clear Creek) two miles upstream	Jan. 1 - July 6	1 per day, 2 in possession
All other areas	closed	closed
King Salmon, less than 16 inches	entire year	10 per day, 10 in possession
Other Salmon, 16 inches or more	entire year	3 per day, 3 in possession
Other Salmon, less than 16 inches	entire year	10 per day, 10 in possession
Rainbow Trout	entire year	5 per day, 5 in possession, only 1 over 20 inches
Dolly Varden	entire year	10 per day, 10 in possession, no size limit
Arctic Grayling	entire year	10 per day, 10 in possession, no size limit
Lake Trout	entire year	20 inches or more: 2 per day, 2 in possession Less than 20 inches: 10 per day, 10 in possession
Other, including burbot and whitefish	entire year	No bag, possession, or size limit

Source: Alaska Department of Fish and Game 1986a:20-22

TABLE 13. SALMON HARVESTS BY SPECIES AND GEAR TYPE, CHASE, GOLD CREEK - CHULITNA, AND HURRICANE - BROAD PASS, 1986

Species	Chase			Gold Creek - Chulitna	Hurricane - Broad Pass
	% by Rod and Reel	% with Set Net	% Remove Comm. Har.	% by Rod and Reel	% by Rod and Reel
King Salmon	87.5%	0	12.5%	100.0%	100.0%
Sockeye Salmon	42.6%	46.3%	11.1%	100.0%	100.0%
Pink Salmon	100.0%	0	0	100.0%	100.0%
Chum Salmon	100.0%	0	0	100.0%	No harvest
Silver Salmon	89.1%	0	10.9%	100.0%	100.0%

Source: Division of Subsistence, Alaska Department of Fish and Game, Resource Harvest Survey, 1987

The closest noncommercial gill net fisheries open to Chase residents occurred on the Kenai Peninsula.

Freshwater Fish

As shown in Figure 7, 76.5 percent of the sampled Chase households used, fished for, and harvested freshwater fish during 1986. The mean household harvest of 42.0 pounds was 7.6 percent of the total wild resource take that year, more then any other category except land mammals, salmon, and edible plants. Figure 9 shows the areas that Chase households have used for non-salmon freshwater fishing since 1968. All of these harvests have occurred with rod and reel gear under sport fishing regulations, which are summarized in Table 12. Fishing through the ice (classed by regulations as sport fishing in this area) occurred in area lakes and streams for trout and burbot.

During 1986, the Chase sample used five kinds of freshwater fish (Table 11). More households used (76.5 percent) and harvested (76.5 percent) rainbow trout than any other species. The total reported harvest of rainbow trout was 133 fish, 7.8 per household over the study year. With a harvest total of 344 fish, more Arctic grayling were taken than any other resource in this category. The mean household harvest of grayling was 20.2 fish, with 64.7 percent of the sample using and harvesting this fish. Fishing for Dolly Varden was also popular among the sampled households, with 52.9 percent using Dolly Varden and 52.9 percent also harvesting them. The total Dolly Varden harvest was 209 fish, 12.3 per household. Use and harvest of burbot and whitefish were much lower than for rainbow trout, grayling, and Dolly Varden. In 1986,

11.8 percent of the sample used and harvested burbot, with a total take of only five fish. The same percentage, 11.8 percent, used and harvested whitefish. The total whitefish take was 18. Finally, one household unsuccessfully fished for lake trout in 1986.

Marine Fish

Although 52.9 percent of the sampled Chase households used marine fish in 1986, only 17.6 percent of the households were successful harvesters of resources in this category (Fig. 7). This is not surprising, since the nearest sources of these species to Chase are lower Cook Inlet or Prince William Sound. On the other hand, 41.2 percent of the households received gifts of marine fish from others. Almost all of this was halibut, which was used by 47.1 percent of the sample, although only one household harvested halibut during the study year. In addition, one household each harvested hooligan, herring, and herring roe-on-kelp outside the Chase area. In total, the sampled households averaged a harvest of 4.4 pounds of marine fish during the study year, less than one percent of the community's total resource harvest (Fig. 8).

Marine Invertebrates

As with marine fish, harvest areas for marine invertebrates are quite distant from Chase, at least 300 miles by railroad and highway. Nevertheless, 35.3 percent of the sample harvested small quantities of clams, crab, and shrimp during the study period, and 41.2 percent used

marine invertebrates in 1986 (Fig. 7). The mean household harvest of 3.8 pounds of clams, crab, and shrimp was less than one percent of the community's total reported resource take (Fig. 8). The most households used king crab (17.6 percent). Also, king crab (11.8 percent) and butter clams (11.8 percent) were the marine invertebrates harvested by the most Chase households in 1986 (Table 11).

Marine Mammals

One Chase household (5.9 percent) used harbor seal and belukha during the study year that they received as gifts from a household living outside the study area (Table 11). Under the provisions of the federal Marine Mammal Protection Act, only Alaska Natives may harvest marine mammals for subsistence uses in Alaska. The inland location of the Chase community places households away from the nearest belukha and seal harvest areas in northern Cook Inlet. As there were no Alaska Natives in the Chase sample, cultural food preferences were probably also a factor in the absence of marine mammal harvests by Chase households.

Land Mammals

As noted above, more sampled Chase households used wild game than any other category of fish or wildlife during the study period. In 1986, 82.4 percent of the Chase sample used land mammals, 82.4 percent hunted land mammals, and 52.9 percent were successful harvesters of at least one resource from this category (Fig. 7). With a mean household

harvest of 303.8 pounds, land mammals made up 54.9 percent of the total resource take during the study year, more than twice the volume of any other category (Fig. 8). In addition, most households gave away (52.9 percent) or received (52.9 percent) land mammals in 1986.

Moose

As measured in pounds edible weight, moose by far made the largest contribution to the Chase community's wild resource harvest in 1986. The sample harvested nine moose, for an average take of 264.7 pounds per household (Table 11). This represents 87.1 percent of all the land mammals harvested, and 47.8 percent of the total resource harvest. Overall, 76.5 percent of the households used moose meat in 1986, 70.6 percent hunted moose, and 52.9 percent killed a moose. In addition, 47.1 percent of the households (88.9 percent of the successful harvesters) gave moose meat to others, and 41.2 percent received moose meat as gifts.

Regulations governing the hunting of moose in Game Management Unit 13E are summarized in Table 14. The season ran from September 1 through September 20. Residents of Chase were eligible for subsistence permits which allowed them to take any bull moose. Other hunters had to take a bull with an antler spread of at least 36 inches or with at least three brow tines on at least one of the antlers. In 1987, six Chase households had subsistence moose hunting permits, and these households reported a take of two moose. During the household interviews, Chase moose hunters reported problems with the timing of the September 1 to 20 season, mostly related to difficulties with preservation of the meat

TABLE 14. HUNTING REGULATIONS, GAME MANAGEMENT UNIT 13E, JULY 1986 - JUNE 1987

Species	Season	Bag Limit
Black Bear	No closed season	Three bears
Caribou	Sept. 6 - Sept. 20 Jan. 1 - Feb. 28	One caribou by registration permit; only antlerless caribou may be taken during the Jan. 1 - Feb. 28 season.
Moose	Sept. 1 - Sept. 20	One bull by registration permit only [a]
Sheep	Aug. 10 - Sept. 20	One ram with 7/8 curl horn or larger
Grouse	Aug. 10 - April 30	Fifteen a day, thirty in possession
Hare	No closed season	No limit
Ptarmigan	Aug. 10 - April 30	Twenty a day, forty in possession
Ducks	Sept. 1 - Dec. 16	Eight a day, twenty four in possession
Porcupine	No closed season	No limit

[a] Under the general hunting regulations, hunters who did not obtain a subsistence registration permit could take a bull having an antler spread of at least 36 inches or with at least three brow tines on at least one of the antlers.

Source: Alaska Department of Fish and Game 1986

from harvests that occurred before freezing outdoors was possible. As noted in Chapter 3, few Chase households had electricity to run freezers during the study period. A later season was the stated preference of Chase households.

Another source of moose for Chase residents was animals that were killed by trains along the railroad corridor. Most of these kills occur in winter when heavy snow pushes moose to the cleared railroad tracks. As reported in Table 15, in 1986 11.8 percent of the sampled Chase households obtained moose from train kills. This provided the average household with 4.1 pounds of moose meat during the study year. Respondents believed that 1986 was atypical; in 1985, for example, eight of the 17 households (47 percent) received meat salvaged from train-killed moose.

Salvaging moose meat from train-killed animals was reported as a highly opportunistic source of meat. The amount of meat obtained depended on whether the moose was found before the meat spoiled and how badly the meat was damaged. Meat from train-kills was widely shared, especially because it came in winter months when supplies from fall hunts were running low.

The wide distribution pattern of moose meat among Chase households was one method of overcoming spoilage and storage problems from lack of refrigeration during the September season. Some households canned moose meat, while several rented freezer storage space in Wasilla. In some years, households at high elevations east of the rail line were able to keep moose meat outdoors during the later part of September. Outdoor storage was typically used for moose meat obtained during colder months, especially train-killed moose. Some smaller households reported taking

TABLE 15. TRAIN AND ROAD-KILLED MOOSE, STUDY COMMUNITIES, 1986

Sample	Percent of HH Receiving Train-Killed Moose	Total Number of Train-Killed Moose Received	Mean Pounds per HH of Train-Killed Moose Used in Community
Chase (N=17 HH)	11.8%	4	4.1 lbs.
Gold Creek-Chulitna (N=5 HH)	60.0%	2	92.0 lbs.
Hurricane-Broad Pass (N=8 HH)	37.5%	4	106.2 lbs.

Source: Division of Subsistence, ADF&G, Survey 1987.

Note: During 1985, 8 of the 17 Chase households (47 percent) indicated receiving train killed moose meat. During 1986 snow conditions were less, resulting in fewer moose being killed by the train near Chase.

one moose every two years because their consumption levels were modest, especially when they had good supplies of other resources and garden produce.

Depending on where moose were taken, the meat was usually transported partly on foot and by ATV. Some moose or caribou taken north of Chase were butchered and then loaded on the train and hauled to Chase. However, most hunters tried to take moose close to home and in locations where transportation would be easy. Hunters usually reached their hunting areas on foot or by ATV. They also hunted along the Susitna River in small skiffs. Figure 10 depicts the areas that interviewed Chase residents have hunted moose during the time they have lived in the community.

Several households used moose hides to make bindings and webbing for snowshoes and, in combination with other furs, in clothing. Antlers were used at times in arts and crafts.

Caribou

The sampled households in Chase area harvested three caribou during the study year, for a mean household take of 22.9 pounds. Three households (17.6 percent) hunted caribou, two were successful (11.8 percent), and three (17.6 percent) used caribou meat in 1986 (Table 11).

All residents of GMU 13E, including those in Chase, qualified for subsistence hunting permits for the Nelchina caribou herd during the study year. As summarized in Table 14, permit holders could hunt caribou during two open seasons, one from September 6 to September 30, and the other from January 1 through February 28. In 1987, 13 residents

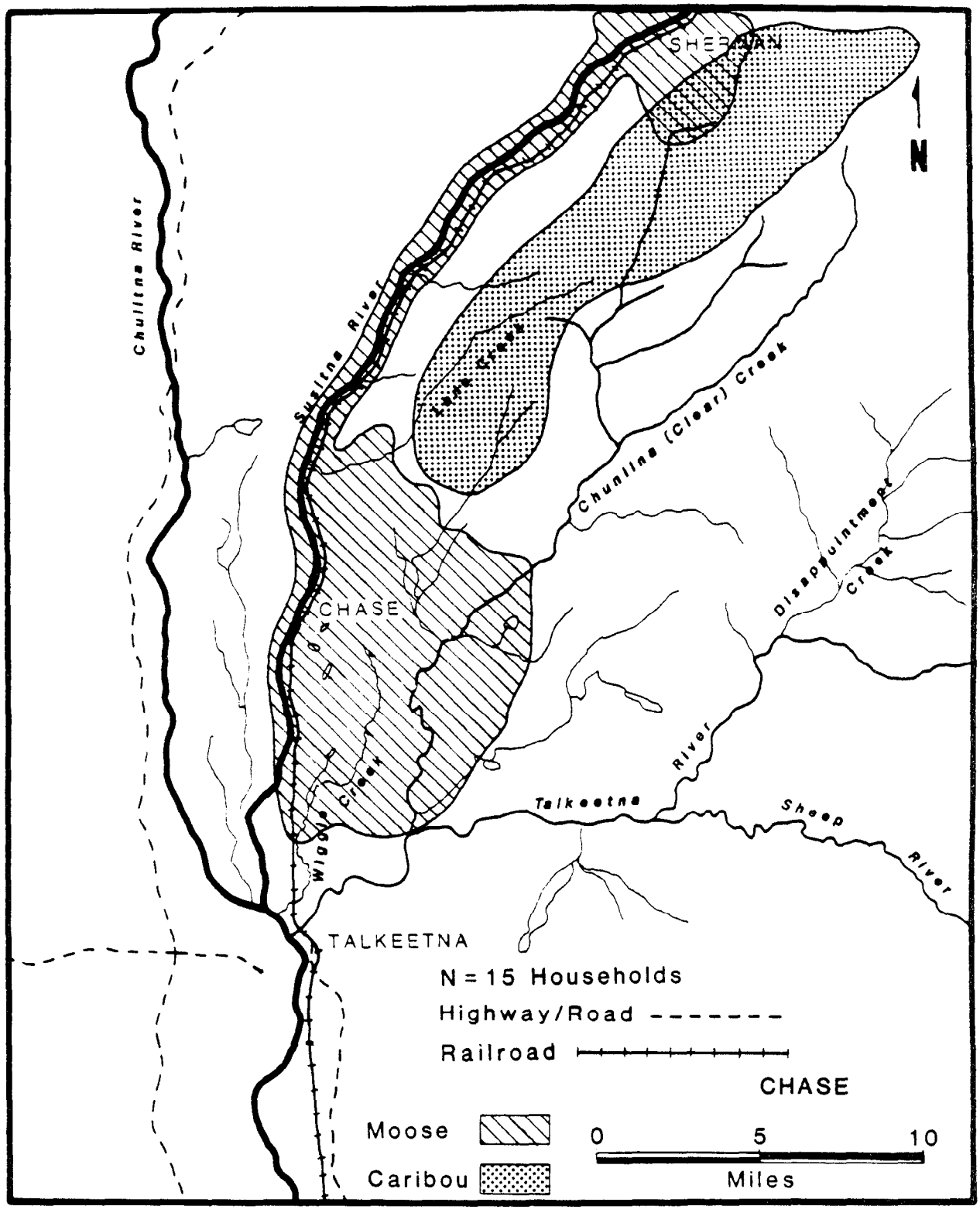

Figure 10. Harvest Areas for Moose and Caribou, Chase, 1968-1986.

of the Chase study area had Nelchina subsistence permits, and they reported a harvest of three animals. Figure 10 shows areas that Chase and Sherman residents have used for caribou hunting since the 1960s.

Most Chase residents did not hunt caribou for several reasons. The area where caribou occur is difficult to reach. The nearest place that caribou have migrated in recent years is near Sherman (Fig. 10), and their numbers there are low. This high plateau northeast of Chase is a long, difficult trip for the majority of Chase residents. The only practical option was to ride the train to Sherman. Hauling the meat back to Chase during September runs a high risk of spoilage. This required meeting weekend train schedules, which was not always possible when having to transport meat. For residents nearer to the caribou, reaching the area was possible only on foot. During the study period and in recent years, caribou have moved out of the area in the winter months, so late season hunting has not been possible.

Caribou hides occasionally were used in clothing and arts and crafts. Antlers were used in arts and crafts.

Other Game

In addition to caribou and moose, the sampled Chase households used seven kinds of land mammals (excluding furbearers) and harvested five kinds. These included hare (41.2 percent harvest, 41.2 percent use), black bear (11.8 percent harvest, 23.5 percent use), deer (5.9 percent harvest, 17.6 percent use), sheep (5.9 percent harvest and use), porcupine (5.9 percent harvest and use), brown bear (5.9 percent use), and goat (5.9 percent use) (Table 11). All of these species are

available in the local area except deer, for which the closest hunting areas to Chase are Kodiak Island and Prince William Sound, and goat, which occupy portions of the Talkeetna Mountains in Game Management Units 14 and 13 that are closed to hunting. The hunting regulations pertaining to these species are summarized in Table 14. Areas where Chase residents have hunted black bears since 1968 are shown in Figure 11.

Furbearers

In 1986, 35.3 percent of the sampled Chase households attempted to trap furbearers, and 29.4 percent were successful (Fig. 7). Table 16 summarizes trapping regulations in GMU 13E. Overall, the community took seven kinds of furbearers during the study year. These were beaver (17.6 percent harvesting), marten (17.6 percent), red squirrel (17.6 percent), mink (11.8 percent), weasel (11.8 percent), land otter (5.9 percent), and red fox (11.8 percent). Additionally, a few sampled households tried unsuccessfully to harvest wolverine, wolf, and coyote (Table 11). Of these species, only beaver were used for food in Chase, with a mean household harvest of 7.2 pounds, 1.3 percent of the community's resource harvest total. Figure 11 depicts the areas that Chase households indicated they had used for trapping during their years of residence in the community.

Residents who moved to Chase in the late 1960s reported good trapping for marten, lynx, and fox at that time. Since settlement has increased, these species have declined dramatically. Marten were almost nonexistent in the Chase area in 1986 according to local trappers.

TABLE 16. FURBEARER TRAPPING REGULATIONS, GAME MANAGEMENT UNIT 13E, 1986

Species	Season	Bag Limit
Beaver[a]	Nov. 10 - April 15	20 per season
Coyote	Nov. 10 - March 31	No limit
Land Otter[a]	Nov. 10 - April 15	No limit
Marten[a]	Nov. 10 - Feb. 28	No limit
Mink	Nov. 10 - Jan. 31	No limit
Muskrat	Nov. 10 - June 10	No limit
Red Fox	Nov. 10 - Feb. 28	No limit
Red Squirrel	No closed season	No limit
Weasel	Nov. 10 - Jan. 31	No limit
Wolf[a]	Nov. 10 - March 31	No limit
Wolverine[a]	Nov. 10 - Feb. 28	No limit

[a] Sealing required.

Source: Alaska Department of Fish and Game 1985, 1986c

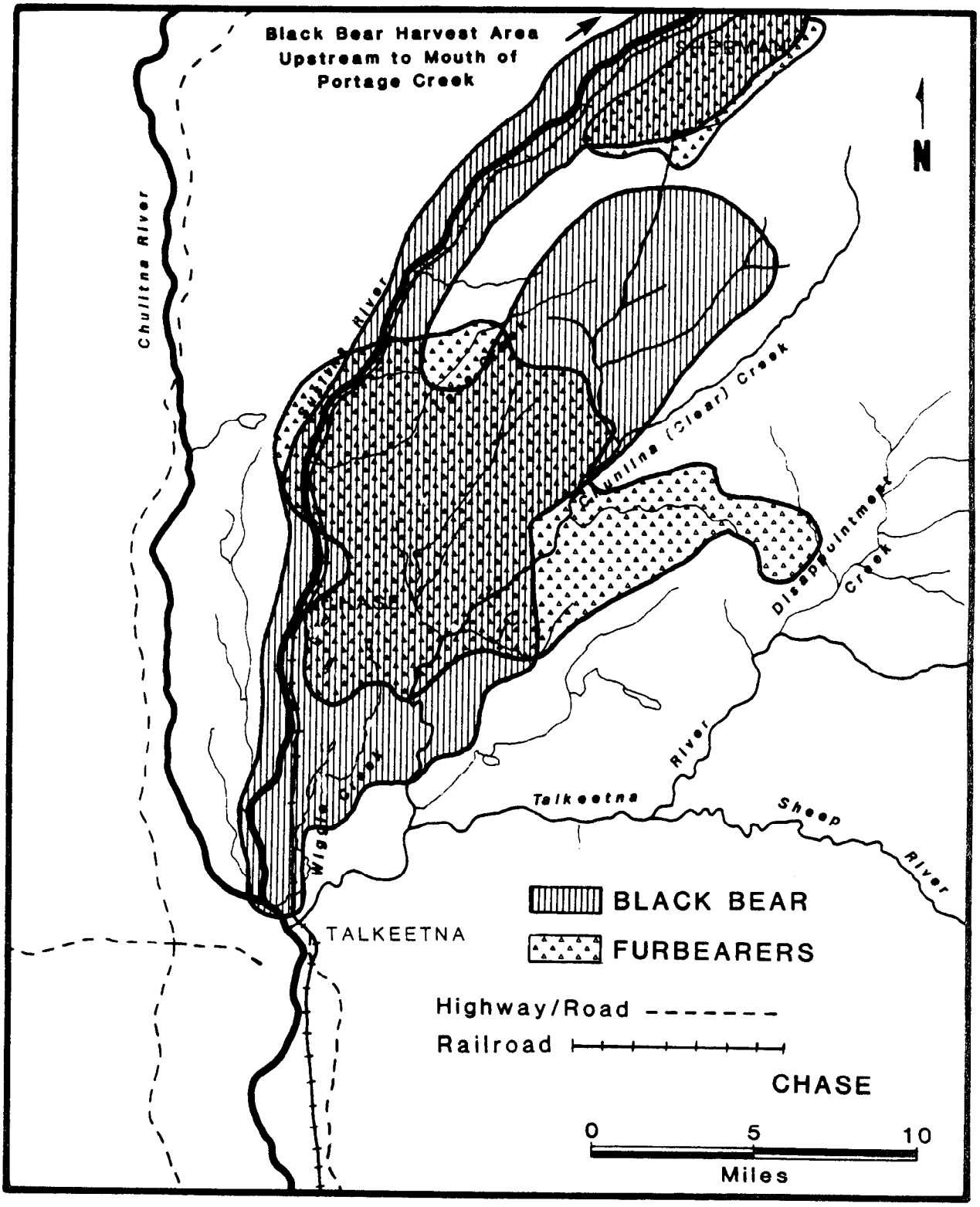

Figure 11. Harvest Areas for Black Bear and Furbearers, Chase, 1968-1986.

Also, coyotes were more abundant in 1981 than in 1986. Several households reported letting their traplines rest in 1986 because of the decline in furbearer populations.

Several households used wild furs and hides including hare, moose, caribou, and red squirrel for making clothing such as hats, mittens, and slippers. Marten, mink, and beaver were most popular for hats and mittens. Weasel was used for hats, slippers, and small bags, and was often used as trim. Red squirrel was used as trim and making small items for children. Also, crafts were made for personal use, traded and bartered for debts and favors, and sold at stores, bazaars, and to individuals.

Furs were an important reserve source of cash and barter for those Chase households unable to earn adequate amounts of cash during the year. Table 17 reports the potential value of the Chase sample's 1986 furbearer harvest. The total value catch was $1,704.64, an average of $100.27 per household for the entire sample and $340.93 per trapping household. Because most furs were not sold, but were used for the manufacture of craft items or clothing for local use, this value does not represent actual cash income and is not included in Table 4.

Birds

Birds were very widely used and harvested by the Chase sample in 1986. As shown in Figure 7, 76.5 percent of the households used and harvested birds during the study year. With a mean household harvest of 12.2 pounds, birds made up 2.2 percent of the total take of edible wild resources (Fig. 8). By far, spruce grouse was the bird most widely used

TABLE 17. POTENTIAL VALUE OF FUR HARVESTS BY CHASE AND HURRICANE - BROAD PASS HOUSEHOLDS, 1986

Resource	Value per Pelt[b]	Chase[a] Catch	Chase[a] Total Value	Hurricane - Broad Pass[a] Catch	Hurricane - Broad Pass[a] Total Value
Beaver	$ 35.00	14	$490.00	6	$ 210.00
Land Otter	45.00	1	45.00	0	0
Mink	17.88	3	53.64	8	143.04
Marten	90.00	11	990.00	18	1,620.00
Red Fox	30.00	4	120.00	9	270.00
Weasel	1.00	6	6.00	4	4.00
Wolf	350.00	0	0	1	350.00
Wolverine	500.00	0	0	2	1,000.00
Total Value			$1,704.64		$3,597.04
Average Per Sampled Household			100.27		449.63
Average Per Trapping Household			340.93		1,798.52

[a] For Chase, the sample included 17 households, 5 of which trapped furbearers in 1986. For Hurricane - Broad Pass, the sample included 8 households, 2 of which trapped furbearers in 1986. No Gold Creek - Chulitna households trapped furbearers for sale or crafts in 1986.

[b] For beaver, land otter, marten, and red fox, average price per pelt in 1986-87 offered by the Seattle fur market for southcentral Alaska furs (Herbert Melchior, Alaska Department of Fish and Game, personal communication, 1988). For the other species, average price per pelt paid to trappers in the Western Susitna basin in 1984 (Stanek 1987:141).

(70.6 percent) and harvested (70.6 percent). The total annual harvest of spruce grouse was 293 birds, 17.2 per household. Almost half (47.1 percent) of the households used ptarmigan and 41.2 percent harvested them for a community total of 77, 4.5 birds per household. Finally, only a few households used or harvested migratory waterfowl (ducks and geese) during the study year (Table 11). Bird hunting areas for the community of Chase are virtually identical to the areas used for furbearer trapping and black bear hunting, which are depicted in Figure 11.

Edible Wild Plants

Almost all (94.1 percent) of the sampled Chase households used and harvested edible wild plants during the study year (Fig. 7). The mean household harvest of 49.2 pounds was 8.8 percent of the community's total resource take (Fig. 8), the third highest percentage after land mammals and salmon. Berries made up about two thirds of the wild plant harvest. Types of berries included blueberries, currents, high bush cranberries, low bush cranberries, raspberries, strawberries, cloudberries, crowberries, watermelon berries, and salmon berries. Additionally, 82.4 percent of the households used and harvested other edible wild plants. These included fiddlehead ferns, rosehips, wild celery, wild cucumber, fireweed, sweet gale, labrador tea, mushrooms, and water cress. Areas which sampled households have used to harvest berries and other plants are shown in Figure 12.

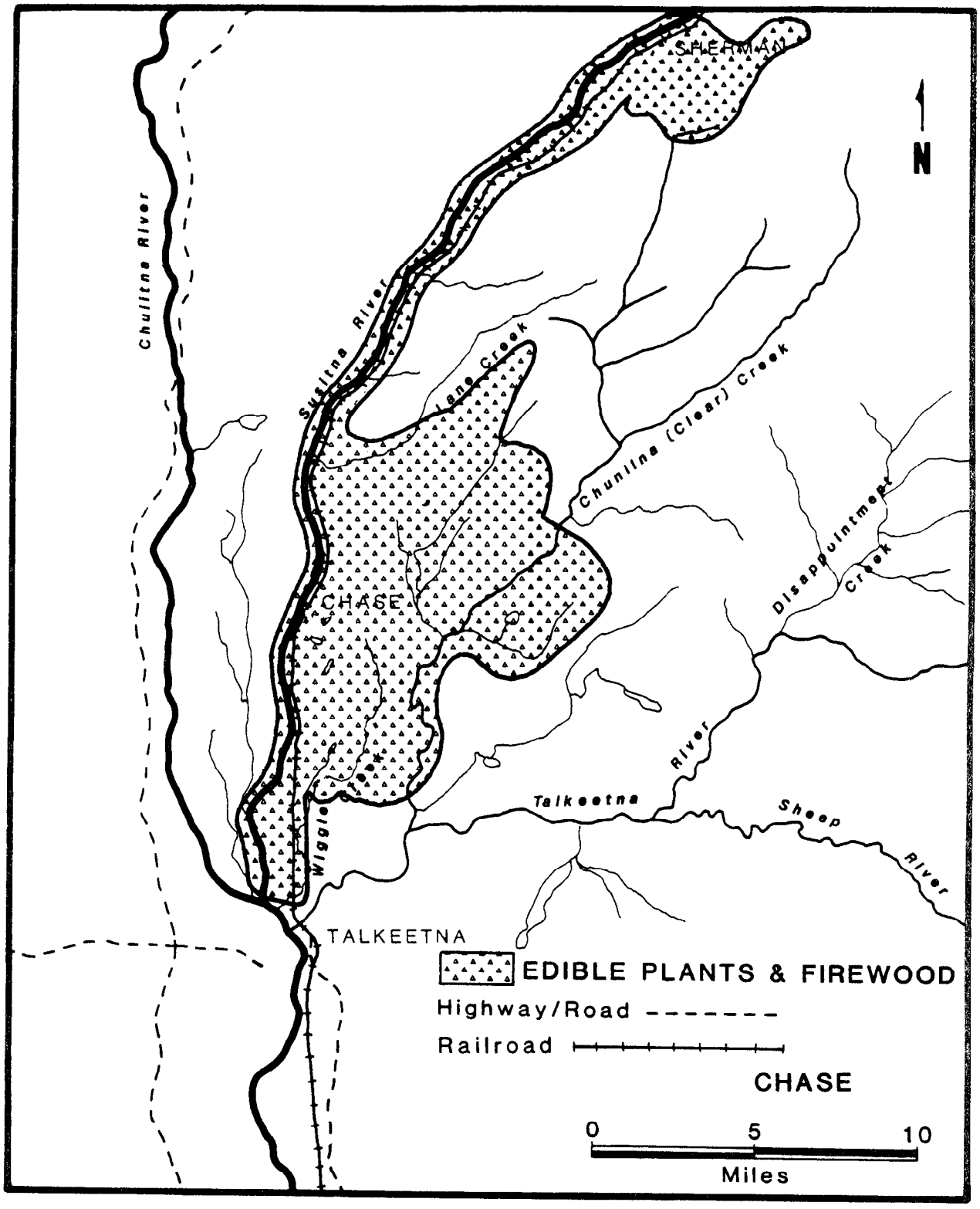

Figure 12. Harvest Areas for Edible Plants and Firewood, Chase, 1968-1986.

Wood

As shown in Table 11, all of the 17 households in the Chase sample harvested cordwood for heating their homes in 1986. The average household cut 5.6 cords of wood during the year, for a community total of 95 cords. Figure 12 shows the Chase community's wood harvest areas. In addition, over half the sample (52.9 percent) harvested house logs in 1986. Other structural materials harvested included dried grass and moss, used extensively for cabin chinking, packing in root cellars, insulation, and bedding for domestic animals.

GARDEN PRODUCE AND HORTICULTURE

As shown in Table 18, the raising of garden products was a major activity and an important part of the economic system in Chase in 1986. At least 11 households (the total which provided quantified harvest data on garden produce) engaged in growing some of their own food. Overall, 28 types were grown by at least one sampled household, with the most common being potatoes (100.0 percent growing), carrots (100 percent), cabbage (90.9 percent), broccoli (90.1 percent), and lettuce (81.8 percent). On average, these 11 households grew 12.2 kinds of garden produce during the study year. The average household production of garden vegetables during the study year was 579.6 pounds, 227.7 pounds per capita (for the 11 households which supplied harvest data). In comparison, in 1983, food industries in the United States produced 149.1 pounds per capita of potatoes and beans and 136.4 pounds per capita of other vegetables for domestic consumption (U.S. Department of Commerce

TABLE 18. HARVESTS OF GARDEN PRODUCE, CHASE, 1986

Type of Produce	Percent of HHs Growing[a]	Total Lbs. of Production	Mean HH Lbs. of Production	Per capita Harvest, lbs
Beans	9.1	4.0	0.4	0.1
Beets	72.7	247.0	22.5	8.2
Broccoli	90.1	500.0	45.5	17.9
Brussel Sprouts	36.4	67.0	6.1	2.4
Cabbage	90.9	573.0	52.1	20.5
Carrots	100.0	705.0	64.1	25.2
Cauliflower	63.6	104.0	9.5	3.7
Celery	9.1	18.0	1.6	0.6
Chives	9.1	3.0	0.3	0.1
Crab Apples	9.1	200.0	18.2	7.1
Jerusalem Artichoke	9.1	10.0	0.9	0.4
Kale/Collards	45.5	401.0	40.1	16.7
Kohlrabi	18.2	15.0	1.5	0.6
Lettuce	81.8	186.0	23.3	9.8
Mustard Green	18.2	78.0	7.1	2.8
Onions	72.7	402.0	36.5	14.4
Parsnips	9.1	20.0	1.8	0.7
Peas	54.5	50.0	4.5	1.8
Peppers	9.1	11.0	1.0	0.4
Potatoes	100.0	1,865.0	169.5	66.6
Radishes	45.5	43.0	3.9	1.5
Rhubarb	45.5	83.0	7.5	3.0
Rutabaga/Turnip	45.5	270.0	24.5	9.6
Spinach	36.4	68.0	6.2	2.4
Swiss Chard	27.3	44.0	4.0	1.6
Tomatoes	45.5	213.0	19.4	7.6
Squash	18.2	41.0	3.7	1.5
Zucchini	45.5	154.0	15.4	6.4
TOTALS	100.0	6,375.0	579.6	227.7

[a] N = 11 households which provided information on garden produce harvests. N = 10 for zucchini, kohlrabi, and kale/collards. N = 8 for lettuce.

Source: Division of Subsistence, Alaska Department of Fish and Game, Survey, 1987

1984:121). At Chase, potatoes provided the largest portion of the produce harvest, a mean of 169.5 pounds per household (66.6 pounds per capita), 29.2 percent of the total production. Carrots were second with 64.1 pounds per household (25.2 pounds per capita), for 11.1 percent of the total, and cabbage was third with 52.1 pounds per household (20.5 pounds per capita), for 8.9 percent of the total.

Garden Produce Storage and Preservation

Chase households utilized a variety of methods to store and preserve garden produce. These methods included canning, drying, and use of cold cellars. Carefully maintained cold cellars allowed the use of fresh vegetables like potatoes, carrots, cabbage, and turnips for as long as nine months of the year. Dried grass and moss were used in cellars for packing and insulating vegetables. Canning and drying most of these crops, as well as beans, beets, peas, and others, provided a year-round supply of produce. Many crops like broccoli, cabbage, kale, and cauliflower produced fresh harvests in the garden well into October until the first hard frosts. If slightly protected from freezing nights, kale lasted until the ground froze, even with snowfall.

In addition to the staple crops listed in Table 18, Chase households grew a variety of garden herbs and spices. Examples include peppermint, spearmint, sage, and parsley. These were usually preserved by drying and canning.

Horticultural Practices

Chase residents took great pride in their gardening efforts and their ability to grow the majority of their fresh produce. Most households considered horticulture (small scale farming) essential in order to live in the area. This is reflected in the wide variety of crops and large quantities of annual production. Residents pointed out that it took experimentation with different crops and methods over the years to achieve consistently high levels of production. The sizes of gardens varied from 20 feet by 40 feet to 100 feet square. Most households had several plots for tilling and planting annuals and rows of perennial berry bushes and herbs. The average garden area utilized by the ten reporting households was 4,500 square feet.

Several practices which contributed to successful horticultural production were composting, crop rotation, frequent soil analysis, and use of only the essential fertilizers. Lime was the most commonly noted mineral added to garden soils. Other materials added to improve soil conditions and nutrient levels included bone meal, blood meal, ashes, fish, green manure, and manure from domestic animals and moose.

Proper garden site selections were well-drained with good exposure to sunlight, especially early spring sunlight to warm the soil. Many homes were equipped with large, south-facing window areas where plants could be started in the spring and later set outside.

The careful selection of the types of crops to grow was also important to extended months of garden production. Particularly, crops tolerant of cold weather like cabbage, broccoli, cauliflower, and kale

were essential. Potatoes and root crops of varieties suited to Alaskan soils and temperatures rounded out Chase gardens.

CHAPTER FIVE

RESOURCE HARVEST AND USE PATTERNS: GOLD CREEK - CHULITNA AND HURRICANE - BROAD PASS

SPECIES USED AND SEASONAL ROUND OF HARVEST ACTIVITIES

Table 9 lists the fish, game, and wild plant resources which households in the Gold Creek - Chulitna and Hurricane - Broad Pass samples either harvested or used during the study period in 1986. For Gold Creek - Chulitna, the total includes 37 resources, with 11 kinds of fish, one species of marine invertebrate, five species of game and furbearers, 9 types of birds and 11 kinds of wild plants. On average, the five sampled households in the Gold Creek - Chulitna area used 11.2 categories of wild resources, attempted to harvest 9.8 categories, and harvested 9.4 categories (Table 10). For the Hurricane - Broad Pass sample, the list includes 48 kinds of wild food, with 11 kinds of fish, one species of marine invertebrate, 13 species of game and furbearers, 9 types of birds, and 14 kinds of wild plants. The average number of resource categories used among these eight households was 10.1, the average number attempted to harvest was 9.4, and the average number harvested was 7.8 (Table 10).

Figure 5 depicts the seasonal round of resource harvesting activities for households in the three sample areas of Chase, Gold - Creek - Chulitna, and Hurricane - Broad Pass. (See Chapter Four for a discussion of this seasonal round.)

TOTAL HARVEST AREA

Figures 13 and 14 depict all local areas used for resource harvesting activities by residents of the Gold Creek - Chulitna and Hurricane - Broad Pass sampled households during the period they have lived in the study area. For Gold Creek - Chulitna, the maximum length of use of these areas was about 40 years. Residents of this study area have used the railroad corridor from Curry to Hurricane, as well as portions of the Susitna River, Chulitna River, and upper Chunilna Creek drainages. A few harvesting activities have occurred outside of this core area, including portions of the Alaska Railroad-Parks Highway corridor north of Hurricane and a section of the Talkeetna River drainage. Virtually all of this harvest areas is within Game Management Unit 13E.

For the Hurricane - Broad Pass households, the maximum length of use of the areas depicted in Figure 14 was 18 years. These households used a large area of Game Management Unit 13E and a small portion of GMU 16A. This area included most of the Chulitna River drainage, including the Parks Highway and Alaska Railroad corridors from Trapper Creek to Cantwell. Also used are portions of the upper Nenana and Susitna river drainages accessed from the Denali Highway. The larger area used by Hurricane - Broad Pass households in comparison with Gold Creek - Chulitna households reflects the former's use of roads for accessing hunting and fishing areas.

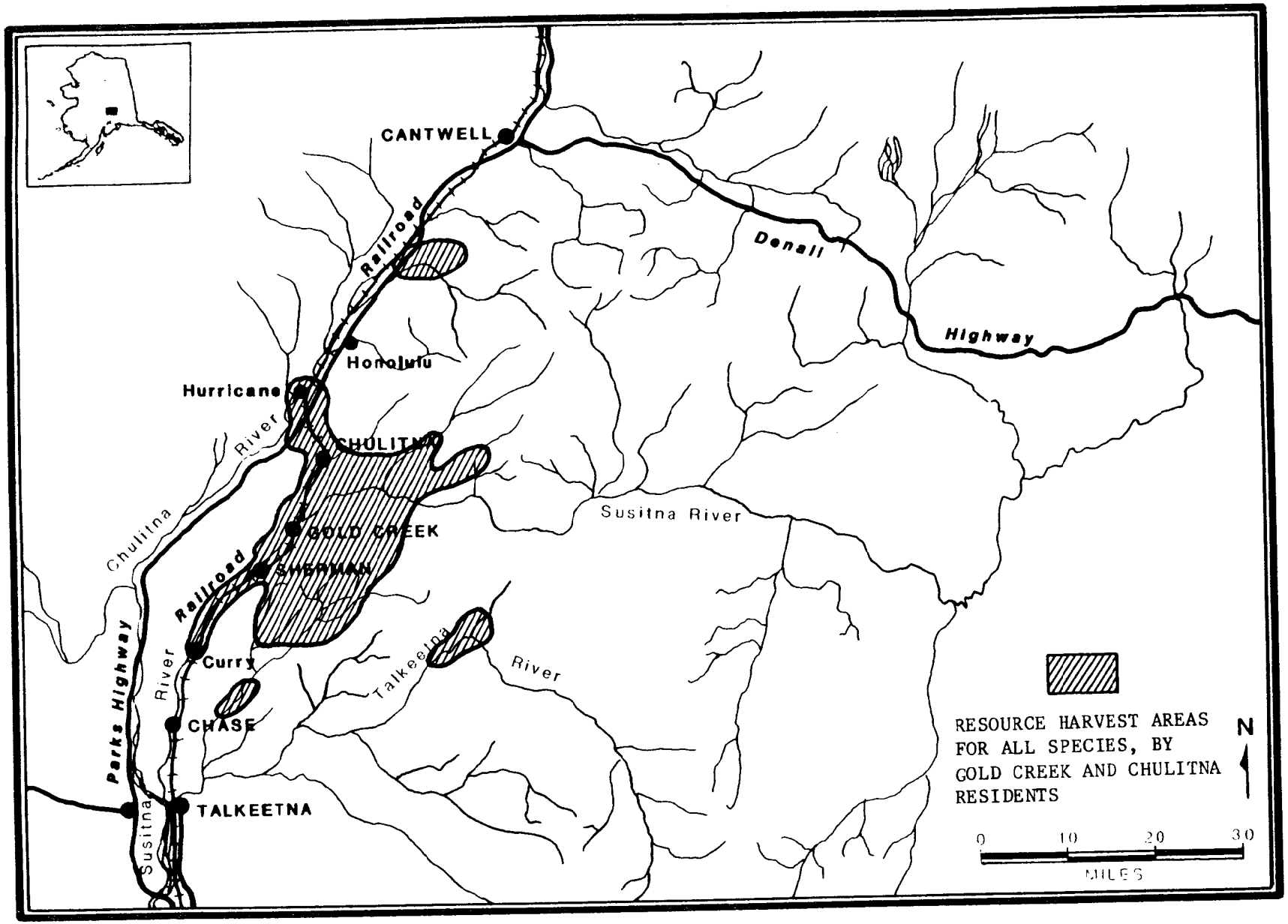

Figure 13. Areas Used for Resource Harvests, Gold Creek-Chulitna, 1940s-1986.

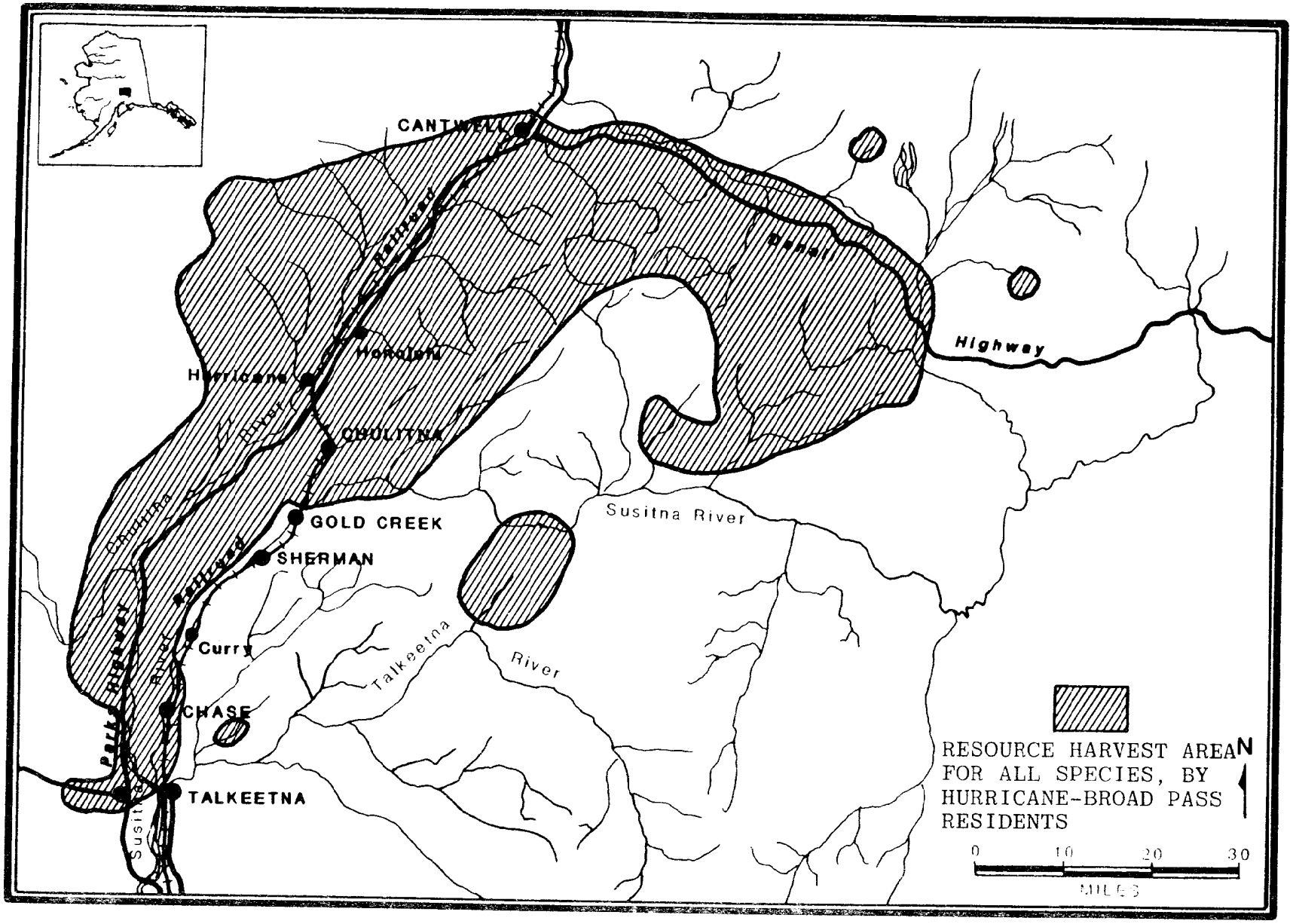

Figure 14. Areas Used for Resource Harvests, Hurricane-Broad Pass, 1968-1986.

LEVELS OF PARTICIPATION IN THE USE AND HARVEST OF WILD RESOURCES

As reported in Table 10, all of the households in the Gold Creek - Chulitna and Hurricane - Broad Pass samples used wild resources during the 1986 study period. Additionally, 100 percent of these households attempted to harvest and successfully harvested at least one kind of wild food in 1986.

As shown in Figure 15, all five Gold Creek - Chulitna households used salmon, land mammals, and birds. Also, 80 percent used freshwater fish and edible plants, 60 percent used marine fish, and 20 percent used marine invertebrates and furbearers. The most commonly used resources at Gold Creek - Chulitna during the study year were moose and spruce grouse, used by all the households. In addition, 80 percent of the sample used rainbow trout, grayling, ptarmigan, berries, and other plants (Table 19). All of the five households fished for salmon, while 80 percent fished for freshwater fish, hunted for land mammals and birds, or searched for wild plants (Fig. 15). One household (20 percent) tried to harvest furbearers. The most commonly sought species were rainbow trout, grayling, moose, berries, and other plants; 80 percent of the households attempted to harvest these resources (Table 19). The entire Gold Creek - Chulitna sample were successful harvesters of salmon (Fig. 15). Also, 80 percent harvested freshwater fish, birds, and edible plants, 60 percent harvested land mammals, and 20 percent furbearers. There were no harvesters of marine fish, marine invertebrates, or marine mammals among the sampled households. The most commonly harvested resources, each taken by 80 percent of the

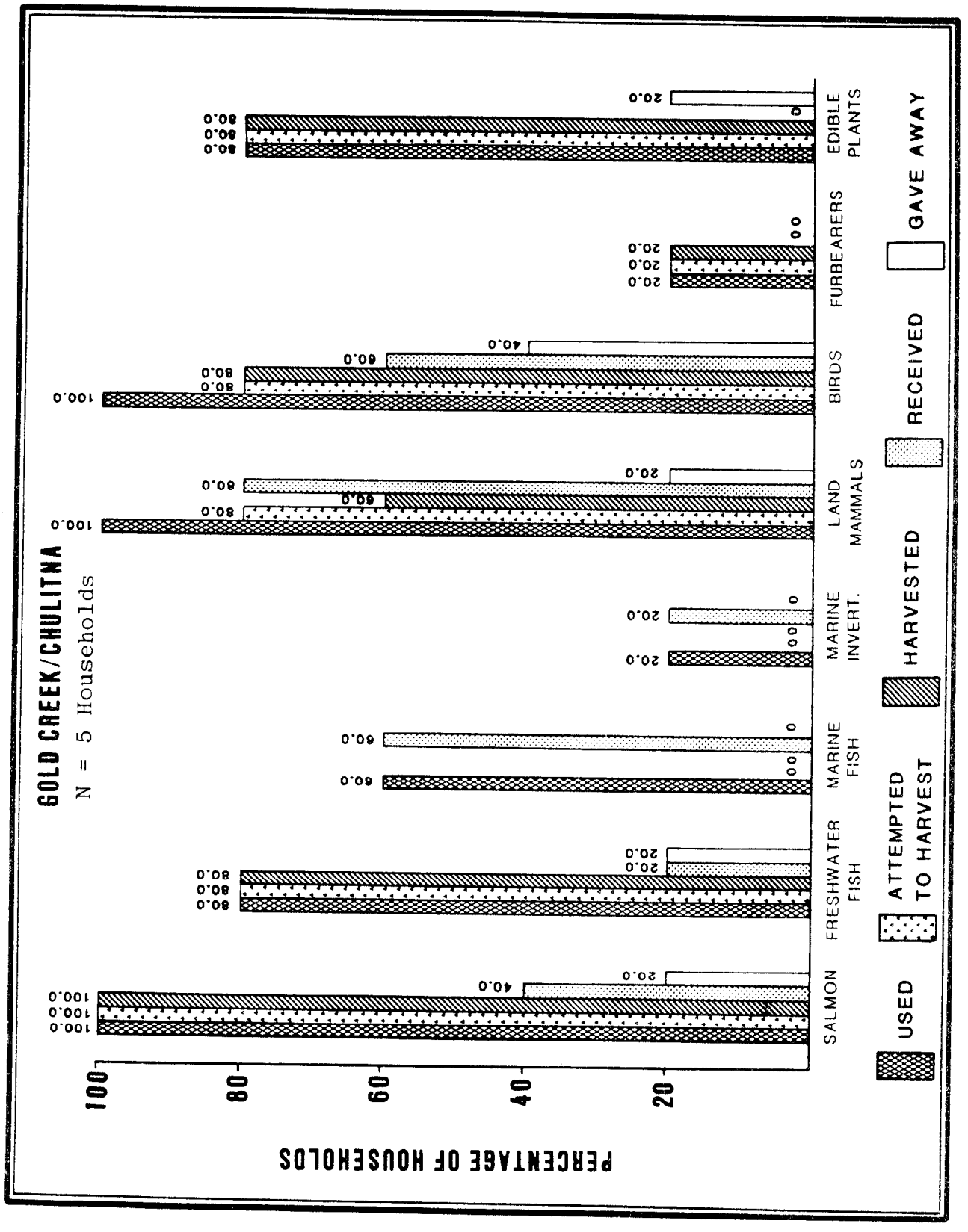

Figure 15. Percentage of Sampled Gold Creek-Chulitna Households Using, Attempting to Harvest, Harvesting, Receiving, and Giving Away Eight Categories of Wild Resources, 1986.

TABLE 19. LEVELS OF HOUSEHOLD HARVEST AND USE OF WILD FISH, GAME, AND PLANT RESOURCES, GOLD CREEK - CHULITNA, 1986 (N=5 households)

Resource	% HH Used	% HH attempt Harvest	% HH Harvested	% HH Received	% HH Gave Away	Mean HH Harvest, Lbs	Total Sample Harvest, Numbers*
SALMON	100.0	100.0	100.0	40.0	20.0	103.6	89
King Salmon	40.0	40.0	40.0	20.0	0	21.6	6
Red Salmon	40.0	40.0	40.0	40.0	20.0	20.8	26
Chum Salmon	40.0	40.0	40.0	0	20.0	7.2	17
Pink Salmon	40.0	40.0	40.0	0	20.0	20.4	12
Silver Salmon	60.0	60.0	60.0	0	0	33.6	28
FRESHWATER FISH	80.0	80.0	80.0	20.0	20.0	49.8	--
Rainbow Trout	80.0	80.0	80.0	0	20.0	34.5	115
Lake Trout	0	0	0	0	0	0	0
Dolly Varden	40.0	40.0	40.0	0	20.0	2.2	11
Grayling	80.0	80.0	80.0	20.0	20.0	11.2	70
Burbot	20.0	40.0	20.0	0	20.0	1.5	3
Whitefish	20.0	20.0	20.0	0	0	.4	2
MARINE FISH	60.0	0	0	60.0	0	0	--
Halibut	60.0	0	0	60.0	0	0	0
Cod	0	0	0	0	0	0	0
Hooligan	0	0	0	0	0	0	0
Herring	0	0	0	0	0	0	0
Herring Roe-on -kelp	0	0	0	0	0	0	0
MARINE INVERTE-BRATES	20.0	0	0	20.0	0	0	--
Razor Clams	20.0	0	0	20.0	0	0	0
Butter Clams	0	0	0	0	0	0	0
King Crab	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0
Shrimp	0	0	0	0	0	0	0
MARINE MAMMALS	0	0	0	0	0	0	--
Harbor Seal	0	0	0	0	0	0	0
Belukha	0	0	0	0	0	0	0
LAND MAMMALS	100.0	80.0	60.0	80.0	20.0	153.7	--
Moose	100.0	80.0	20.0	80.0	20.0	100.0	1
Caribou	20.0	20.0	20.0	0	0	26.0	1
Sheep	0	0	0	0	0	0	0
Goat	0	0	0	0	0	0	0
Black Bear	40.0	40.0	40.0	0	0	23.2	2
Brown Bear	0	0	0	0	0	0	0
Elk	0	0	0	0	0	0	0
Deer	0	0	0	0	0	0	0
Porcupine	0	0	0	0	0	0	0
Hare	40.0	40.0	40.0	0	0	4.5	12

TABLE 19. (Continued) LEVELS OF HOUSEHOLD HARVEST AND USE OF WILD FISH, GAME, AND PLANT RESOURCES, GOLD CREEK - CHULITNA, 1986 (N=5 households)

Resource	% HH Used	% HH Attempt Harvest	% HH Harvested	% HH Received	%HH Gave Away	Mean HH Harvest, Lbs	Total Sample Harvest, Numbers*
BIRDS	100.0	80.0	80.0	60.0	40.0	14.2	--
Ducks	40.0	20.0	20.0	20.0	0	3.0	10
Geese	0	0	0	0	0	0	0
Spruce Grouse	100.0	60.0	60.0	40.0	20.0	4.2	42
Ptarmigan	80.0	60.0	60.0	20.0	40.0	7.0	70
FURBEARERS	20.0	20.0	20.0	0	0	1.0	--
Beaver	0	0	0	0	0	0	0
Muskrat	0	0	0	0	0	0	0
Land Otter	0	0	0	0	0	0	0
Mink	0	0	0	0	0	0	0
Marten	0	0	0	0	0	0	0
Wolverine	0	0	0	0	0	0	0
Wolf	0	0	0	0	0	0	0
Coyote	0	0	0	0	0	0	0
Red Fox	0	0	0	0	0	0	0
Red Squirrel	20.0	20.0	20.0	0	0	1.0	10
Weasel	0	0	0	0	0	0	0
EDIBLE PLANTS**	80.0	80.0	80.0	0	20.0	25.6	--
Berries	80.0	80.0	80.0	0	20.0	24.0	120 qt
Other Plants	80.0	80.0	80.0	0	0	1.6	8 qt
WOOD	100.0	100.0	100.0	0	0	--	--
Cordwood	100.0	100.0	100.0	0	0	--	13 c
House Logs	0	0	0	0	0	--	0
ALL EDIBLE WILD RESOURCES***	100.0	100.0	100.0	100.0	40.0	347.9	--
ALL RESOURCES	100.0	100.0	100.0	100.0	40.0	--	--

* Harvests are reported in numbers of fish or animals, except resources marked by "b" (five gallon bucket), "g" (gallons), "qt" (quarts), or "c" (cords).

** Does not include garden-grown produce.

*** Deleting cordwood and house logs

Source: Division of Subsistence, ADF&G, Survey 1987

households, were rainbow trout, grayling, berries, and other plants (Table 19).

Figure 16 shows the percentage of sampled Hurricane - Broad Pass households that used, attempted to harvest, harvested, received, or gave away eight categories of wild resources. The pattern is very similar to that just described for Gold Creek - Chulitna. All of the households used wild plants, 87.5 percent used land mammals, 75 percent used salmon, 62.5 percent used freshwater fish, 50 percent used birds and marine fish, and 25 percent used marine invertebrates and furbearers. The most commonly used resources in 1986 among the eight interviewed households at Hurricane - Broad Pass were berries (100 percent using), moose (87.5 percent), other plants (87.5 percent), sockeye salmon (75 percent), and grayling (62.5 percent) (Table 20). Most households attempted to harvest edible plants (87.5 percent), salmon (75 percent), land mammals (75 percent), and freshwater fish (Fig. 16). Additionally, 50 percent hunted birds, 37.5 percent tried to harvest furbearers, and 12.5 percent fished for marine fish. More households attempted to harvest berries and other plants (both 87.5 percent) than any other wild foods, followed by moose (75 percent hunting), sockeye salmon (62.5 percent), and grayling (62.5 percent) (Table 20). The most commonly harvested resource category among sampled Hurricane - Broad Pass households in 1986 was edible plants (87.5 percent), followed by salmon (75 percent), freshwater fish (62.5 percent), land mammals (62.5 percent), birds (50 percent), marine fish (25 percent), and furbearers (25.0 percent) (Fig. 16). Berries (87.5 percent harvesting) and other plants (87.5 percent) were harvested by the most households, while 62.5 percent harvested sockeye salmon, 62.5 took grayling, and 50 percent

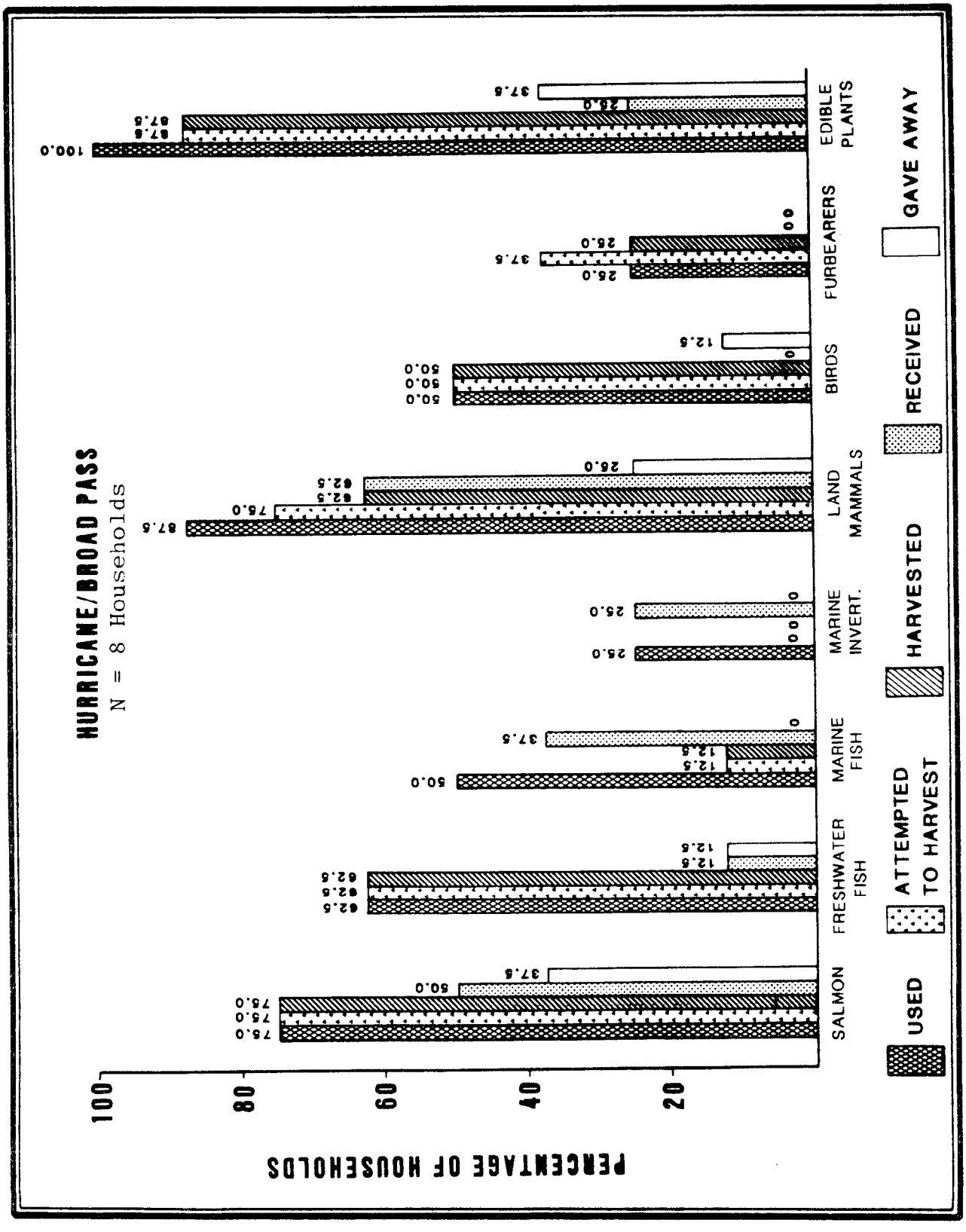

Figure 16. Percentage of Sampled Hurricane-Broad Pass Households Using, Attempting to Harvest, Harvesting, Receiving, and Giving Away Eight Categories of Wild Resources, 1986.

TABLE 20. LEVELS OF HOUSEHOLD HARVEST AND USE OF WILD FISH, GAME, AND PLANT RESOURCES, HURRICANE - BROAD PASS, 1986 (N=8 households)

Resource	% HH Used	% HH attempt Harvest	% HH Harvested	% HH Received	% HH Gave Away	Mean HH Harvest, Lbs	Total Sample Harvest, Numbers*
SALMON	75.0	75.0	75.0	50.0	37.5	97.0	149
King Salmon	50.0	37.5	25.0	37.5	0	20.3	9
Red Salmon	75.0	62.5	62.5	37.5	37.5	44.0	88
Chum Salmon	0	0	0	0	0	0	0
Pink Salmon	25.0	25.0	25.0	12.5	0	6.5	26
Silver Salmon	37.5	37.5	37.5	12.5	12.5	26.3	35
FRESHWATER FISH	62.5	62.5	62.5	12.5	12.5	31.2	--
Rainbow Trout	37.5	37.5	37.5	0	0	5.6	30
Lake Trout	37.5	25.0	25.0	12.5	12.5	14.4	77
Dolly Varden	0	0	0	0	0	0	0
Grayling	62.5	62.5	62.5	0	12.5	9.6	96
Burbot	12.5	12.5	12.5	0	0	1.6	5
Whitefish	0	0	0	0	0	0	0
MARINE FISH	50.0	12.5	12.5	37.5	0	5.0	--
Halibut	50.0	12.5	12.5	37.5	0	5.0	1
Cod	12.5	0	0	12.5	0	0	0
Hooligan	0	0	0	0	0	0	0
Herring	0	0	0	0	0	0	0
Herring Roe-on -kelp	12.5	0	0	12.5	0	0	0
MARINE INVERTE-BRATES	25.0	0	0	25.0	0	0	--
Razor Clams	25.0	0	0	25.0	0	0	0
Butter Clams	0	0	0	0	0	0	0
King Crab	0	0	0	0	0	0	0
Dungeness Crab	0	0	0	0	0	0	0
Shrimp	0	0	0	0	0	0	0
MARINE MAMMALS	0	0	0	0	0	0	--
Harbor Seal	0	0	0	0	0	0	0
Belukha	0	0	0	0	0	0	0
LAND MAMMALS	87.5	75.0	62.5	62.5	25.0	401.9	--
Moose	87.5	75.0	50.0	37.5	25.0	375.0	6
Caribou	12.5	12.5	12.5	0	0	16.3	1
Sheep	0	0	0	0	0	0	0
Goat	0	0	0	0	0	0	0
Black Bear	37.5	12.5	12.5	25.0	0	7.2	1
Brown Bear	0	0	0	0	0	0	0
Elk	12.5	0	0	12.5	0	0	0
Deer	0	0	0	0	0	0	0
Porcupine	12.5	12.5	12.5	0	0	3.4	6
Hare	12.5	0	0	12.5	0	0	0

TABLE 20. (Continued) HOUSEHOLD HARVEST AND USE OF WILD FISH, GAME, AND PLANT RESOURCES, HURRICANE - BROAD PASS, 1986 (N=8 households)

Resource	% HH Used	% HH Attempt Harvest	% HH Harvested	% HH Received	%HH Gave Away	Mean HH Harvest, Lbs	Total Sample Harvest, Numbers*
BIRDS	50.0	50.0	50.0	0	12.5	7.1	--
Ducks	12.5	12.5	12.5	0	0	1.1	6
Geese	0	0	0	0	0	0	0
Spruce Grouse	25.0	25.0	25.0	0	12.5	2.7	43
Ptarmigan	37.5	37.5	37.5	0	12.5	3.3	53
FURBEARERS	25.0	37.5	25.0	0	0	6.6	--
Beaver	25.0	25.0	25.0	0	0	6.6	6
Muskrat	0	0	0	0	0	0	0
Land Otter	0	37.5	0	0	0	0	0
Mink	25.0	25.0	25.0	0	0	0	8
Marten	25.0	25.0	25.0	0	0	0	18
Wolverine	12.5	37.5	12.5	0	0	0	2
Wolf	12.5	37.5	12.5	0	0	0	1
Coyote	0	37.5	0	0	0	0	0
Red Fox	25.0	37.5	25.0	0	0	0	9
Red Squirrel	0	0	0	0	0	0	0
Weasel	12.5	12.5	12.5	0	0	0	4
EDIBLE PLANTS**	100.0	87.5	87.5	25.0	37.5	51.8	--
Berries	100.0	87.5	87.5	25.0	37.5	38.8	310 qt
Other Plants	87.5	87.5	87.5	0	25.0	13.0	104 qt
WOOD	87.5	87.5	87.5	0	0	--	--
Cordwood	87.5	87.5	87.5	0	0	--	38 c
House Logs	62.5	62.5	62.5	0	0	--	76
ALL EDIBLE WILD RESOURCES***	100.0	100.0	100.0	75.0	62.5	600.5	--
ALL RESOURCES	100.0	100.0	100.0	75.0	62.5	--	--

* Harvests are reported in numbers of fish or animals, except resources marked by "b" (five gallon bucket), "g" (gallons), "qt" (quarts), or "c" (cords).

** Does not include garden-grown produce.

*** Deleting cordwood and house logs

Source: Division of Subsistence, ADF&G, Survey 1987

harvested moose (Table 20). No one in the Hurricane - Broad Pass sample harvested marine invertebrates or marine mammals in 1986.

HARVEST QUANTITIES

The five sampled households living at Gold Creek - Chulitna harvested an average of 347.9 pounds of wild foods in 1986. The community per capita harvest was 174.0 pounds (Table 10). Land mammals made up the largest portion of this harvest, 44.2 percent (153.7 pounds per household), followed by salmon (103.6 pounds, 29.8 percent), freshwater fish (49.8 pounds, 14.3 percent), edible plants (25.6 pounds, 7.4 percent), birds (14.2 pounds, 4.1 percent), and furbearers (1 pound, .3 percent) (Fig. 17). Moose was the resource which made the largest contribution to the mean household harvest (100.0 pounds, 28.7 percent of all resources taken), followed by rainbow trout (34.5 pounds, 9.9 percent), silver salmon (33.6 pounds, 9.7 percent), caribou (26.0 pounds, 7.5 percent), berries (24.0 pounds, 6.9 percent), and black bear (23.2 pounds, 6.7 percent) (Table 19).

The Hurricane - Broad Pass sample harvested a mean household harvest of 600.5 pounds of wild foods in 1986. The community per capita harvest was 177.9 pounds (Table 10). As in Chase and Gold Creek - Chulitna, land mammals contributed the largest share of this harvest at Hurricane - Broad Pass, with an average household take of 401.9 pounds, 66.9 percent of the total harvest. Next most significant in 1986 was salmon (97.0 pounds, 16.2 percent), followed by edible plants (51.8 pounds, 8.6 percent), freshwater fish (31.2 pounds, 5.2 percent), birds (7.1 pounds, 1.2 percent), furbearers (6.6 pounds, 1.1 percent), and

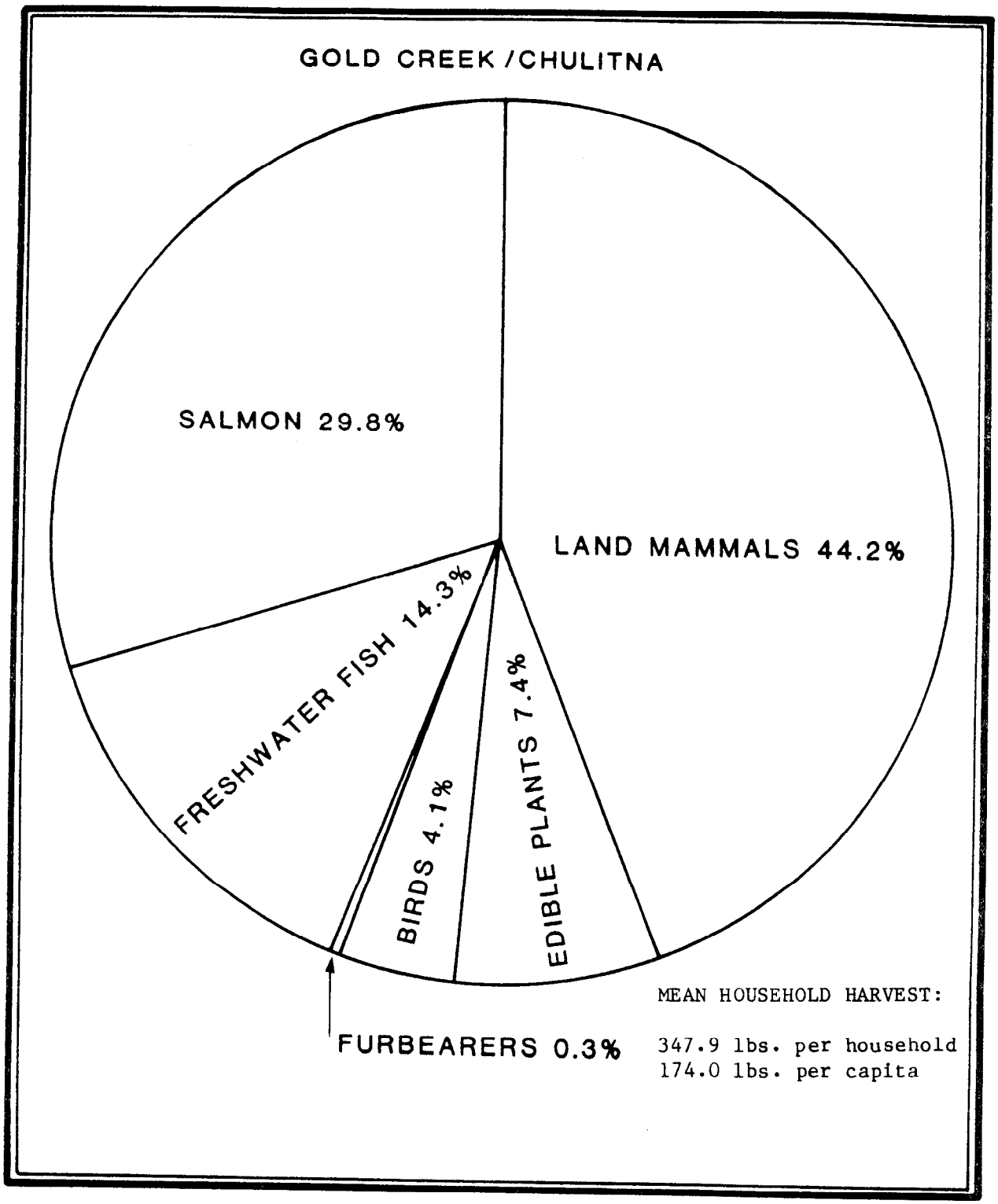

Figure 17. Composition of Wild Resource Harvests by Resource Category, Gold Creek-Chulitna, 1986.

marine fish (5 pounds, 0.8 percent) (Fig. 18). Again, moose provided the most pounds to the total resource take (375 pounds, 62.4 percent of all resources, followed by sockeye salmon (44 pounds per household, 7.3 percent of all resources), berries (38.8 pounds per household, 6.5 percent), and silver salmon (26.3 pounds per household, 4.4 percent) (Table 20).

SHARING AND RECEIVING WILD RESOURCES

As in Chase, most households in the Gold Creek - Chulitna and Hurricane - Broad Pass areas gave away portions of the wild resource harvests during the study year, or received fish, game, or plants from successful harvesters living in other households. All of the five sampled households at Gold Creek - Chulitna received wild foods from other households, and 40 percent shared their harvests with other households (Table 10). The average number of resource categories received per household within this sample was 3.2 and the average number of resource categories given away was 2.4. The most commonly received wild resource category was land mammals (80 percent receiving), with birds and marine fish received by 60 percent. Four out of the five households (80 percent) received gifts of moose meat, and 60 percent received halibut (Table 18). Two of the five households (40 percent) gave away portions of their harvests of birds, while one each gave away salmon, freshwater fish, land mammals, and edible plants (Fig. 15). Two Gold Creek - Chulitna households (40 percent) gave away ptarmigan, with harvests of ten other resources given away by one household each.

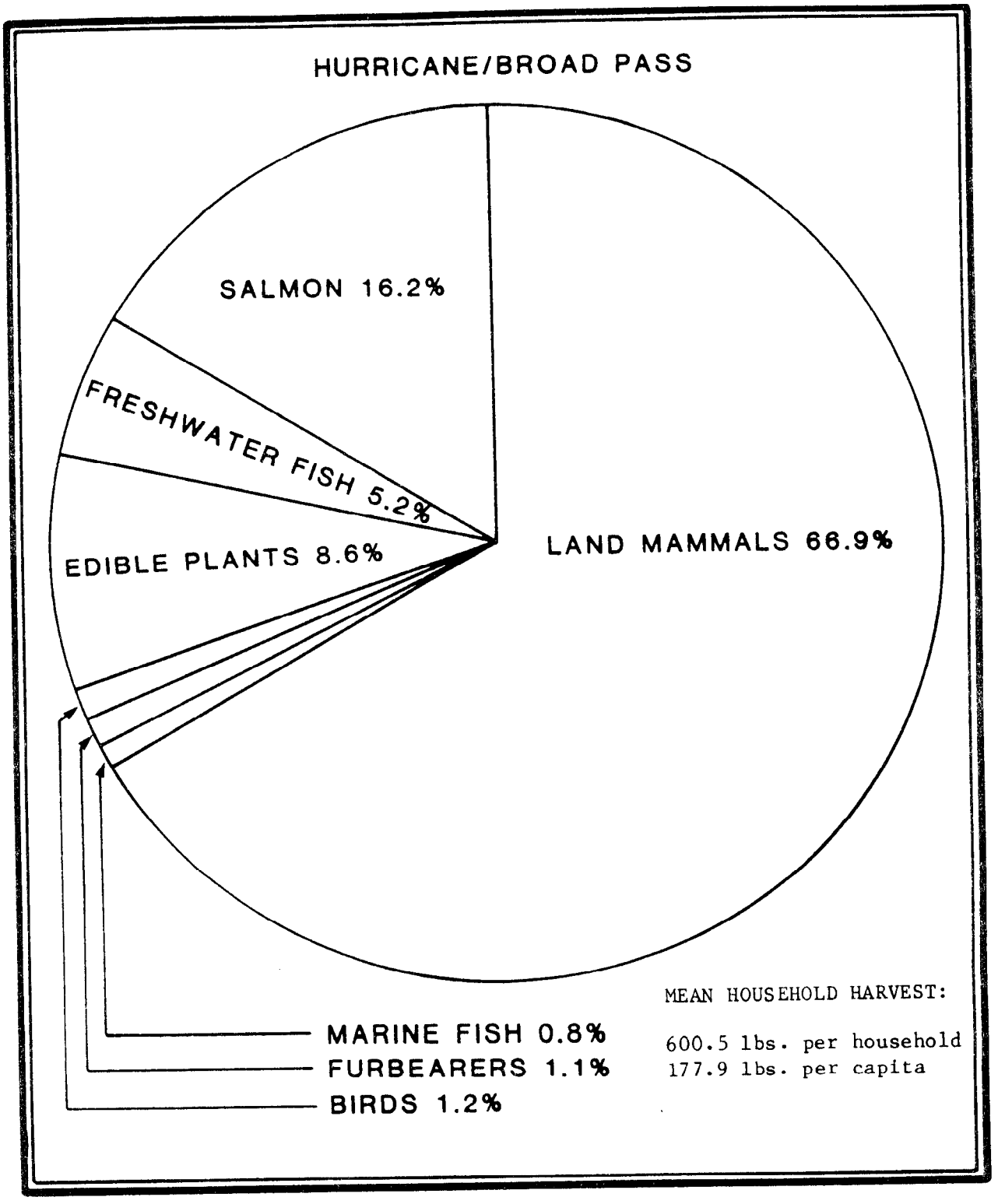

Figure 18. Composition of Wild Resource Harvests by Resource Category, Hurricane-Broad Pass, 1986.

Of the eight households in the Hurricane - Broad Pass sample, 75 percent received wild foods from successful harvesters in other households, and 62.5 percent shared their own harvests with people living outside their household (Table 10). The average number of resource categories received in 1986 within the Hurricane - Broad Pass sample was 3.1, and the average number given away was 1.9. Of all the resource categories, land mammal products were received by the most Hurricane - Broad Pass households in 1986 (62.5 percent), followed by salmon (50 percent), marine fish (37.5 percent), edible plants (25 percent), marine invertebrates (25 percent), and freshwater fish (12.5 percent) (Fig. 16). The resources received by the most households in this sample were king salmon, sockeye salmon, halibut, and moose, all 37.5 percent (Table 20). More households gave away edible wild plants and salmon (both 37.5 percent) than any other resource category (Fig. 16). Additionally, 25 percent gave away land mammals, and 12.5 percent gave away birds and freshwater fish. Sockeye salmon and berries were the most commonly shared wild foods (Table 20). Also, 25 percent of the households gave away moose.

USE AND HARVEST CHARACTERISTICS BY RESOURCE CATEGORY

Salmon

Salmon were one of the most widely used and harvested categories of wild resources among sampled households in the Gold Creek - Chulitna and Hurricane - Broad Pass in 1986. All five Gold Creek - Chulitna households used and harvested at least one species of salmon (Fig. 15,

Table 19). The mean household harvest of salmon of 103.6 pounds made up 29.8 percent of the total resource take, second only to land mammals (Fig. 17). These households harvested five species of salmon. Sixty percent used and harvested silver salmon, and 40 percent each caught king salmon, sockeye salmon, chum salmon, and pink salmon.

As noted in Chapter Four, there were no subsistence or personal use salmon fisheries in the study area in 1986, and all local harvests of salmon took place under sport fishing regulations. As shown in Table 13, all the the salmon harvests by Gold Creek - Chulitna households in 1986 were taken with rod and reel gear. The areas these households have used to harvest salmon from the 1940s until the present are shown in Figure 19.

In the Hurricane - Broad Pass study area, 75 percent of the sampled households used and harvested salmon in 1986 (Fig. 16, Table 20). The mean household harvest of salmon was 97.0 pounds, 16.2 percent of all resources taken during the study year (Fig. 18). Sockeye salmon accounted for most of this harvest, with 75 percent of the households using sockeyes, and 62.5 percent harvesting them, for a total catch of 88 fish. Additionally, 50 percent used king salmon, 37.5 percent used silvers, and 25.0 percent used pink salmon during the study year. As in Gold Creek - Chulitna, all of these harvests took place with rod and reel gear under sport fishing regulations (Table 13).

Figure 20 shows areas which the sampled Hurricane - Chulitna households have used to harvest salmon and other fish during their residency in the study area. Most local fishing for salmon has occurred in the Chulitna and Susitna river drainages.

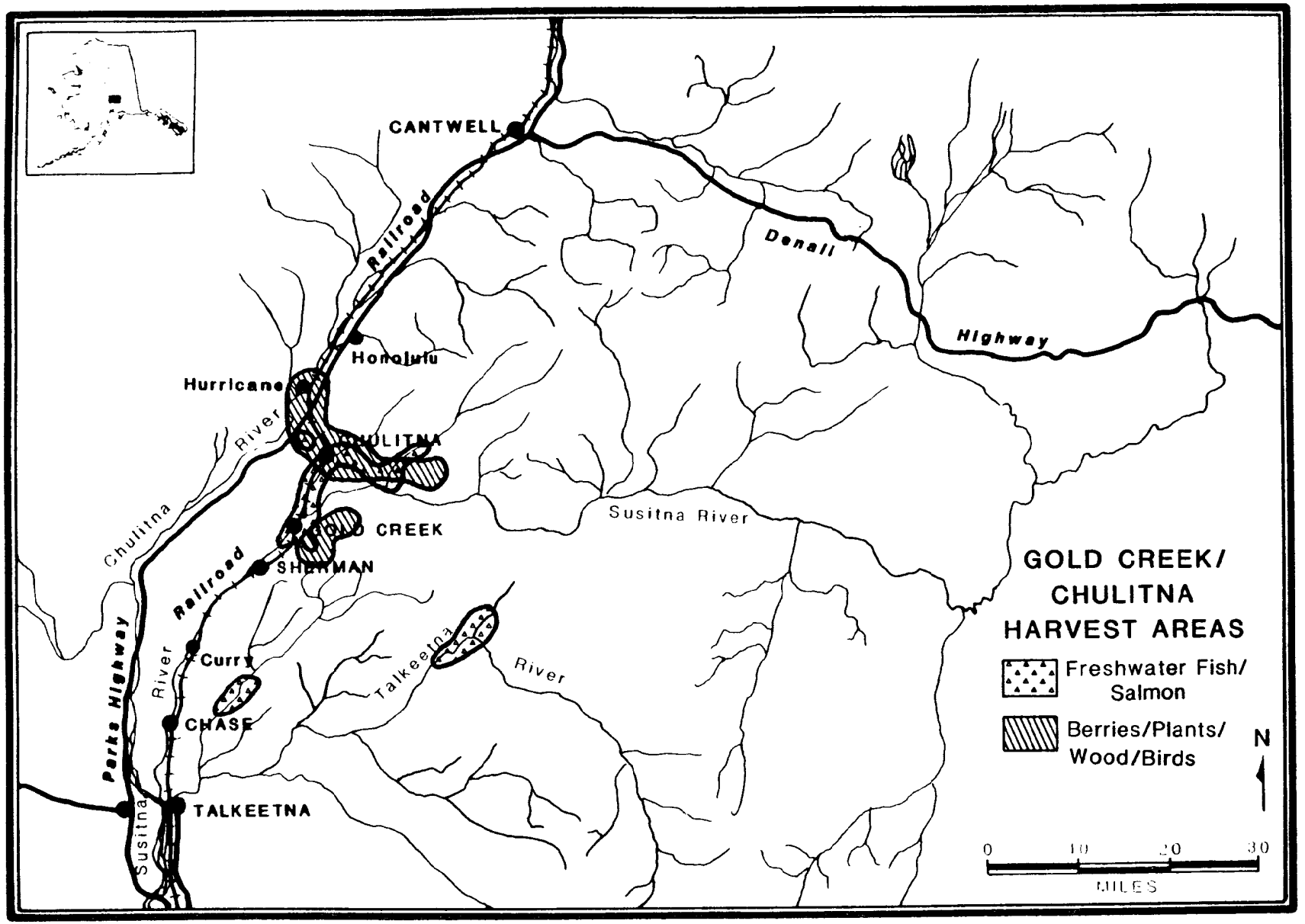

Figure 19. Harvest Areas for Salmon and Freshwater Fish, and Berries, Plants, Wood, and Birds, Gold Creek-Chulitna, 1940s-1986.

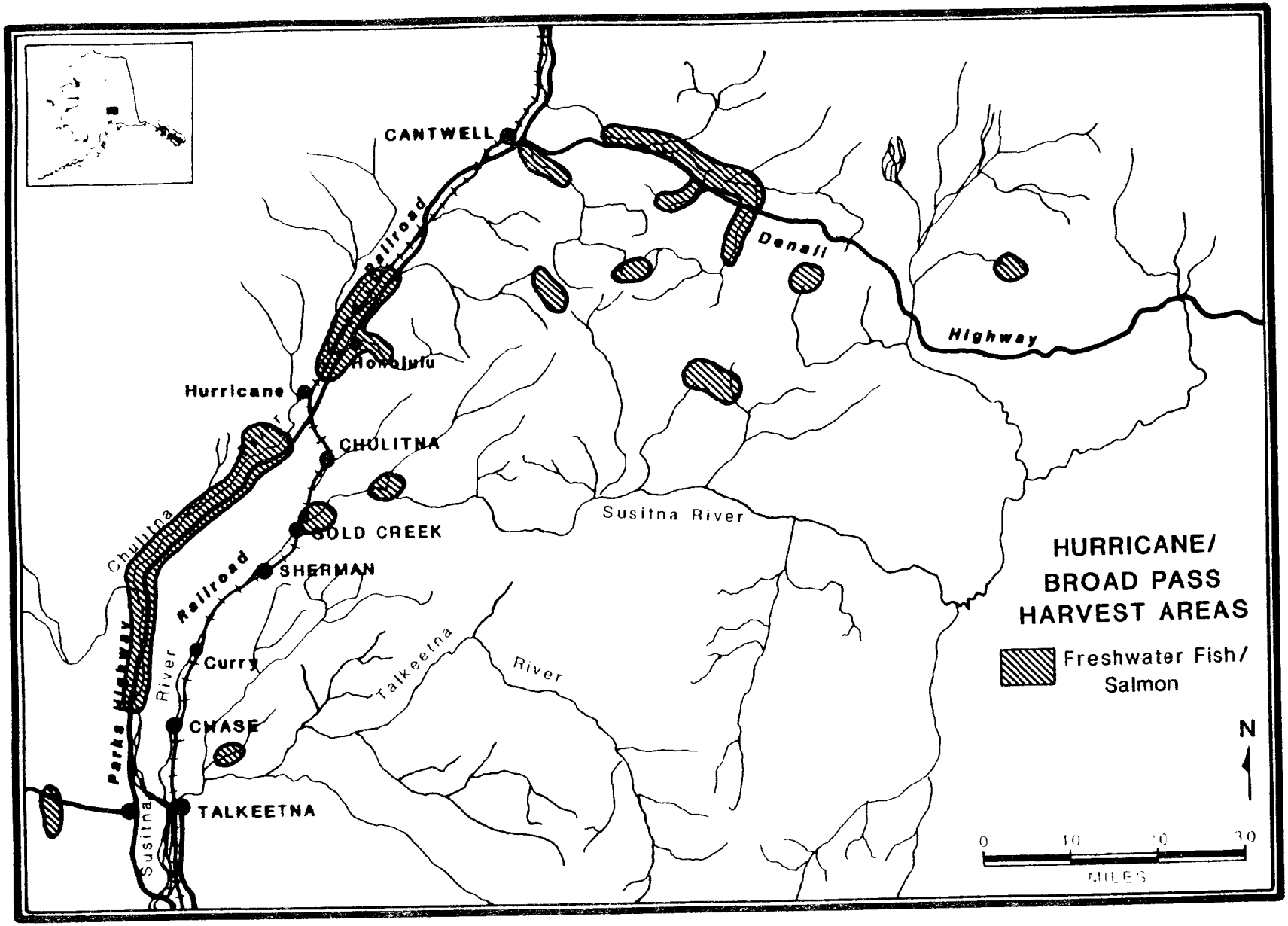

Figure 20. Harvest Areas for Salmon and Freshwater Fish, Hurricane-Broad Pass, 1968-1986.

Freshwater Fish

Fishing in freshwater for fish other than salmon was a popular activity for most households in the Gold Creek - Chulitna and Hurricane - Broad Pass areas in 1986. All of this fishing took place with rod and reel gear under sport fishing regulations (Table 12). Four of the five interviewed households in the Gold Creek - Chulitna area used and harvested freshwater fish in 1986 (Fig. 15, Table 19). Five kinds were taken, with rainbow trout (80 percent using and harvesting) and grayling (80 percent using and harvesting) accounting for most of the harvest. The other species used were Dolly Varden (40 percent using and harvesting), burbot (20 percent using and harvesting), and whitefish (20 percent using and harvesting). In total, harvests of these fish added 49.8 pounds to the average household harvest of wild foods in this study area in 1986, 14.3 percent of the total harvest that year (Fig. 17).

Of the eight households in the Hurricane - Broad Pass sample, 62.5 percent used and 62.5 percent harvested non-salmon freshwater fish in 1986 (Fig. 16, Table 20). Grayling were the most popular kind (62.5 percent using and harvesting), followed by lake trout (37.5 percent using, 25 percent harvesting), rainbow trout (37.5 percent using and harvesting), and burbot (12.5 percent using and harvesting). The mean household harvest of these fish for the Hurricane - Broad Pass sample was 31.2 pounds, 5.2 percent of the total resource harvest during the study year.

Figures 19 and 20 depict areas where residents of the Gold Creek - Chulitna and Hurricane - Broad Pass areas have fished for freshwater species while living in the study areas. Gold Creek - Chulitna

households have harvested freshwater fish in the nearby Susitna River and Indian River. Freshwater fish have been harvested by Hurricane - Broad Pass households primarily in the Chulitna River drainage.

Marine Fish, Marine Invertebrates, and Marine Mammals

Few sampled households in either Gold Creek - Chulitna or Hurricane - Broad Pass used or harvested many resources in these three categories in 1986. Among the five interviewed households at Gold Creek - Chulitna, three (60 percent) used halibut that they had received as gifts and one (20 percent) used razor clams that had been given to that household (Table 19). None of these households reported any harvest of marine fish, marine invertebrates, or marine mammals for the study year. Half (50.0 percent) of the Hurricane - Broad Pass sample used marine fish, mostly halibut that they received from other households (Table 20). One household in the study area harvested one halibut. One household each also received gifts of cod and herring roe-on-kelp. Also, one Hurricane - Broad Pass household received razor clams in 1986, the only use of marine invertebrates among sampled households during the study year. There was no reported harvest or use of marine mammals by this sample.

Land Mammals

All of the Gold Creek - Chulitna households and all but one (87.5 percent) of the Hurricane - Broad Pass sample used land mammals in 1986 (Figs. 15 and 16, Tables 19 and 20). Also, 60 percent of the Gold Creek

- Chulitna households and 62.5 percent of those at Hurricane - Broad Pass harvested at least one kind of land mammal during the study year. The mean household harvest of land mammals for the Gold Creek - Chulitna group was 153.7 pounds, 44.2 percent of the total harvest of wild foods (Fig. 17). This was, by far, larger than any other resource category. The mean household harvest of land mammals by Hurricane - Broad Pass households was even larger, 401.9 pounds, and made up an even larger percentage of the total take, 66.9 percent, in 1986 (Fig. 18). Also, land mammals were the most commonly received category of wild foods in both samples. In 1986, 80 percent of the Gold Creek - Chulitna received gifts of land mammals, as did 62.5 percent of the Hurricane - Broad Pass households.

Moose

As in Chase, moose was the most notable wild resource in the harvests of Gold Creek - Chulitna and Hurricane - Broad Pass households in 1986 as measured in participation in use and harvesting as well as in harvest quantities in pounds edible weight. All of the Gold Creek - Chulitna households used moose meat during the study year. Four of the five (80 percent) hunted moose, and one (20 percent) was successful. The other four households (80 percent) received gifts of moose meat. The one harvested moose provided a mean household harvest of 100 pounds (Table 19). This was 65.1 percent of the land mammal harvest, and 28.7 percent of the total resource take. Also, three of the five households (60.0 percent) received moose meat from train-killed moose (Table 15).

At Hurricane - Broad Pass, 87.5 percent of the sample used moose meat in 1986, 75.0 percent hunted moose, and 50 percent of the households were successful (Table 20). In addition, 37.5 percent received moose meat from other households. In total, the sampled households harvested six moose during the study year. The average household harvest of moose was 375.0 pounds, representing 93.3 percent of the land mammal harvest, and 62.4 percent of the total harvest of all wild foods. Additionally, 37.5 percent of the households received road or train killed moose during 1986 (Table 15).

Regulations governing the hunting of moose in Game Management Unit 13E are summarized in Table 14. The season opened on September 1 and closed on September 20. Residents of GMU 13, including those domiciled in the Gold Creek - Chulitna and Hurricane - Broad Pass areas, were eligible for subsistence permits which allowed them to take any bull moose. In 1987, nine hunters in these two study areas had permits, and reported a take of two moose.

Figure 21 shows the areas that Gold Creek - Chulitna households have used for hunting moose while they have lived in the study area. Moose hunting has occurred near the community in the Susitna River drainage, as well as near Chase and along a portion of the Talkeetna River. Hunters from Gold Creek and Chulitna sought moose along the railroad corridor, or hunted on foot or with off-road vehicles on the limited trail system near Gold Creek. There was also some use of planes to hunt moose and caribou in the Talkeetna Mountains. Respondents reported that the preservation of moose taken during the open September season was difficult. Freezing outdoors was not usually possible and much of the meat was canned to preserve it.

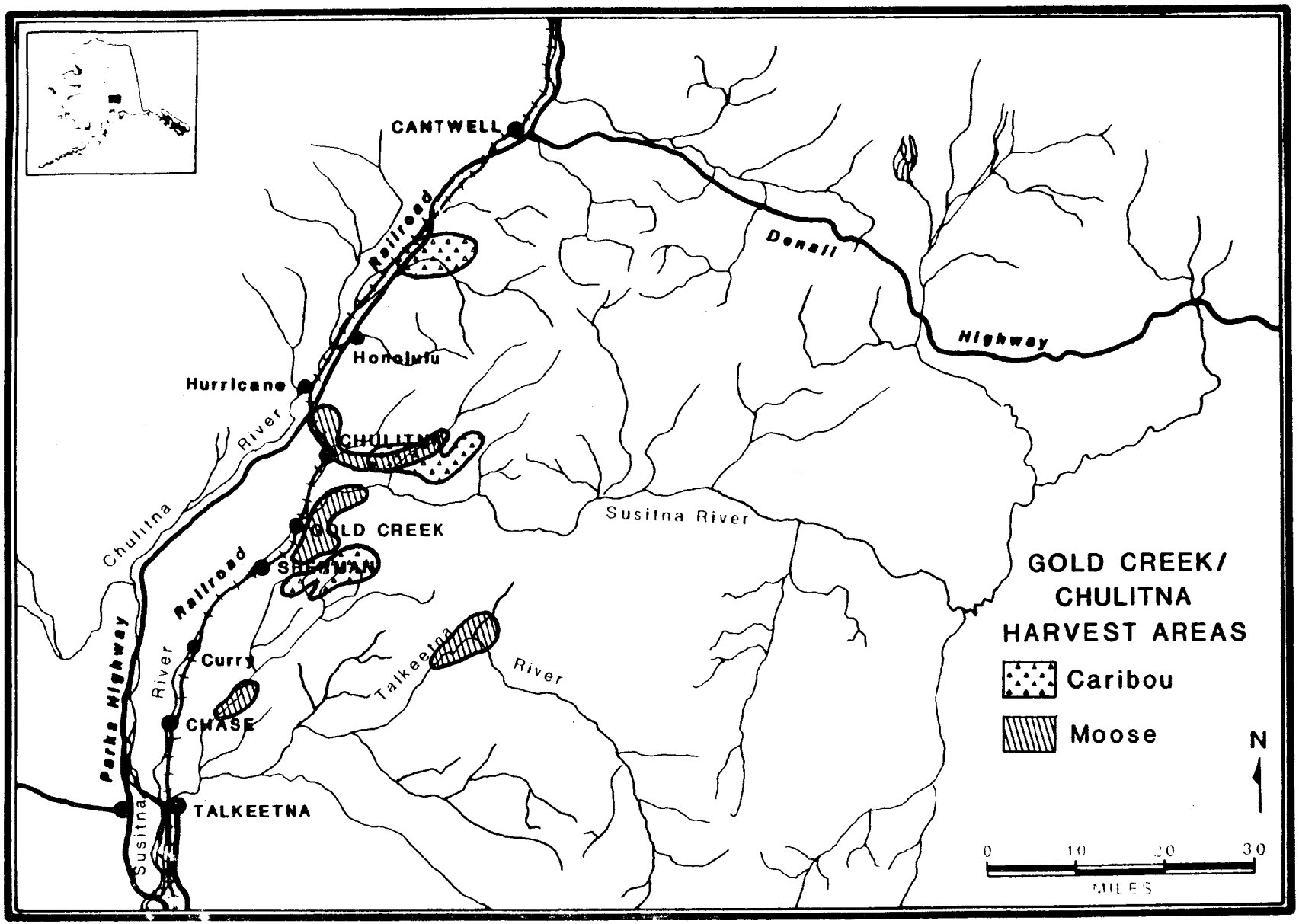

Figure 21. Harvest Areas for Moose and Caribou, Gold Creek-Chulitna, 1940s-1986.

Areas used for moose hunting by Hurricane - Broad Pass households areas shown in Figure 22. These households have hunted in a large portion of GMU 13E, mostly in the Chulitna River drainage. Access to these areas was by plane (two households) or off-road vehicle. Hunting along the Parks Highway also occurred. Moose meat was often canned or, if taken late in the fall, frozen outdoors. A few households used their generators to run freezers to preserve meat during the warmer portions of the hunting season.

Caribou

Residents of both the Gold Creek - Chulitna and Hurricane - Broad Pass areas qualified for subsistence permits for hunting caribou in GMU 13E. Seasons occurred in August - September and January - February (Table 14). In 1987, ten hunters from these study areas held subsistence caribou permits and reported a take of three caribou.

According the the survey results, one Gold Creek - Chulitna household (20.0 percent) hunted, harvested, and used a caribou in 1986 (Table 19). In the Hurricane - Broad Pass sample as well, one household (12.5 percent) hunted, harvested, and used a caribou. Areas which sampled households in these study areas have used for caribou hunting are depicted in Figures 21 and 22. Gold Creek - Chulitna households have hunted caribou in the Talkeetna Mountains and around Broad Pass, while Hurricane - Broad Pass households have hunted caribou most along the Parks Highway corridor from Hurricane to Cantwell and along the western portion of the Denali Highway.

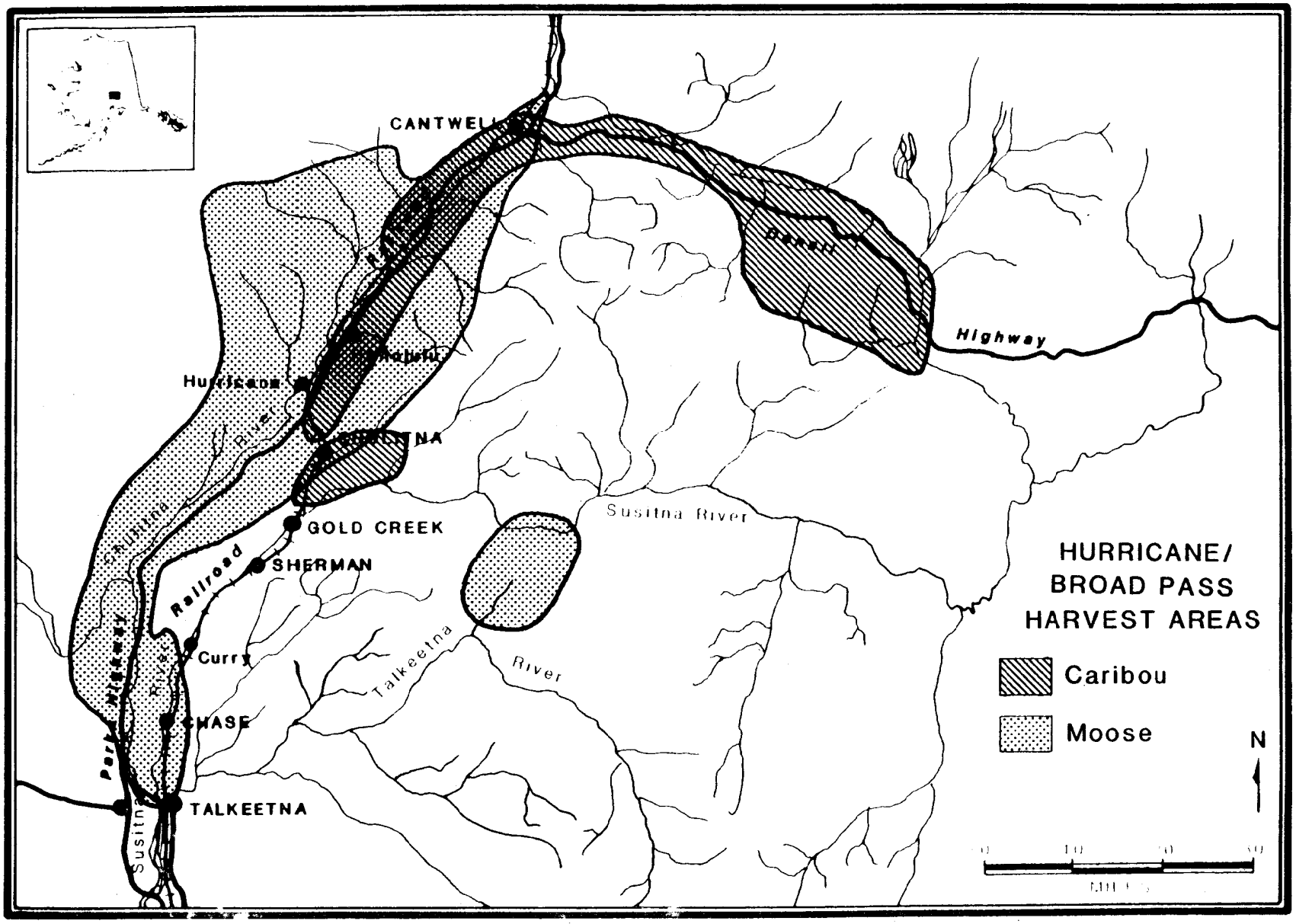

Figure 22. Harvest Areas for Moose and Caribou, Hurricane-Broad Pass, 1968-1986.

Other Game

Households in the Gold Creek - Chulitna sample used two kinds of land mammals other than moose, caribou, or furbearers in 1986 (Table 19). First, two households (40.0 percent) used and harvested one black bear each. Areas where sampled households have hunted for black bear are shown in Figure 23. Second, two households (40 percent) used and harvested a total of 12 hares (a mean household harvest of 4.5 pounds).

As shown in Table 20, sampled households in the Hurricane - Broad Pass area used a total of four other land mammals, and harvested two kinds. One household each received gifts of elk (not present locally) and hare, but no households in this sample reported any harvest of these species. One household (12.5 percent) harvested a black bear, and two others (25.0 percent) received gifts of black bear meat during the study period. Areas where Hurricane - Broad Pass households have hunted black bear since about 1968 are shown in Figure 24. Finally, one household (12.5 percent) reported a harvest of six porcupines in 1986.

Furbearers

Only one household in the Gold Creek - Chulitna sample used furbearers in 1986 (Fig. 15, Table 19). This household harvested ten red squirrels with a rifle, and used them for food. Households within this sample have trapped furbearers in the past, however, and the areas that have been used by Gold Creek and Chulitna households for furbearer trapping are depicted in Figure 23.

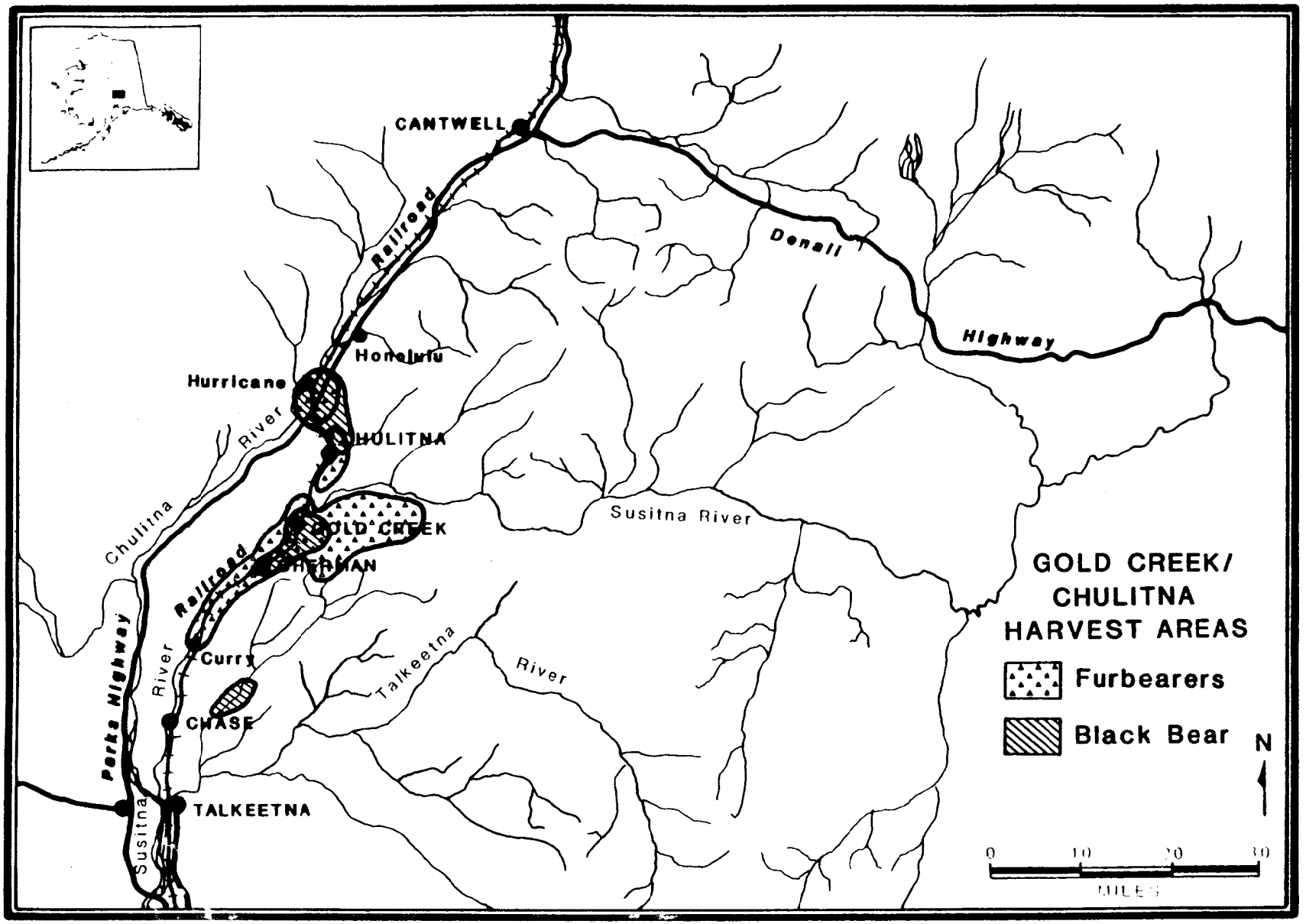

Figure 23. Harvest Areas for Furbearers and Black Bear, Gold Creek-Chulitna, 1940s-1986.

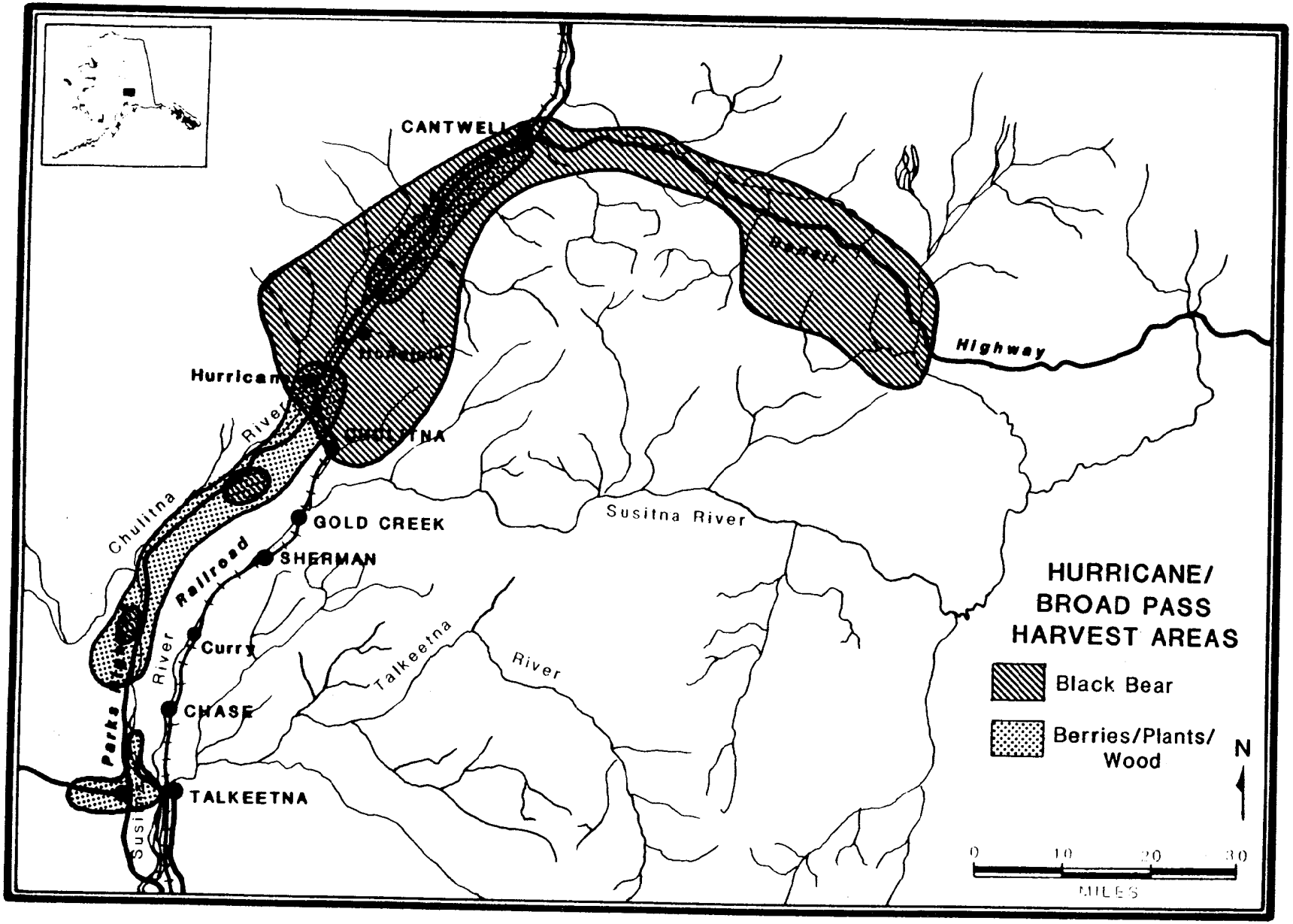

Figure 24. Harvest Areas for Black Bear and Berries, Plants, and Wood, Hurricane-Broad Pass, 1968-1986.

The harvest and use of furbearers was more common among the Hurricane - Broad Pass sample in 1986. Three of the eight households (37.5 percent) attempted to harvest furbearers, and two (25.0 percent) were successful (Fig. 16, Table 20). Seven kinds of furbearers were harvested, with marten (18 animals), red fox (9 animals), mink (8 animals), and beaver (6 animals) making up most of the take. In addition, these households trapped a few wolverines and weasels, and one wolf. The sample also reported trying to trap coyote and land otter without success. The only furbearer that was used for food was beaver, which accounted for a mean household harvest of 6.6 pounds, 1.1 percent of the year's total. Figure 25 depicts areas that Hurricane - Broad Pass households have been using for furbearer trapping during their residency in the study area.

As reported in Table 17, the potential total value of the furs harvested by Hurricane - Broad Pass households in 1986 was $3,597.04. This is an average of $449.63 for the eight sampled households and an average of $1,798.52 for the two households which successfully trapped furbearers in the study year.

Birds

All of the sampled Gold Creek - Chulitna households used birds in 1986, and 80 percent harvested birds (Fig. 15, Table 19). This resource category contributed 14.1 pounds to the mean household harvest of wild foods during the study year, 4.1 percent of the total harvest (Fig. 17). More households used spruce grouse (100 percent) than any other kind of bird; 60 percent of the households harvested grouse, for a mean

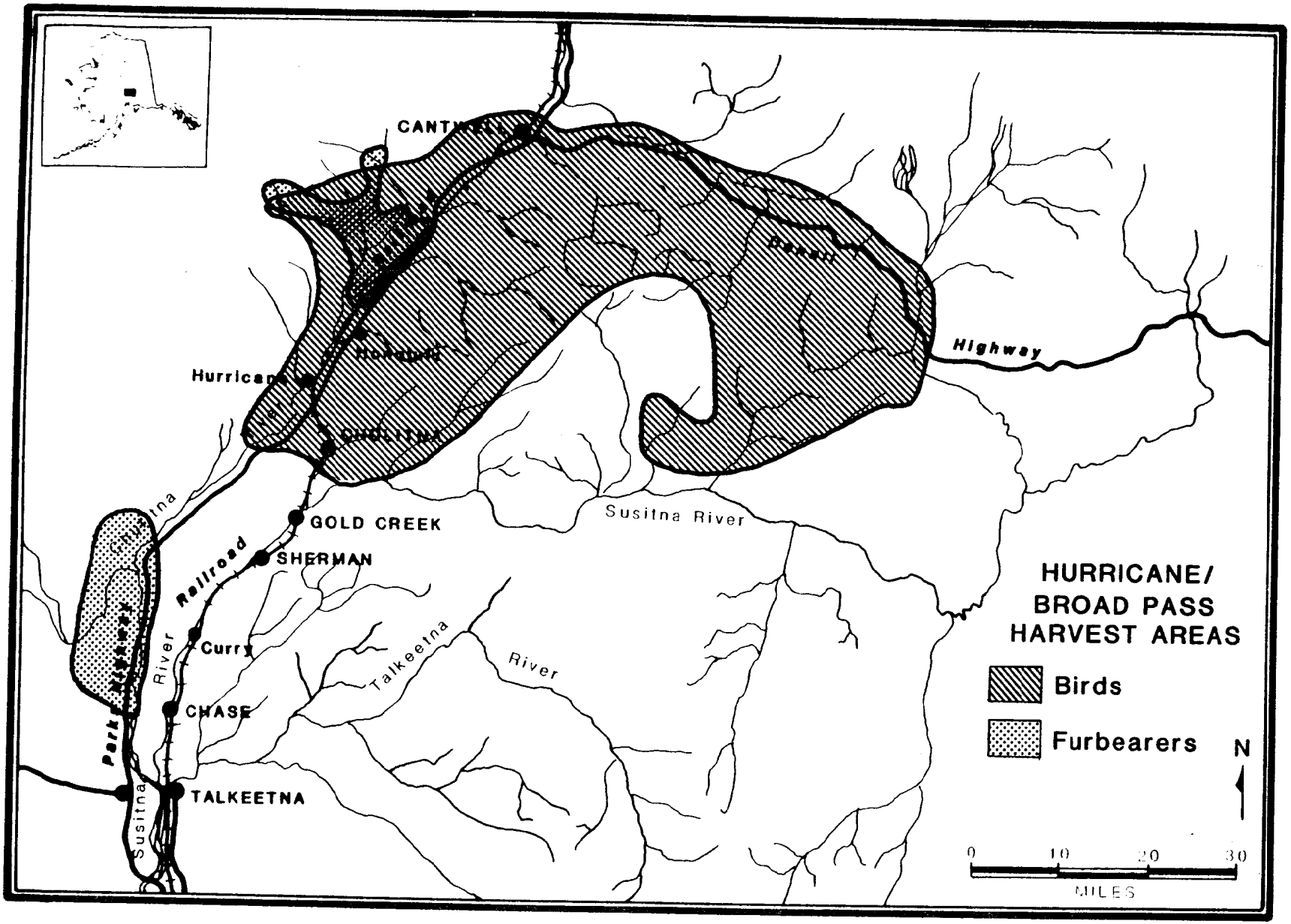

Figure 25. Harvest Areas for Birds and Furbearers, Hurricane-Broad Pass, 1968-1986.

household take of 4.2 pounds. Ptarmigan were used by 80 percent of the households and harvested by 60 percent. The mean household harvest of ptarmigan was 7.0 pounds, more than any other bird. Fewer households at Gold Creek - Chulitna used or harvested waterfowl in 1986. One household (20 percent) harvested ducks, and 40 percent used ducks. There was no harvest or use of geese in 1986.

A similar pattern occurred among the sampled Hurricane - Broad Pass households, with 50 percent harvesting and using at least one species of bird during the study year (Fig. 16, Table 20). The mean household harvest of birds was 7.1 pounds, 1.2 percent of the total harvest (Fig. 18). As in Gold Creek and Chulitna, ptarmigan (37.5 percent used and harvested), and spruce grouse (25 percent used and harvested) accounted for most of the bird harvest in the Hurricane - Broad Pass study area. Only one household used and harvested ducks in 1986, and there was no harvest or use of geese.

Figure 19 depicts the areas that Gold Creek - Chulitna households have hunted for birds from the 1940s until the present. Figure 25 shows the bird hunting areas of Hurricane - Broad Pass households.

Edible Plants

Eighty percent of the Gold Creek - Chulitna households used and harvested wild plants during the study year (Fig. 15, Table 19), while all of the Hurricane - Broad Pass sample used edible wild plants and 87.5 percent harvested them (Fig. 16, Table 20). This resource category added 25.6 pounds to the average household harvest of the Gold Creek - Chulitna sample, 7.4 percent of the total harvest (Fig. 17). At

Hurricane - Broad Pass, the mean household harvest of edible wild plants was 51.8 pounds, 8.6 percent of the total reported resource take (Fig. 18). Berries made up most of the edible wild plant harvest at both Gold Creek - Chulitna (80 percent used and harvested) and Hurricane - Broad Pass (100 percent used, 87.5 percent harvested). Types of berries used by sampled households included blueberries, lowbush cranberries, high bush cranberries, raspberries, nagoon berries, crow berries, currents, and watermelon berries. Additionally, 80 percent of the Gold Creek - Chulitna households used and harvested other kinds of edible wild plants, as did 87.5 percent of the Hurricane - Chulitna households. Examples of these plants include fiddlehead ferns, rosehips, and fireweed. As shown in Figures 19 and 24, most wild plant harvests by sampled households have occurred near their residences and along transportation corridors.

Wood

Almost every household in both the Gold Creek - Chulitna (100 percent) and Hurricane - Broad Pass (87.5 percent) harvested and used cordwood for heating their homes during the study year (Tables 19 and 20). In addition, 62.5 percent of the Hurricane - Broad Pass sample harvested house logs to use for home construction or repairs in 1986. Figures 19 and 24 show where these wood harvests have occurred.

CHAPTER SIX

DISCUSSION AND CONCLUSIONS

THE ROLE OF WILD RESOURCE HARVESTS IN THE SOCIOECONOMIC SYSTEMS OF THE STUDY COMMUNITIES

During the study period in 1986, the use and harvest of wild fish, game, and plant resources played a notable role in the socioeconomic systems of the three areas discussed in this report, Chase, Gold Creek - Chulitna, and Hurricane - Broad Pass. Every sampled household used and harvested wild foods in 1986. Furthermore, most households shared portions of their harvests with others, or received fish or game from successful harvesters from other households (Table 10). Also, harvest quantities were similar. Chase households on average harvested 553.8 pounds of wild foods in 1986, and Hurricane - Broad Pass households harvested an average of 600.5 pounds. The average household harvest at Gold Creek - Chulitna was lower, 346.9 pounds, but household size of this sample was lower as well. On a per capita basis, harvest quantities of the Gold Creek - Chulitna and Hurricane - Broad Pass samples were virtually identical, 174.0 pounds and 177.9 pounds, respectively. The per capita harvest among Chase households was slightly higher, at 209.2 pounds (Table 10).

Harvests of wild resources in all three samples were relatively diverse. On average, Chase households used 11.7 kinds of wild resources during the study period, Gold Creek - Chulitna households used 11.2 kinds, and Hurricane - Broad Pass households used 10.1 kinds (Table 10). In general, the composition of these harvests, as measured in pounds edible weight, was similar in all three areas. Land mammals, especially moose, was the dominant

resource category, contributing 54.9 percent of the total resource take at Chase, 44.2 percent at Gold Creek - Chulitna, and 66.9 percent at Hurricane - Broad Pass (Figures 8, 17, and 18). Salmon made the second largest contribution to the harvests of the three areas, 23.7 percent at Chase, 29.8 percent at Gold Creek - Chulitna, and 16.2 percent at Hurricane - Broad Pass. Freshwater fish and edible plants ranked either third or fourth in each sample. By far, moose made a larger contribution to the overall resource take for all three samples than any other single resource (Tables 11, 19, and 20).

There were also some differences between the three samples. Chase households were more likely to travel outside the study area to harvest marine invertebrates, marine fish, or salmon with non-recreational methods than were households at Gold Creek - Chulitna or Hurricane - Broad Pass. Although harvests of furbearers were not high in any of the samples, over a third of the Chase and Hurricane - Broad Pass households trapped for furbearers in 1986. On the other hand, only one household at Gold Creek - Chulitna (20.0 percent) took any resources from this category.

A final difference concerns the role of horticulture in Chase's local economy. As discussed in Chapter Four, in 1986, households in Chase raised at least 28 kinds of vegetables in their gardens. The average household grew 12.2 kinds of garden produce and harvested 579.6 pounds of these foods during the study year. Households at Chase have, through practice and experimentation, developed ways to grow and store these vegetable foods under relatively severe local conditions. Most believed that gardening, along with hunting and fishing, was an essential component of the local economy. Combining wild resources with garden produce, Chase households, on average, produced 1,133.4 pounds of food in 1986. Horticulture did not play a similar major role in the other two sample areas.

COMPARISONS WITH OTHER SOUTHCENTRAL ALASKA COMMUNITIES

Table 21 presents recent information on the size and composition of wild resource harvests of communities in southcentral Alaska based upon research by the Division of Subsistence. Figure 26 compares per capita resource harvests of several communities in the Cook Inlet drainage area (plus Cantwell, which is just to the north of this drainage). The per capita harvests of wild foods in 1986 for samples of households at Chase (209 pounds), Gold Creek - Chulitna (174 pounds), and Hurricane - Broad Pass (178) were notably higher than those reported for most communities along the road system in the Cook Inlet basin, such as Kenai (37 pounds), Talkeetna (55 pounds), Trapper Creek (66 pounds), Ninilchik (76 pounds), and Homer (104 pounds). Harvests by the three study communities most closely resembled those of Skwentna (178 pounds), Tyonek (272 pounds), and Alexander Creek (313 pounds), all Cook Inlet basin communities off the road system. The study communities' harvests also resembled those in the upper range of Copper Basin communities, such as Chitina (190 pounds) or Gakona (192 pounds), but exceeded those of many other Copper Basin communities such as Mentasta (109 pounds) and Copper Center (113 pounds). These comparisons suggest that, within the context of southcentral Alaska, wild resource harvests play a relatively large role in the economy of Chase, Gold Creek - Chulitna, and Hurricane - Broad Pass.

In terms of harvest quantities and composition of wild resource harvests, the three study communities have the most in common with Skwentna. Per capita harvests are in the 170 to 200 pound range. Also, in all four areas, land mammals, rather than salmon, make up the largest portion of the harvests. There are several reasons for these similarities. First, as in Skwentna, seasonal patterns of wage employment are the norm in the three study areas.

TABLE 21. COMPARISON OF PER CAPITA WILD RESOURCE HARVESTS AND THE COMPOSITION OF WILD RESOURCE HARVESTS BY RESOURCE CATEGORY IN SELECTED SOUTHCENTRAL ALASKA COMMUNITIES

Community[a]	Per Capita Harvest, Pounds	Percent of Harvest Composed of: Salmon	Other Fish	Marine Invert.	Land Mammals	Marine Mammals	Birds & Eggs	Wild Plants
Cook Inlet, Coastal								
Homer	104	16.0	32.0	22.0	29.0	0	b	1.0
Kenai	37	42.0	29.0	9.0	18.0	0	b	2.0
Ninilchik	76	24.0	28.0	18.0	27.0	0	b	3.0
Seldovia	52	35.0	25.0	16.0	16.0	0	b	8.0
Tyonek	272	71.0	3.0	2.0	21.0	1.0	1.0	1.0
Susitna River Basin								
Alexander Creek[c]	313	24.9	5.3	NA	58.9	0	2.0	2.4
Cantwell	130	5.0	19.0	0	73.0	0	b	3.0
Chase	209	23.7	8.4	.7	56.2	0	2.2	8.9
Gold Creek - Chulitna	174	29.8	14.3	0	44.5	0	4.1	7.4
Parks Highway	58	37.3	4.3	1.5	50.7	0	.7	5.5
Hurricane - Broad Pass	178	16.2	6.0	0	68.0	0	1.2	8.6
Petersville Road	167	39.7	10.2	.5	43.5	0	3.2	2.8
Skwentna[c]	178	24.9	5.3	NA	58.9	0	2.0	2.4
Talkeetna	55	40.1	17.6	.6	31.1	0	1.4	9.1
Trapper Creek	66	52.9	21.5	1.2	16.4	0	1.6	6.4
Copper River Basin								
Chistochina	115	37.0	8.0	0	43.0	0	b	12.0
Chitina	190	61.0	4.0	0	28.0	0	b	7.0
Copper Center	113	62.0	21.0	0	13.0	0	b	5.0
Gakona	192	56.0	13.0	0	28.0	0	b	3.0
Glennallen	71	44.0	10.0	0	42.0	0	b	4.0
Gulkana	114	49.0	14.0	0	33.0	0	b	5.0
Mentasta	109	19.0	4.0	0	63.0	0	b	14.0
Prince William Sound								
Chenega Bay	361	21.0	16.0	1.0	20.0	39.0	1.0	1.0
Cordova	151	39.0	22.7	6.2	26.9	<.1	1.5	3.6

[a] Study years: Homer, Kenai, Ninilchik, and Seldovia, 1982 (Reed 1985); Tyonek 1982-3 (Fall et al 1984); Alexander Creek and Skwentna, 1984 (Stanek 1987); Cantwell, Chistochina, Chitina, Copper Center, Gakona, Glennallen, Gulkana, and Mentasta, 1982 (Stratton and Georgette 1984); Parks Highway, Petersville Road, Talkeetna, Trapper Creek, 1985-86 (Fall and Foster 1987); Chenega Bay 1986 (Stratton and Chisum 1986); Cordova, 1986 (Stratton 1987).

[b] Included in game.

[c] Harvest composition is based on combined Alexander Creek and Skwentna harvests.

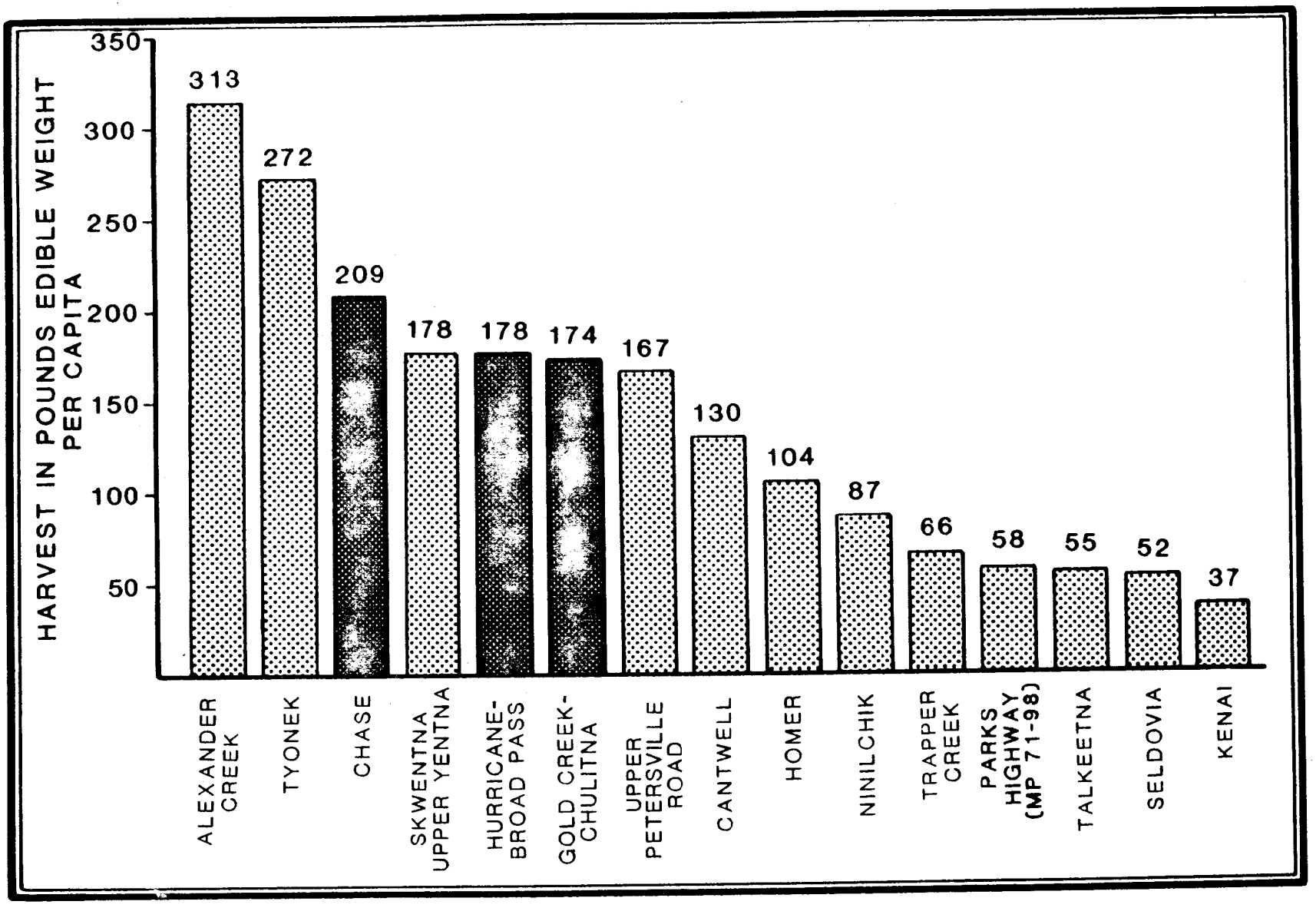

Figure 26. Comparison of Per Capita Harvests of Wild Fish, Game, and Plant Resources, Selected Southcentral Alaska Communities.

Chase, Gold Creek - Chulitna, and Skwentna are not road connected, and, along with the Hurricane - Broad Pass area, are geographically marginal to the employment opportunities and services found in the more densely populated portions of southcentral Alaska (cf. Stanek 1987). In these relatively sparsely settled regions, wild resources, such as moose and salmon, are relatively abundant and accessible. Regulations governing moose hunting favor local residents in both areas; Skwentna residents may hunt during a winter season, and residents of GMU 13 (including residents of all three study areas) may take any bull moose rather than one with an antler spread of 36 inches or more (the bag limit for other hunters). Finally, although salmon are plentiful in the Susitna basin, residents of all four areas are restricted to rod and reel gear and bag limits in their salmon fishing; they are not eligible for any subsistence fisheries. This may in part account for the dominance of moose over salmon in these areas in contrast to, for example, Tyonek or most Copper basin communities that have access to the use of more efficient subsistence gear types (gill nets for Tyonek, fishwheels and dip nets for the Copper Basin).

There are also some notable similarities between the study communities and Cantwell, which is immediately north of the Hurricane - Broad Pass sampling area. For example, in 1982, land mammals, mostly caribou and moose, dominated Cantwell's harvest of wild foods, making up 73 percent of the total harvest as measured in pounds edible weight (Table 21; Stratton and Georgette 1984:178). This compares with 56.2 percent for Chase, 44.5 percent for Gold Creek - Chulitna, and 68.0 percent for Hurricane - Broad Pass. Also, although Cantwell's per capita harvest of wild foods of 130 pounds in 1982 was lower than the harvests reported for the study communities in 1986, Department of Fish and Game subsistence permit data for moose and caribou suggest that

Cantwell residents' harvests of these species have increased substantially since 1982. This is a consequence of regulatory changes which have provided enhanced opportunities for Cantwell residents to obtain subsistence hunting permits for caribou and moose. Based on 1986-7 regulatory year permit data and comparisons with 1982 survey data, it is estimated that the per capita harvest of wild foods in Cantwell for the 1986-87 regulatory year was 214 pounds, very similar to those reported for the three study populations as well as Skwentna (Files, Division of Subsistence, Anchorage).

CONCLUSIONS

As noted in Chapters Two and Three, settlement entry programs during the last 20 years are largely responsible for the presence of much of the current population of the study areas, especially around Chase. This population is, on average, a relatively recent one that has been attracted to the area by the availability of land and a set of values centering around perceived self-reliance and a healthful lifestyle which include the harvest of wild resources and home-grown produce.

Since the arrival of these settlers to the study area, they have developed a socioeconomic system that combines seasonal wage employment, craft production for local use and sale, the harvest of wild fish, game, and plant resources, and horticultural production. This combination allows them to live in an area that is marginal to the economic opportunities found in more densely populated parts of southcentral Alaska. Even the contrast between the three study communities and the road-connected areas just to the south around Trapper Creek and Talkeetna is notable. The economy of this latter area is organized around providing services to highway travelers and visiting

recreationists (Fall and Foster 1987). Most households in the Trapper Creek - Talkeetna area use and harvest wild foods, but harvest quantities are relatively low. In contrast, harvests at Chase, Gold Creek - Chulitna, and Hurricane - Broad Pass are much higher and approach those of other communities off the road system such as Skwentna and Tyonek. Especially when the large harvest of garden produce at Chase is considered, it is likely that most of these households are producing much of their own food supplies. This economic pattern is a product of the relatively high availability of wild resources, a low population density, a marginal cash economy, and a value orientation conducive to living in a relatively remote area.

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APPENDIX A

SURVEY INSTRUMENT

CHASE RESOURCE USE

Sample_____ Interviewer_____

Household ID #_____ Date_____

HELLO, MY NAME IS _____AND I AM CONDUCTING A SURVEY FOR THE ALASKA DEPARTMENT OF FISH AND GAME. THE QUESTIONS ARE ABOUT THIS HOUSEHOLD'S HUNTING AND FISHING ACTIVITIES, AND ITS EMPLOYMENT PATTERNS. THE SURVEY WILL TAKE ABOUT ___ TO ___ TO COMPLETE. I NEED TO TALK TO SOMEONE OVER AGE 18 WHO KNOWS ABOUT THIS HOUSEHOLD'S HUNTING AND FISHING ACTIVIES. IS THAT YOU?

FIRST, I WOULD LIKE TO ASK SOME QUESTIONS ABOUT THE CHARACTERISTICS OF THIS HOUSEHOLD.

1. HOUSEHOLD INFORMATION

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

2. Did anyone live at this location before you? _____ yes _____ no.

If yes, who? _____

For how long? _____

3. How did you obtain this property?

_____ Purchased from previous owner	_____ Borough Housing
_____ State Open-to-Entry (OTE) Program	_____ Federal Cabin Site
_____ State Remote Parcel	_____ Rental
_____ Federal Homestead	_____ Purchased from State
_____ State Homesite Program	_____ Other (explain)

NEXT, I WOULD LIKE TO ASK SOME QUESTIONS ABOUT YOUR HOUSEHOLD'S FISHING ACTIVITIES. IN THE 12 MONTH PERIOD FROM JANUARY 1986 THROUGH DECEMBER 1986, WHEN WE ASK "DID YOU USE A RESOURCE?" WE MEAN DID YOUR FAMILY EAT IT, SERVE IT, OR OTHERWISE USE IT IN YOUR HOME. DO NOT INCLUDE PURCHASED FOODS.

4. First, did this household use SALMON in 1986?

_____ yes _____ no

5. Second, how many household members fished for SALMON in 1986?

_____

6. SALMON HARVEST AND USE INFORMATION

Species	Used? Yes	Used? No	Attempt Harvest? Yes	Attempt Harvest? No	Harvest #s by Gear Type: Rod and Reel	Dip net	Fish-wheel	Sub. Set-net	Other*	Give Away? Yes	Give Away? No	Receive? Yes	Receive? No
King Salmon													
Red Salmon													
Pink Salmon													
Chum Salmon													
Silver Salmon													

* Identify method, including fish removed from commercial catches for home use by this household or others.

7. Did this household use FRESHWATER FISH in 1986?

_____ yes _____ no

8. How many household members fished for FRESHWATER FISH in 1986?

_____

9. FRESHWATER FISH HARVEST AND USE INFORMATION

Species	Use? Yes	Use? No	Attempt harvest? Yes	Attempt harvest? No	Harvest in numbers	Give away? Yes	Give away? No	Received? Yes	Received? No
Rainbow Trout									
Lake Trout									
Dolly Varden									
Grayling									
Burbot									
Pike									
Whitefish									
Other (Name)									
Other (Name)									

10. Did this household use MARINE FISH in 1986?

_____ yes _____ no

11. How many household members fished for MARINE FISH in 1986?

_____

12. MARINE FISH HARVEST INFORMATION

Species	Use? Yes	Use? No	Attempt harvest? Yes	Attempt harvest? No	Harvest in numbers	Give away? Yes	Give away? No	Received? Yes	Received? No
Halibut									
Flounder									
Cod									
Hooligan					gal				
Herring					gal				
Herring Roe on Kelp					gal				
Other (Name)									
Other (Name)									

13. Did this household use MARINE INVERTEBRATES in 1986?

_____ yes _____ no

14. How many household members fished for MARINE INVERTEBRATES in 1986?

_____

15. HARVEST AND USE INFORMATION ON MARINE INVERTEBRATES

Species	Use? Yes	Use? No	Attempt harvest? Yes	Attempt harvest? No	Harvest in numbers	Give away? Yes	Give away? No	Received? Yes	Received? No
Razor clams									
Other clams									
King Crab									
Tanner Crab									
Dungeness Crab									
Shrimp									
Other (Name)									
Other (Name)									

NOW, I WOULD LIKE TO ASK A SERIES OF QUESTIONS ABOUT HUNTING.

16. Did this household use game in 1986? _____ yes _____ no

17. How many household members hunted in 1986? _____

18. GAME HARVEST USE AND INFORMATION

Species	Use? Yes	Use? No	Attempt harvest? Yes	Attempt harvest? No	Harvest in numbers	Give away? Yes	Give away? No	Received? Yes	Received? No
Moose									*
Caribou									
Sheep									
Goat									
Black Bear									
Brown Bear									
Bison									
Deer									
Elk									
Harbor Seal									
Porcupine									
Hare									
Other (Name)									

* If the household obtained train killed moose, estimate the number of pounds useable meat and number of animals used: _____ pounds useable meat, from _____ moose.

19. Did this household use BIRDS in 1986? _____ yes _____ no

20. How many household members hunted BIRDS in 1986? _____

21. BIRDS HARVEST AND USE INFORMATION

Species	Use? Yes	Use? No	Attempt harvest? Yes	Attempt harvest? No	Harvest in numbers	Give away? Yes	Give away? No	Received? Yes	Received? No
Ducks									
Geese									
Spruce Grouse									
Ptarmigan									
Other (Name)									
Other (Name)									

NOW, I WILL ASK SOME QUESTIONS ABOUT TRAPPING.

22. Did this household use the meat or fur of burbearers in 1986?

_____ yes _____ no

23. How many household members trapped in 1986? _____

24. FURBEARER HARVEST AND USE INFORMATION

Species	Use? Yes	Use? No	Attempt harvest? Yes	Attempt harvest? No	Harvest in numbers	Give away? Yes	Give away? No	Received? Yes	Received? No
Beaver									
Muskrat									
Land Otter									
Mink									
Marten									
Wolverine									
Weasel									
Wolf									
Coyote									
Red Fox									
Lynx									
Parka Squirrel									
Red Squirrel									
Marmot									
Other (Name)									

NEXT, SOME QUESTIONS ABOUT PLANTS.

25. Did this household use wild plants in 1986. _____ yes _____ no

26. How many household members gathered wild plants in 1986? _____

27. PLANT HARVEST AND USE INFORMATION

Species	Used? Yes	No	Attempt harvest? Yes	No	Harvest in Quarts	Give away? yes	No	Receive? Yes	No
Berries									
Other Plants (Name)									

QUESTIONS ABOUT WOOD

28. Did this household use wood for fuel or construction material in 1986?

_____ yes _____ no

29. How many household members harvested wood in 1986? _____

30.

	Used yes	no	Attempt harvest? yes	no	Harvest quantity	Gave away yes	no	Receive yes	no
Cordwood					cords				
House logs					logs				

NEXT, I WOULD LIKE TO ASK SOME QUESTIONS ABOUT EMPLOYMENT PATTERNS OF THIS HOUSEHOLD'S MEMBERS.

31. [Complete the following set of questions for each adult (18 and older) member of the household.]

ADULT ONE. ID# _____ (from question 1)

Present employment status. _____

1. Employed or self-employed
2. Retired
3. Unemployed (active)
4. Unemployed (inactive)
5. Homemaker
6. Student
7. Disabled

EMPLOYMENT IN 1986

Occupation Type	Employer & Type	Location	Which Months	hrs/ week	How much did you earn?
1.					
2.					
3.					
4.					

ADULT TWO. ID# _____ (from question 1)

1. Employed or self-employed
2. Retired
3. Unemployed (active)
4. Unemployed (inactive)
5. Homemaker
6. Student
7. Disabled

EMPLOYMENT IN 1986

Occupation Type	Employer & Type	Location	Which Months	hrs/ week	How much did you earn?
1.					
2.					
3.					
4.					

ADULT THREE. ID# _____ (from question 1)

Present employment status. _____

1. Employed or self-employed
2. Retired
3. Unemployed (active)
4. Unemployed (inactive)
5. Homemaker
6. Student
7. Disabled

EMPLOYMENT IN 1986

Occupation Type	Employer & Type	Location	Which Months	hrs/ week	How much did you earn?
1.					
2.					
3.					
4.					

ADULT FOUR. ID# _____ (from question 1)

1. Employed or self-employed
2. Retired
3. Unemployed (active)
4. Unemployed (inactive)
5. Homemaker
6. Student
7. Disabled

EMPLOYMENT IN 1986

Occupation Type	Employer & Type	Location	Which Months	hrs/ week	How much did you earn?
1.					
2.					
3.					
4.					

32. Please list other sources of cash income for this household.

1. _____ _____

2. _____ _____

3. _____ _____

4. _____ _____

5. _____ _____

33. Were the last 12 months typical of the employment patterns of this household in recent years?

yes _____ no _____ Explain _____

_____

_____

34. Are there more _____ or less _____ sources of employment in this area now than 12 months ago?

35. Why did you move to this area? _____

_____

_____

MAPPING INFORMATION

36. Did any member of this household hunt, fish, or trap in this area before you began living here? yes _____ no _____. If yes:

Year first hunted _____.
Year first fished _____.
Year first trapped _____.

Comments on frequency _____

_____

_____

37. Please draw a circle around all the areas where you have hunted moose since you began living in this area.

38. Draw a circle around those areas where, over time, you seem to consistently harvest moose.

39. Draw a circle around those areas where you hunted moose in 1986.

40. Draw a circle around all the areas where you have hunted caribou since you began living in this area.

41. Draw a circle around all the areas where you have hunted black bear since you began living in this area.

42. Draw a circle around all the areas where you have hunted sheep while living in this area.

43. Draw a circle around all the areas where you have attempted to trap furbearers since you began living in this area.

44. Draw a circle around all the areas where you have hunted spruce grouse and ptarmigan since you began living in this area.

45. Draw a circle around all the areas where you have fished for salmon since you began living in this area.

46. Draw a circle around all the areas where you have fished for other fish since you began living in this area. Indicate which species are taken within each area.

47. Draw a circle around all the areas where you have harvested berries and other vegetation since you began living in this area.

48. Draw a circle around all the areas where you have harvested wood since you began living in this area.

APPENDIX B: CONVERSION FACTORS

Resource	Edible weight per animal in pounds
King salmon	18.0
Sockeye salmon	4.0
Pink salmon	2.0
Chum salmon	6.0
Silver salmon	6.0
Rainbow trout	1.5
Lake trout	1.5
Dolly Varden	1.0
Grayling	0.8
Burbot	2.5
Whitefish	1.0
Halibut	a
Hooligan	3.2/gallon
Herring	0.4
Herring roe-on-kelp	7.0/gallon
Razor clams	0.25
Butter clams	a
King crab	2.3
Dungeness crab	0.7
Shrimp	a
Moose	500.0
Caribou	130.0
Sheep	65.0
Black bear	58.0
Deer	42.5
Porcupine	4.5
Snowshoe Hare	1.5
Ducks	1.5
Geese	3.0
Spruce grouse	0.5
Ptarmigan	0.5
Beaver	8.75
Red squirrel	0.5
Berries	1.0/quart
Other plants	1.0/quart

[a] Recorded in pounds.

Sources: Fall, Foster, and Stanek 1984; Stanek 1987; Fall and Foster 1987; Files, Division of Subsistence, Anchorage

APPENDIX C. INDUSTRY - EMPLOYER CATEGORIES AND OCCUPATION CATEGORIES

INDUSTRY - EMPLOYER CATEGORIES

1. Agriculture, Forestry, and Commercial Fishing. (loggers, farm implement and fertilizer sales, farmers and ag. laborers, trappers)

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

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

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

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

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

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

8. Finance, Insurance, and Real Estate. (banks, realty offices, insurance companies, credit agencies, and investment companies)

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

10. Federal Government

11. State Government (including education)

12. Local Government (including education and utilities)

OCCUPATION CATEGORIES

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

2. Clerical Workers and Sales Persons. (bookkeepers, secretaries, shipping and receiving clerks, telephone operators, and clothing sales people)

APPENDIX C. (continued)

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

4. Agriculture, Fishery, and Forestry-Related Workers. (loggers, commercial fishers, trappers, farmers, and landscapers)

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

6. Machine Trades. (Machinists, Mechanics, Printers, Cabinetmakers)

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

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

9. Armed Forces

10. Recreation-based Occupations. (guiding, mountain-climbing)

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

12. Packing and Materials Handling. (packagers, movers, stevedores)

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

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