# FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES

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ABSTRACT

This report presents descriptive information on contemporary fish and wildlife use patterns by Yakutat residents and analyzes the relationships between these uses and biophysical and socioeconomic conditions created by timber harvesting, road building and other development activities. This information is useful for land use planning by federal, state and private land managers, as well as for resource allocation decisions by the Alaska Boards of Fisheries and Game.

Field research was conducted during the fall of 1984, and winter and spring of 1985. Twenty-five long-term residents that were knowledgeable of hunting and fishing patterns in Yakutat were interviewed numerous times to develop time-depth background information and fish and wildlife land use maps. Changes in hunting and fishing patterns were analyzed to understand relationships with road building, timber harvesting and changes in transportation technology. After the researchers had obtained a comprehensive understanding of fish and wildlife gathering activities through time, a random survey was conducted with 50 households in Yakutat (30 percent of the community), collecting quantitative information on hunting, fishing and gathering that had occurred during 1984. The methodology allows household information to be generalized to the community level.

Yakutat households were found to harvest over seventy different types of wild resources during 1984, representing use of over 150 different species. The average household harvested 1,105 pounds of fish

and wildlife during 1984 or 368 pounds per household member, from the waters and uplands between the Deception Hills near Dry Bay, north to Cape Suckling, a distance of over 200 miles. Fish represented 57 percent of the total harvest by weight, land mammals 14 percent and shellfish 12 percent. The remaining 17 percent of the total harvest consisted of marine plants, marine mammals, birds, berries and plants. These resources were shared and widely distributed throughout the community. For example dungeness crab was harvested by 40 percent of Yakutat's households but used by 90 percent; moose was harvested by 22 percent and used by 70 percent of Yakutat's households.

The construction of Forest Highway #10, which began in 1963, provided roaded access to portions of the Yakutat Forelands, which led to increased use of certain areas by local and non-local hunters and fishers. Competition for resources in a few of these areas resulted in some Yakutat residents being displaced to other hunting and fishing locations. Areas of the Yakutat Forelands that were roaded or easily accessible by roads showed one-sixth the rate of moose hunter success in 1984 compared to non-roaded areas, despite receiving greater hunter effort. Since construction of Forest Highway #10, highway vehicles have been used more frequently for hunting; in 1984 they were used by more than twice as many Yakutat households as before the construction of the road. The proportion of households using boats for hunting has declined during this same time period.

Clearcut areas near Yakutat are now used infrequently for hunting or trapping. This was reported to be true for recent clearcut areas as well as areas that were logged 30 years ago that now contain young second growth stands of conifers. Loss of salmon habitat in Ophir Creek

near Yakutat has decreased the number and quality of salmon available in Ophir Creek for subsistence use. The role of naturally changing land forms and man-made disturbances in decreasing available salmon habitat in Ophir Creek is still uncertain.

Residents of Yakutat have developed economic strategies that allow for an involvement in both market activities and subsistence hunting and fishing activities. The result is a mixed subsistence-cash economy based on the harvest of renewable fish and wildlife resources. This mixed economy is made possible in Yakutat by an abundance of wild food resources and the largely undisturbed fish and wildlife habitat of the area.

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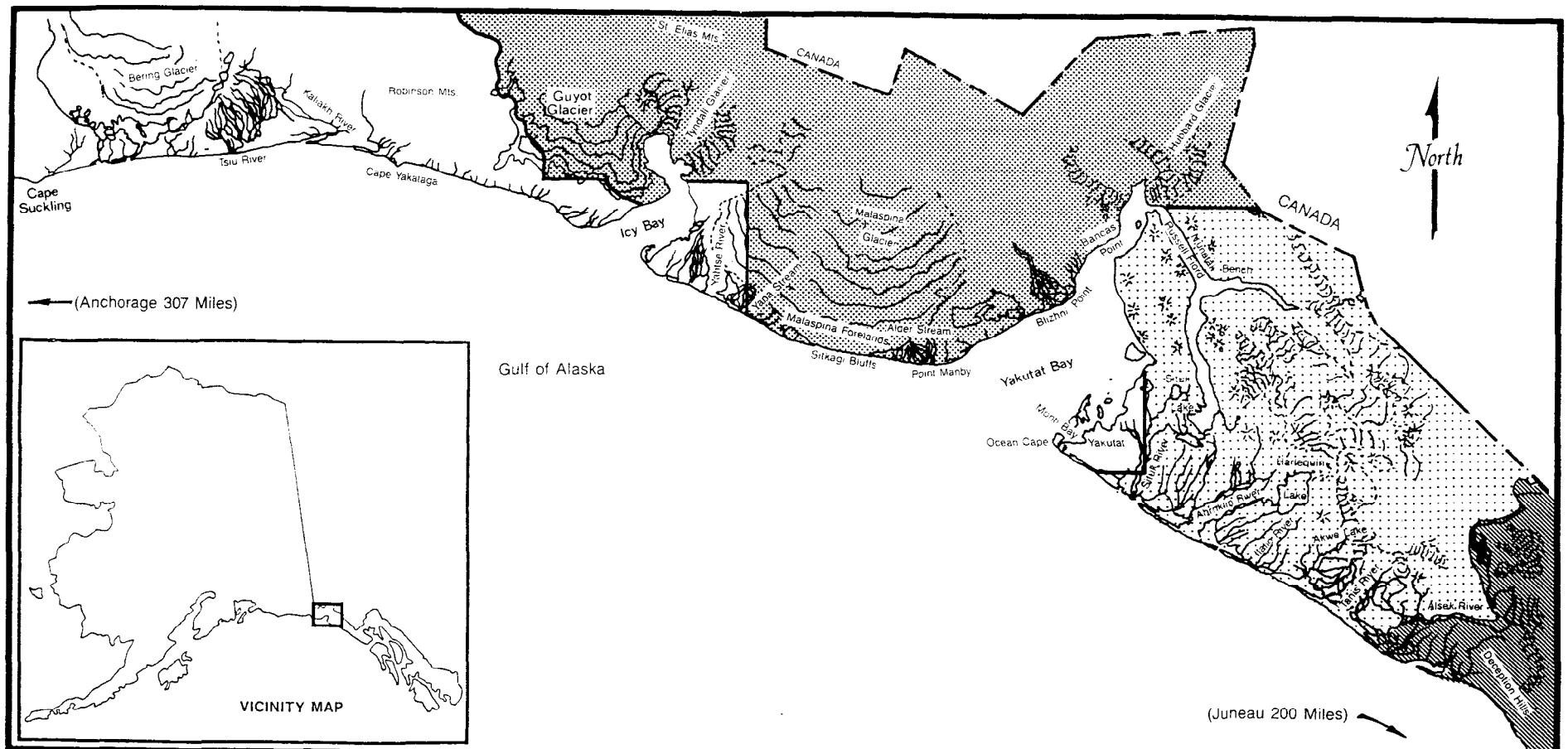
# CHAPTER 1

# STUDY BACKGROUND

## INTRODUCTION

Although fish and wildlife harvest are known to contribute significantly to the food supply of southeast Alaska's population (Alves 1980), little detailed information exists about the current role of fish and wildlife uses in the socioeconomic systems and ways of life of the region's communities. Recent research by the Division of Subsistence has suggested that this role continues to be significant in Hydaburg, Craig, Klawock, Angoon, Haines, Klukwan and Sitka, (Mills 1982; George and Kookesh 1982, 1983; Nelson and Schroeder 1983; Mills et al. 1984).

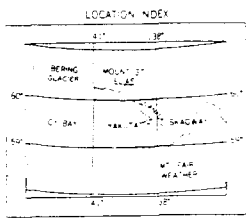
Yakutat is a community of approximately 550 year-round residents, located on the Gulf of Alaska in the northern southeast region of the State (Fig. 1). A variety of resource development activities are planned, or are occurring in the Yakutat area, including timber harvesting, tourism, commercial fish processing, and potential oil and gas development on the outer continental shelf. Land management plans are nearing completion for newly designated federal conservation system units near the community. These federal lands include Wrangell-St. Elias National Park and Preserve and Glacier Bay National Park and Preserve under the management of the U.S. National Park Service. The Tongass National Forest and the Russell Fiord Wilderness Area are managed by the U.S. Forest Service and are also developing management plans.




0 3 6 9 12 15 miles

Base map adapted from USGS Bering Glacier, Mt. St. Elias, Icy Bay, Yakutat 1:250,000 Quads

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.




WRANGELL-ST. ELIAS NATIONAL PARK AND PRESERVE (U.S. National Park Service)

STATE OF ALASKA, PRIVATE, OR CITY LANDS, OR CANADA

TONGASS NATIONAL FOREST (U.S. Forest Service)

GLACIER BAY NATIONAL PARK AND PRESERVE (U.S. National Park Service)

FIG.1 THE YAKUTAT AREA AND LAND TENURE

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985

Concerns have been expressed by community organizations, including the city council, the native corporation, and fish and game advisory committee, about the possible effects of these development and planning efforts on community uses of fish, wildlife, and plant resources (Powell and Porter 1984). In response to information needs, the goal of this study is to document uses of wild resources by residents of the community of Yakutat, and to analyze the relationship between these uses and resource development and planning activities.

The potential effects of the logging development on local uses of fish and wildlife is an important resource issue in southeast Alaska. Research on the effects of timber harvesting on wildlife species important to Yakutat residents have been conducted in other parts of southeast Alaska for moose (Doerr 1983, 1985, Hundertmark et al. 1983, Craighead et al. 1984), mountain goat (Schoen 1978, Fox 1979, Schoen and Kirchhoff 1982, Smith 1982, 1983, 1985), brown bear (Zager and Jonkel 1983, Russell 1974), black bear (Erickson et al. 1982, Hanson and Doerr 1982), and salmon (Elliot et al. 1980). According to these studies, past clearcut logging of forests in specific situations have had major negative impacts on these important species. Concerns about these effects, and their relationships to the continuing public use of fish and wildlife in southeast Alaska, have been raised by the Southeast Alaska Regional Fish and Game Advisory Council, the local Yakutat fish and game advisory committee, and local communities. Acting on the concerns of the advisory committees and the Southeast Regional Council, the Alaska Boards of Fisheries and Game passed resolutions in 1980 and 1983 urging the Forest Service to review and revise its logging

practices on the Tongass to ensure the maintenance of existing fish and wildlife populations.

Timber harvesting in the Yakutat use area is currently taking place on private lands, state lands, and within the Tongass National Forest on the Yakutat Forelands. Created in 1906, the Tongass National Forest covers an area of approximately 17 million acres and includes most of the lands southeast and north of Yakutat (Fig. 1). Management decisions concerning timber harvesting on the Tongass have major implications for the future condition and uses of resources around Yakutat and throughout the region. In order to guide timber harvesting within the national forest, the Forest Service has implemented the Tongass Land Management Plan (TLMP). The plan classifies forest lands, divided into "value comparison units" (VCUs), according to four land use designations (LUD) from the most restrictive for resource development (LUD I) to the most intensive for resource use and development (LUD IV). Finalized in 1979, the plan will undergo a major revision in 1989. In addition to TLMP, which sets the broad conditions under which timber harvests take place, more specific operational plans are prepared for each timber sale within the national forest. Each plan describes the location of timber cuts, roads, log transfer sites, and camps, as well as harvest schedules and methods. The National Environmental Protection Act (NEPA) requires that an environmental analysis be conducted along with each of these plans.

In addition, as a result of the passage of the Alaska National Interest Lands Conservation Act (ANILCA) in 1980, subsistence uses by rural Alaska residents must be considered in the development of management policies and plans in all federal lands in Alaska, including national forests. ANILCA Section 802 requires that:

> Consistent with sound management principles, and the conservation of healthy populations of fish and wildlife, the utilization of the public lands in Alaska is to cause the least adverse impact possible on rural residents who depend upon subsistence uses of the resources of such lands; consistent with management of fish and wildlife in accordance with recognized scientific principles and the purposes for each unit established, designated, or expanded by or pursuant to titles II through VII of the Act, the purpose of this title is to provide the opportunity for rural residents engaged in a subsistence way of life to do so.

Also, ANILCA Section 810 requires each federal agency:

> In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands.... shall evaluate the effect of such use, occupancy or disposition on subsistence uses and needs and the availability of other lands... No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such Federal agency 1) gives notice to the appropriate State agency and the appropriate local communities and regional councils established pursuant to Section 805; 2) gives notice of, and holds, a hearing in the vicinity of the area involved; and 3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands, (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps, will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

Section 810 determinations are required for all Tongass National Forest Planning documents, including the TLMP revision of 1989.

Despite the concerns raised by fish and wildlife managers, foresters, and the general public, and the data needs brought about by the forest planning process and ANILCA, little information has been available about effects development of the timber industry and other development have had on local patterns of fish and wildlife use in southeast Alaska.

## PURPOSE AND OBJECTIVES

This report has two major purposes.

1. Present descriptive information on contemporary fish and wildlife use patterns by Yakutat residents, useful for land use planning and resource allocation decisions.
2. Analyze the relationships between the patterns of fish and wildlife uses in Yakutat and the biophysical and socioeconomic conditions created by the development of timber, tourism, fishing and other activities.

Specific objectives completed by the research include:

1. Descriptions of current patterns of resource use in Yakutat including:
   a. Seasonal rounds of harvest activities (timing and species);
   b. Estimates of levels of household participation in resource harvesting activities;
   c. Estimates of levels of harvest quantities of fish and game resources;
   d. Types of equipment and methods used in resource harvesting;
   e. The social organization of resource production and exchange;
   f. Maps of geographic areas used for resource harvesting, by species or resource groups;
   g. Relationships between commercial-wage activities and wild resource uses.

2. A compilation of data on current demographic and socioeconomic conditions in Yakutat including population, household size, employment, age, gender, ethnicity and length of residency.
3. Descriptions of past and contemporary development of the timber industry, tourism, commercial fishing and other activities.
4. Document conditions created by timber harvesting, conservation system unit management, commercial fishing, tourism and other development. Evaluate relationships between these conditions and community hunting, fishing and gathering patterns.

## METHODOLOGY

A case study, community based methodology was employed during the research project. Four communities were selected throughout southeast Alaska (Yakutat, Tenakee Springs, Angoon and Klawock), each with contrasting histories of involvement with timber harvesting activities. The Yakutat area was selected as an area which has received a "light to moderate amount" of timber cutting activities when compared to the other three communities, although roading has occurred in the area in anticipation of timber harvesting. Relationships between conditions created by timber harvesting activities and changes in hunting and fishing patterns will be compared and contrasted between communities in a separate report. A methodology was developed that allows household information to be generalized to the community level. A major portion of this report focuses on changes in hunting and fishing patterns as a result of road building, timber harvesting and changes in transportation technology.

Several data gathering techniques were employed during the research project. Following a literature review and introduction of the study design to numerous groups within the community, in-depth interviews were conducted with selected "key respondents" which focused around resource use mapping. After these interviews were completed and the researchers had obtained an in-depth understanding of fish and wildlife gathering activities through time, a systematic resource use survey was developed. This survey was then administered to randomly selected households by means of personal interviews. The resulting data base was then entered into an SPSS program to facilitate statistical analysis. Interviews with the key respondents began in November of 1984 and continued through the winter of 1985. The random survey interviews were conducted between January and April of 1985.

## Literature Search

One of the reasons the focus of this report is on contemporary uses of fish and wildlife is due to the excellent literature available on the traditional culture of the Yakutat Tlingit by Dr. Frederica de Laguna. Dr. de Laguna spent time in Yakutat during the late 1940s and the early 1950s collecting oral history from people of the area resulting in a 1,375 page comprehensive ethnography of the Yakutat people (de Laguna 1972). She also authored a separate publication on the archeology of the Yakutat Bay area (de Laguna et al. 1964). Prior to de Laguna's work Walter Goldschmidt and Theodore Haas collected land use information from Yakutat people during 1946 and presented it to the Commission of Indian Affairs in a report title "Possessory Rights of the Natives of Southeast-

ern Alaska" (Goldschmidt, Hass 1946). The two references provide an excellent basis for understanding historic use of fish, wildlife and plants by Yakutat residents.

Recently, Stephen McNeary documented contemporary life in Yakutat during 1977, providing information on uses of various fish and wildlife resources by residents of the area (McNeary 1978). The Yakutat Comprehensive Plan, developed by the City of Yakutat in November 1983, provides excellent background on the development of facilities within the city (City of Yakutat 1983). Existing data on fish and wildlife harvest in the Yakutat area from the Department of Fish and Game were organized as well as a timber harvesting and road construction history from the Department of Natural Resources, the U.S. Forest Service and the Department of Transportation.

## Key Respondent Interview

Meetings were held throughout the community to present the project, receive suggestions on content and methodology and obtain permission and support to conduct the research. The Yakutat Fish and Game Advisory Committee, Alaska Native Brotherhood and Sisterhood, State and Federal agencies, Yak-Tat-Kwaan Inc., and the City of Yakutat were all contacted and involved with the project. At that time, confidentiality of information and safeguards in data handling were discussed and techniques were developed to meet concerns.

After meeting with these various groups and establishing a list of knowledgeable and experienced people that were recommended to be contacted, 25 people were selected for in-depth interviews. These key

respondents were selected based upon their knowledge of local history and community patterns and involvement in hunting and fishing activities. Because of the need to develop information with time depth, all selected key respondents had lived in Yakutat at least 15 years. They were selected so that each major occupation, age, sex, and ethnic group was represented.

Table 1 shows a profile of community residents that were selected key respondents. Although information collected from key respondents was not used to represent the community as a whole as with the random survey information, representative individuals of a cross section of the community were selected. Criteria used to select individuals was based upon a population profile presented in the Yakutat Comprehensive Development Plan (1983:84-86). Male and female residents of Yakutat for more than 15 years who were active in hunting, fishing and gathering activities were selected as well as, Native and Non-Native Yakutat residents living inside and outside the city limits, ages 25 to 82 years, and residents unemployed, retired, commercial fishing, working for the government, longshoring, logging, or involved in private business or construction. Key respondents were selected approximately proportional to ethnic composition, location of residence and employment type, as represented in information presented in the Yakutat Comprehensive Plan and U.S. Census.

TABLE 1. YAKUTAT KEY RESPONDENT PROFILES (EMPLOYMENT OF RESIDENT BY AGE, ETHNICITY, LOCATION OF RESIDENCE AND SEX).

| Age Group | Yakutat Residents Within the City Limits | | Yakutat Residents Outside the City Limits | |
|---|---|---|---|---|
| | Alaska Native | Non-Native | Alaska Native | Non-Native |
| under 30 | 1- Fisher (M)<br>1-Longshore, Unemployed (M) | | | 1-Logger, Contruction (M) |
| 30-49 yrs. | 1-Fisher, Government (F)<br>1-Fisher, Private Business (M)<br>2-Fisher, Longshore (M) | 1-Fisher (M)<br>1-Government, Fisher (M) | 1-Fisher, Private Business (M) | 1-Construction (M) |
| 50-69 yrs. | 1-Private Bus. (M)<br>1-Fisher, Gov. (F) | 1-Private Business, Construction (M)<br>1-Private Business (M)<br>1-Government, Fisher (M)<br>1-Government (M) | | 1-Government (M)<br>1-Private Business (M)<br>1-Fisher, Private Business (M) |
| 70-89 yrs. | 1-Fisher, Retired (F)<br>1-Private Business, Government, Retired (M)<br>2-Fisher (M)<br>1-Government, Fisher Retired (M) | | | |

M = Male
F = Female

PROFILE SUMMARY OF THE 25 YAKUTAT AREA KEY RESPONDENTS

| Age (Years) | Percent | Sex | Percent | Residence Location City Limits: Within | Residence Location City Limits: Outside | Within City Native/Non-Native | | Outside City Native/Non-Native | |
|---|---|---|---|---|---|---|---|---|---|
| Under 30 | 12 | F | 12 | 76% | 24% | 68% | 32% | 17% | 83% |
| 30-49 | 32 | M | 88 | | | | | | |
| 50-69 | 36 | | | | | | | | |
| 70-89 | 20 | | | | | | | | |

Interviews with the key respondents were open-ended and involved two to four, two-hour meetings with each individual through the course of the winter. Background information was collected on the respondent's household and uses of fish and wildlife. Interviews were conducted with the key respondents that were designed to document the effects of commercial activities and land use planning on the community's environment (property, ecological changes, population changes, labor relations) and on the respondents individual patterns of fish and wildlife uses. Maps were used to orient these discussions. The key respondent interviews utilized the following procedures:

a. The extensity of all areas used to harvest a resource (or resource category) during a key respondents lifetime were mapped. Major resources were mapped in separate sessions, noting dates of use on the map for each area and resource.

b. The researcher asked a series of questions about each currently used harvest area. Topics included: How long has this area been used? What is the access? Why is it a preferred area? What level of harvest has the area produced for the household? How frequently is it used? Does use vary from year to year?

c. The researcher discussed each formerly used area with the harvesters. Questions included: Why is this area no longer used? When was it last used? How frequently was it used? How productive was this area?

d. The researcher next compared the historical and contemporary household use area maps with maps of timber management activities and other commercial resource use activities within the total harvest range of the household. Specific questions

were asked about the relationships between development activities and the use of certain geographic areas. Topics included perceived changes in access, hunting success and competition with other user groups.

Information collected from the key respondents was used primarily to provide the researchers with information on patterns of resource and land use within the last 50 years and to provide a basis for the design of a subsequent community survey.

## Resource Use Survey

After an in-depth description of Yakutat's resource use activities was provided to researchers by the 25 key respondents, a resource use survey was developed (Appendix A). This survey was administered to 50 randomly selected households in the community which represented approximately 30 percent of the occupied households during the winter of 1984-1985. These households were located within the city of Yakutat, along the airport road, and in the Silver Bay logging camp.

Using a map developed by Environmental Services Limited in 1983 as a base map of existing houses within the Yakutat city limits, all houses where field checked by the researchers during the winter of 1984. Vacant houses were deleted from consideration and newly built houses and float homes were added. In areas outside the city limits, (primarily the airport road area and Silver Bay logging camp) occupied houses were individually mapped by the researcher. All 181 of the identified households in the Yakutat area were numbered and 28 percent or 50 households were randomly selected to be surveyed. The random sample was checked

to insure that it represented a cross section of the entire community by comparing the sample with U.S. census information (Table 2).

TABLE 2. PROFILE OF YAKUTAT RANDOM SURVEY PARTICIPANTS COMPARED TO YAKUTAT U.S. CENSUS INFORMATION (1980).

| Population | Census Information | Random Sample |
|---|---|---|
| City | 449 (80%) | 424 (78%) |
| Outside City | 112 (20%) | 119 (22%) |
| Total | 561 | 543 |
| **Ethnicity** | | |
| City | | |
| Native | 62% | 59% |
| Non-Native | 38% | 41% |
| Outside City | | |
| Native | Unavailable | 9% |
| Non-Native | Unavailable | 91% |
| **Sex** | | |
| Male | 52% | 55% |
| Female | 48% | 45% |
| **Place of Birth of Household Residents** | | |
| Yakutat | Unavailable | 33% |
| Other S.E. Communities | Unavailable | 28% |
| Other Alaska Communities | Unavailable | 20% |
| Outside of Alaska | Unavailable | 12% |
| **Length of Residency of Longest Residing Household Member** | | |
| Under 5 years | Unavailable | 20% |
| 6-20 years | Unavailable | 34% |
| over 20 years | Unavailable | 46% |

Typically, the survey took one to two hours to administer and usually involved numerous people in the household. Surveys provided resource harvest and use, socioeconomic, and demographic information for generalization to the entire community and for selected sub-populations within the community. Information was also collected about areas used for the hunting and fishing for certain resources during the lifetimes of household residents while they lived in Yakutat as well as transportation used to access these areas. Areas which had previously been used for resource harvesting, but in 1984 were not used, were identified and additional information was collected on reasons why these areas were no longer in use. Data were also collected on perceived changes in competition for resources as well as general comments and concerns by Yakutat residents.

The entire area used by Yakutat residents for hunting and fishing was divided into 30 different sub-units based upon mapped information collected from key respondents and geographic watersheds. Maps were developed from the random survey interviews describing hunting and fishing activities in these sub-units over time for moose, salmon, and all resources combined. Information on the percentage of surveyed households who used an area at a specific time was collected.

Harvest quantities in 1984 for over 150 different resources were obtained from the 50 randomly selected households. Mean household harvests by resource and groups of resources (resource categories) were determined. Resources harvested were converted into pounds of dressed or usable weight and then combined into resource categories for the purpose of comparisons among sub-samples. Existing harvest information

from Alaska Department of Fish and Game on moose was summarized and presented.

Random survey households were asked the types of cash employment they were involved with during 1984 and the percent of their household income derived from each source. Household income sources were combined to form job classes, including government work, commercial fishing, private business, construction, longshoring and logging. Cash income sources were also combined into job categories, including wage employment, commercial fish and a combination of the two for comparison and analysis.

Randomly surveyed households also provided valuable information on the history of timber harvesting and road development in the area as well as changes in local hunting and fishing patterns. Data was entered into an automated data base system and statistically analyzed using Statistical Package for the Social Sciences (SPSS).

## ORGANIZATION OF THE REPORT, LIMITATIONS AND ASSUMPTIONS

This report has been organized to first provide the reader with background descriptive information which was collected from the research project followed by a discussion and analysis of the information. This information is typically provided in the same chapter, with the exception of Chapter 5 and 6, which is totally devoted to changes in resource use. The Appendix includes case studies providing information on specific areas showing changes in use patterns over time related to community development activities (Appendix B). These case studies have

been used as background information in the discussion sections to help develop and illustrate major themes within the report.

Throughout the report an attempt is made to distinguish information presented according to the source of the data. Information presented that was obtained from sources other than the projects research is appropriately cited. Data presented that was collected through the resource use survey portion of the project, is labeled as "random survey" information. Information collected through in-depth interviews with key respondents are described as "key respondent" information and is not presented in a statistical manner.

There are limitations to some of the information presented in this report. Information presented on maps was collected from 25 individuals in the community and 50 randomly selected households. While many of the community use areas are represented it is very likely that some areas have been missed since a total sample was not attempted. Since harvest information was collected from a random sample of 30 percent of Yakutat's households, this information can be extrapolated in order to estimate total community harvests.

The project was well received within the community and cooperation with all aspects of the research has made the project successful. All of the households contacted in the random sample agreed to participate in the survey and provided complete information with the exception of three households that preferred not to discuss household income. Winter was an excellent time to contact people at their homes and people generally had sufficient time to devote to the project. Only two alternate households needed to be substituted in the random selection process because residents were out of town for the winter.

Use of verbally reported data, unsubstantiated by the researcher's observations, can be limiting. However, this tool of recording information based on an individual's memory has been frequently and successful employed in social science research. It is the researcher's belief that information received from interviews were expressed sincerely and numeric values are reasonably accurate estimates of resource harvest patterns during the study periods.

# CHAPTER 2

# STUDY AREA

## GEOGRAPHIC LOCATION

The community of Yakutat is located on the protected waters of Monti Bay in the southeast portion of Yakutat Bay (Fig. 1). It is the only year-round community along the 250 mile coastline from Cape Spencer to the Copper River and has one of the few protected anchorages along the entire coastline. Yakutat is separated from the rest of southeast Alaska and the Alexander Archipelago by the Fairweather Mountains and ice fields of Glacier Bay National Park and Preserve to the southeast. To the north and northwest the Saint Elias Mountains and ice fields separate Yakutat from the interior of Alaska. To the south are the unprotected waters of the Gulf of Alaska making water access to Yakutat possible only by ocean-going vessels. Juneau is located 200 air miles southeast of Yakutat, and Cordova and Anchorage are 190 and 307 air miles northwest, respectively. Daily air connection with these three communities in recent years has lessened the physical isolation that Yakutat has from these regional centers. No roads connect Yakutat with any other communities, and the Alaska state ferry system does not travel the open waters of the Gulf of Alaska.

Most vegetated land in the Yakutat area is contained within the Yakutat Forelands. The Yakutat Forelands is a relatively flat, narrow coastal strip extending about 50 miles south of Yakutat Bay to Dry Bay. The Malaspina Forelands, a similar but smaller coastal flatland, extends

north of Yakutat between Yakutat and Icy bays. About half of the Yakutat Forelands is accessible by road from Yakutat. The Malaspina Forelands is only accessible by boat or small aircraft. Other lands are glaciated or mountainous, except for the Alsek River corridor extending from Dry Bay north into Canada. North of Cape Yakataga about 40 miles from Yakutat, there is another narrow strip of coastal forest and muskeg extending some 20 miles to Cape Suckling (Fig. 1).

## LAND STATUS

Most of the lands within the Yakutat area, from Cape Fairweather to Cape Suckling, are presently within federal ownership. Figure 1 shows the major land owners within the Yakutat area.

Glacier Bay National Park and Preserve extends northward along the Gulf of Alaska coast from Icy Straits to the Alsek River in Dry Bay and inland to the Canadian border. The area north of the Alsek River to the Hubbard Glacier in Russell Fiord is part of the Tongass National Forest. Small tracts near the southeast portion of Yakutat Bay are owned by the City of Yakutat, State of Alaska, Yak-Tat-Kwaan (Yakutat's village corporation) and other private land owners. The Sealaska Corporation holds potential land selections adjacent to those of Yak-Tat-Kwaan but has not filed application for permanent conveyance.

To the north of Yakutat Bay the Malaspina Forelands and the mountainous areas inland to the Canadian border are under the jurisdiction of Wrangell-Saint Elias National Park and Preserve. The remaining lands from the Yana River to Icy Bay have been selected by Chugach Natives, Inc., the profit corporation of the Cook Inlet area. Lands

north of Icy Bay along the coast to Cape Yakataga and north to Cape Suckling primarily belong to the State of Alaska. Small Native allotments exist throughout the Federal lands and are recognized as private lands.

## ENVIRONMENTAL SETTING

### Physical Environment

One of the largest mountain ranges in North America, the Saint Elias Mountains, surround Yakutat 30 miles to the north, northwest and southeast. This range contains some of the highest peaks in North America: Mt. Logan at 19,580 feet, Mt. Saint Elias at 18,008 feet, and Mt. Fairweather at 15,300 feet. The foothills of this mountain range include the Brabazon Range and the Robinson Mountains which are 5-6,000 feet in elevation.

Immense glaciers spill from major valleys in these mountain ranges and flow southward toward the ocean. The Hubbard Glacier flows 92 miles and ends at the head of Yakutat Bay with a tidewater terminus over six miles in width. Numerous other large glaciers flow from the mountains but do not presently reach the sea, including the Malaspina and Bering Glaciers which each total over 2,000 square miles. These glaciers have advanced and retreated throughout geologic history. During the past 200 years many of the glaciers along the coast have been retreating inland leaving bays along the Gulf of Alaska. Yakutat Bay and Icy Bay have been enlarged since the 1800s because of this glacial retreat. Recently, the Hubbard Glacier has began an advance into Disenchantment Bay.

According to estimates by the United States Geological Survey, Hubbard Glacier is advancing at an annual rate of 74 feet and could possibly once again block off Russell Fiord as early as the 1990s (City of Yakutat 1983). If the outlet of Russell Fiord was dammed it would again force water to drain out the southern end of the fiord and across the Yakutat Forelands to the ocean, changing the physical characteristics of the area drastically.

The glaciers from the Saint Elias Mountains feed numerous major rivers and streams along the Yakutat and Malaspina Forelands which provide important habitat for anadromous fish. The Alsek River, flowing into Dry Bay, is the only river system that transects the Saint Elias Range. Retreating glaciers have also left numerous freshwater lakes along the forelands including the Tanis, Ustay, Akwe, Harlequin, Malaspina and Bering. Clearwater lakes are also found in the area and are important fish habitat. They include the Redfield, Situk, Mountain and Italio Lakes.

The entire north Gulf Coast contains active fault systems associated with the juncture of the Pacific and North American tectonic plates. Earthquake induced tectonic events have played an important role in creating the physical environment of the Yakutat area, even in recent years. In 1899 a series of major earthquakes in the Yakutat area, the largest ever to have been recorded anywhere in the world (8.6 on the Richter scale), caused a broad area near Yakutat to be uplifted as much as 47 feet.

Recent geological changes have had a profound influence on the lives of the people in the Yakutat area. In addition to advancing and retreating glaciers and changing river courses, earthquakes have changed

shorelines and areas where villages once stood. The 1899 earthquake produced waves that destroyed forest up to 40 feet above sea level on the mainland and washed away a grave yard on the southern tip of Khantaak Island (de Laguna 1972:28). Another earthquake in 1958 resulted in the submergence of the southeastern point of Khantaak Island and the loss of several lives. In addition to the tectonic lateral movement of the earth's plates, the ground on the Yakutat Forelands is thought to be rising because of rebound of the earth's crust after the weight of glaciers have been removed from the surface. This general uplift has also been observed in recently glaciated areas around Glacier Bay where rebound rates of two feet per decade have been recorded (Bishop 1970). These physical changes have caused dramatic changes in fisheries and wildlife habitat and the use of these resources by residents of Yakutat. It is important to realize that the landscape in the Yakutat area is changing at a rapid rate by geological standards. For a detailed physiographic description of the Yakutat area refer to recent publications by Wahrhaftig (1965), Wright (1981) and Molina (1982).

## Climate

Yakutat's climate is moderated by the influence of Gulf of Alaska waters. Daily as well as seasonal average temperature are held within confined limits by this maritime influence. Differences between average maximum and minimum readings range from 12°F in October to 16°F in April and May. Monthly average temperatures range from 26°F in January to 53°F in July and August. Although a record low of minus 24°F and a high of over 80°F have been recorded, these readings are rare. Because

Yakutat is located near high mountains with extensive ice fields, cold downslope air drainage, especially during the winter, can result in temperatures cooler than the island areas of southeast Alaska (NOAA 1983).

Yakutat's proximity to the Saint Elias Mountain range and exposure to moisture laden air from the Gulf of Alaska provides abundant precipitation the area year-round. Total precipitation averages 135 inches per year. Snowfall occurs during all months of the year except June, July and August with an average snowfall of 209 inches per year. The winters of 1970-1971 and 1971-1972 both had over 300 inches of snowfall, which contributed to high mortality rates of deer and moose in the area (NOAA 1983) (Smith and Franzman 1979).

## Fish and Wildlife

Due to abundant rainfall and relatively mild year-round temperatures, combined with the occurrence of a high water table and gravel substrates, the forelands along the coast provide very productive spawning and rearing habitat for anadromous fish. Five species of salmon (king, sockeye, pink, chum, coho) spawn in the area as well as rainbow (steelhead) and cutthroat trout, Dolly Varden, and eulachon. Numerous marine fish and shellfish occur in ocean waters as well as marine plants.

The Yakutat area has long been known for its richness and diversity of wildlife species. Terrestrial mammals include moose, goat, brown and black bear and numerous furbearers. Whales, seals, sea lions and a wide variety of marine birds also inhabit the area.

Chapter 4 describes in detail the harvest of fish and wildlife resources by residents of Yakutat. Appendix A lists all resources used during 1984.

## Vegetation

Plant communities present along the Yakutat coastline reflect the geologic forces which recently have changed the area. Many of the land areas support early successional stages of vegetation. Only a narrow band of vegetation, always under 30 miles wide and often less than 15 miles wide, exists along the coast. The remainder of the area is primarily glacial ice and rock. Only portions of the vegetated coastal areas are forested. Much of the foreland area is wet muskeg consisting of sedges, heather, deer cabbage, and various species of willow. Early successional plants such as willow and cottonwood occur near the changing river courses and in recently deglaciated areas. The relatively young forested areas are composed primarily of Sitka spruce and a lesser amount of western hemlock. Large bogs or muskegs are mixed with the scattered spruce stands which are typically concentrated along former river banks or ocean terraces. Limited old growth spruce and hemlock forest exist adjacent to old terminal moraines in areas near the community of Yakutat and southeast along the coast toward Dry Bay. Some of the forests near Yakutat have been recently clearcut. The timber harvesting history of the area and changes in Yakutat resident's hunting and fishing patterns is discussed in detail in Chapter 5.

## COMMUNITY PROFILE

### Population History

The Native people of the Yakutat area trace their origins to a number of different homelands. While the people of the area are considered to be the northernmost group of the Tlingit Indians and a part of northwest culture, a great deal of mixing has taken place with Alaska Natives from inland regions. At one time, three or four different languages were spoken along the coast between the Copper River and Cross Sound (de Laguna 1972:17). In addition to the Tlingits, the Eyak of the Copper River and the Ahtna from Chitina migrated to the area, intermarried and settled. The southern Tutchone of the Upper Yukon and Alsek Rivers also moved into the area by means of the Alsek River corridor which transects the Saint Elias Mountains and flows into Dry Bay.

Prior to Russian contact, numerous villages existed along the coastline adjacent to major rivers. The Selikov Company, a Russian fur trading company, moved into the Yakutat area and harvested and traded for sea otter pelts in the late 1700s. They attempted to maintain a colony near Yakutat for 10 years before being destroyed by Yakutat Natives in 1805. By the mid-1800s smallpox wiped out many of the Native inhabitants of the villages along the coast. The Native population declined drastically during this time and many of the remaining people moved to other areas of southeast Alaska or consolidated near present day Yakutat (de Laguna 1972:18).

In 1880 Ivan Petroff attempted one of the first census of the area for the United State Census Office and reported approximately 500 people

living along the Gulf of Alaska coast from Cape Spencer to Bering Bay (Rollins 1978). The United States Census conducted between 1890 and 1980 have only included the village or the City of Yakutat and not outlying areas in the Yakutat statistics (Fig. 2). The community of Yakutat includes not only the city, which incorporates the immediate area of Monti Bay, but also settlements along a four mile road from the city to the airport. The population of the city was approximately 450, and that of the entire Yakutat area about 600 respectively, during the winter of 1984-85.

The late 1800s and early 1900s were considered prosperous times around Yakutat when commercial fishing began and salmon stocks were abundant. By the end of World War I salmon populations were very low and the sea otter was nearly extinct. Most of the outlying village people had congregated at present day Yakutat and the population reached its lowest recorded level, 165 people in the 1920 U. S. Census. A few non-Native people had moved to the outlying area, primarily prospectors, fox farmers and people associated with the salmon cannery.

The population in 1940 was slightly under 300 people. World War II brought thousands of soldiers through the area who were housed at the airfield four miles east of Yakutat. Most of the soldiers left the area after the war and the population remained about 300 people until the 1960s. During this time period dwindling salmon runs forced the closure of the cannery. Frederica de Laguna conducted her research in the Yakutat area during the 1950s and reported hard times for many of the Yakutat residents because of the poor salmon populations in the area (de Laguna 1972:18).

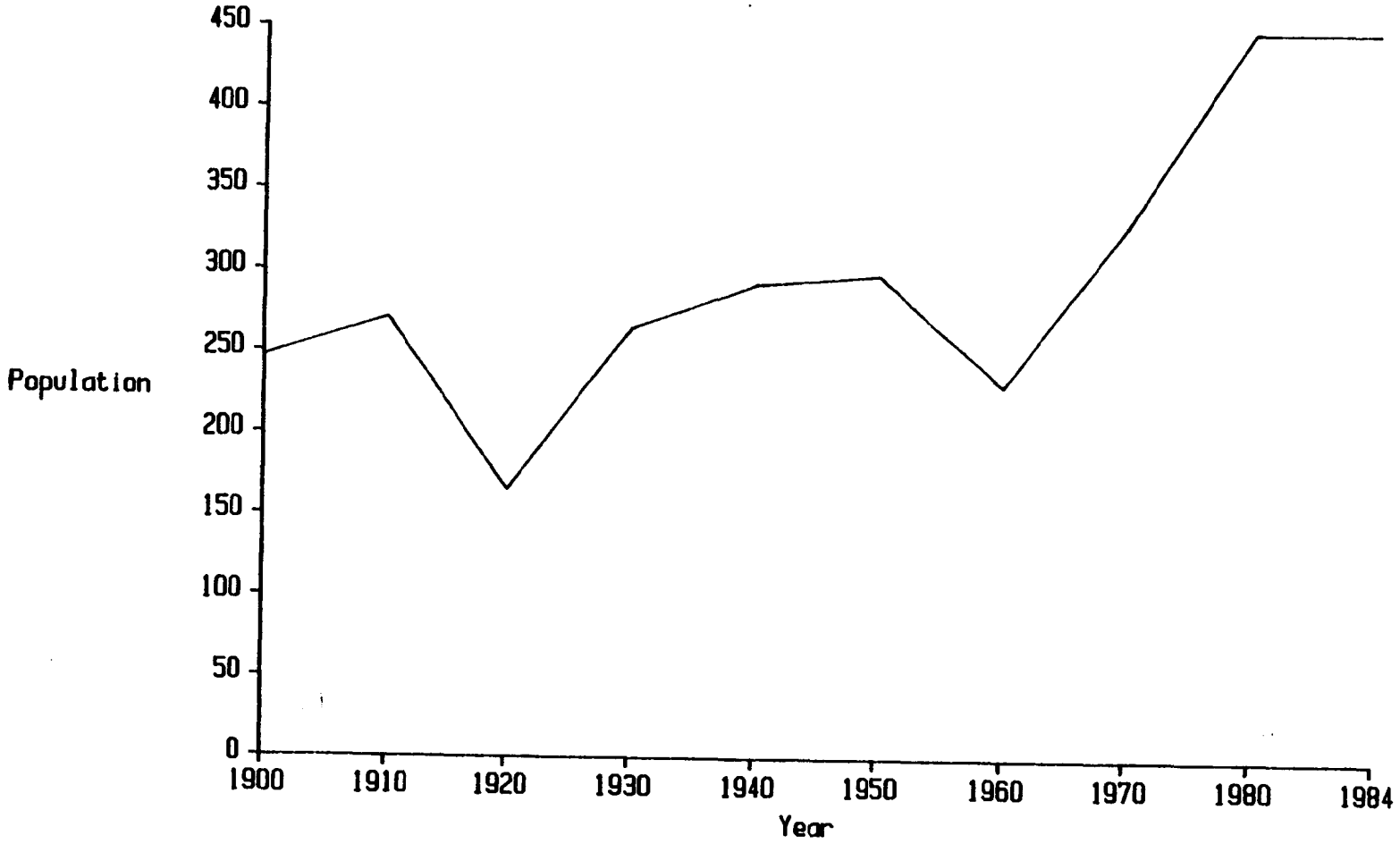



Fig. 2. Population trends for Yakutat,Alaska 1900-1984 (city population only). (U.S. Census)

The 1960s brought new people to the Yakutat area for road construction and commercial logging. The U.S. Census does not reflect this population because the Yakutat city census only covered the city limits, which are close to town. Many of the newer arrivals established residences near the airport, working for government agencies, logging and roading crews, commercial fishing, or fishing and hunting lodges which were newly built.

The 1970 U.S. Census listed the Yakutat city population at 190. However, the city comprehensive plan states the enumeration was poorly done and did not represent the actual populations. The 1980 census was more accurately conducted and listed the city population at 449 and the area population at 561, showing the increase of primarily non-Native inhabitants outside the city limits. The ethnic composition of the city also changed during this time. In 1970 Native people comprised 82 percent of the city population. In 1973 the city annexed additional surrounding lands. The 1980 census recorded the Alaska Native population of the city at 62 percent.

The survey conducted for this report during the winter of 1984-1985 identified 181 households in the entire Yakutat area including the city and the airport area. Fifty households randomly selected as respondents contained a total of 150 people, 48 percent of which were Alaska Native. Extrapolating from the sample, the estimated population of the entire area during the winter of 1984-1985 was about 550 people. The recent migration of new people to the area after 1960 was primarily due to government employment, timber harvesting, commercial fishing, oil exploration which also occurred between the 1950s and the early 1980s, and the establishment of two hunting and fishing lodges in the area.

## Age and Gender Profile

Figure 3 shows the composition of people in Yakutat by age and sex from the random survey of 50 households, representing 30 percent of all Yakutat area households during the winter of 1984-1985. Males in the sample out-numbered females 82 to 68 and represented 55 percent of the population. Seventy-two percent of the residents were 40 years or younger. The age groups under 40 years each had approximately 20 percent of the population, except for the 21-30 age group which has approximately one-half the number of males or females as the other groups. The most common age groups were those of ages 11-20 and 31-40, which included nearly one-half of the total population. The average size of the 50 households that were randomly interviewed was 3.0 members per household.

## Ethnicity

The residents of the Yakutat households randomly selected during the winter of 1984-1985 were approximately 50 percent Alaska Native. Alaska Natives were considered those residents who reported to be at least one-quarter Alaskan Indian or Eskimo. The survey included households outside the city limits, which probably accounts for the higher percentage of non-Native residents compared to recent city surveys. Native households were 42 percent larger than non-Native households, averaging 3.7 people per household versus 2.5 people for non-Native households. Native households were defined as those households having at least one Alaska Native over 18 years old.

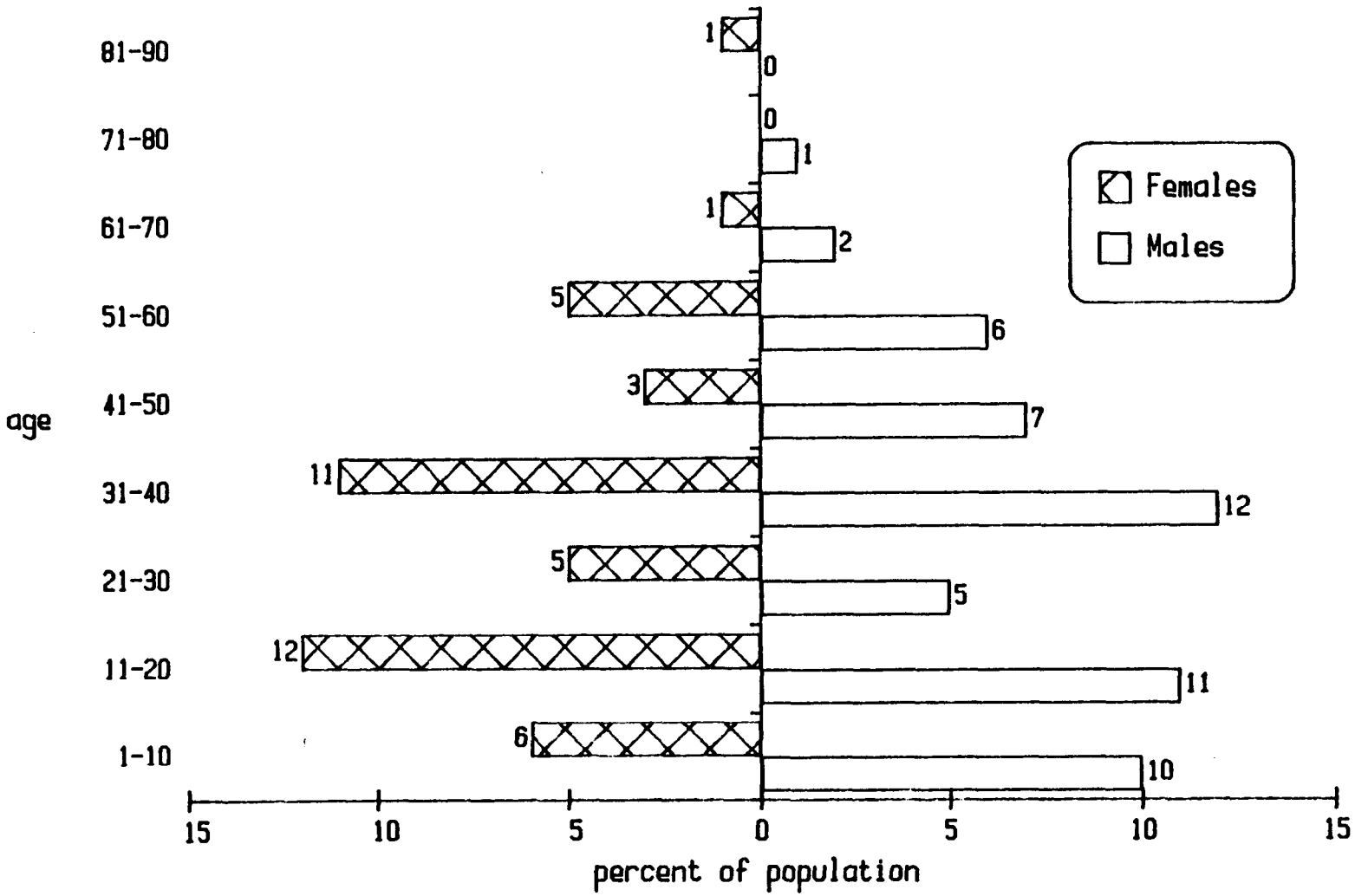



Fig. 3. Age and sex composition of Yakutat households during the winter of 1984-1985 (random sample, n=50 households).

## Place of Birth

Randomly interviewed households were asked the place of birth of the longest residing member of the household. One third of the households' longest residing members were born in Yakutat. Many Yakutat residents choose to have their children delivered in hospital facilities in Juneau or Anchorage since they are not available in Yakutat, the mother's place of residency at parturition was taken to be a person's birthplace. Twenty-eight percent of the households' longest residing members had moved to Yakutat from other parts of southeast Alaska, about one-half of them from Juneau. Twenty percent had previously lived in other parts of Alaska and 12 percent came to Yakutat from one of the southern 49 States. Two percent of the households' longest residing members lived in a foreign country before moving to Yakutat.

## Length of Residency

Figure 4 shows the length of residency of the longest residing member of the households that were randomly interviewed. Twenty percent had lived in Yakutat five years or less, while one-half had lived in Yakutat greater than 20 years.

## Community Services and Facilities

The city of Yakutat was first incorporated into a second class city in 1948 and reclassified as a first class city in 1973. It is governed by a mayor and a six-member city council and mayor with assistance from

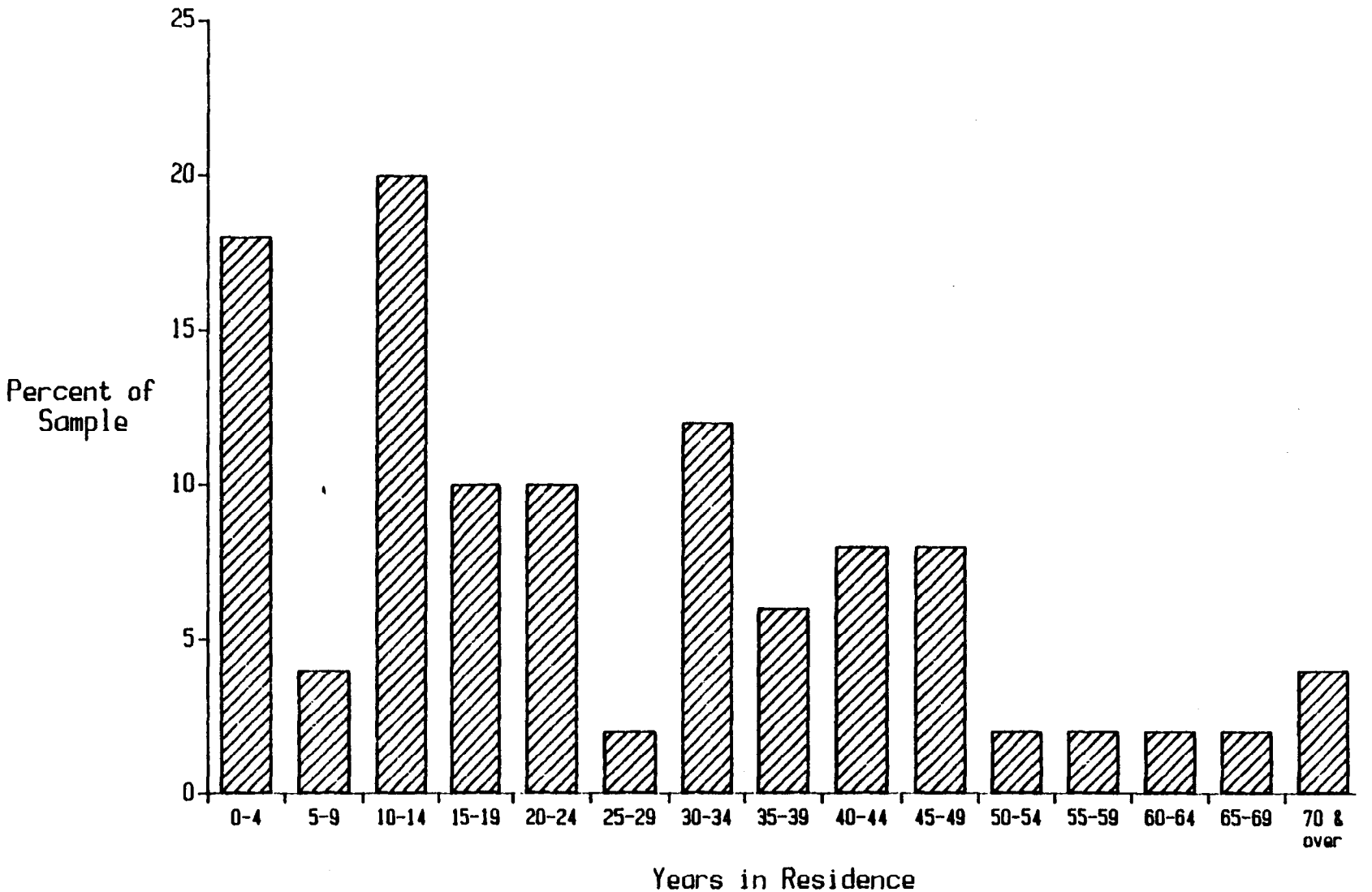



Fig. 4. Years of residence in Yakutat by a households's longest residing member (random sample, 1984, n=50).

a city manager. The city staff also includes a planner, public work superintendent, financial officer, water plant operator, physician's assistant, and Village Public Safety Officer. Rather than form its own IRA Council, Yakutat has designated the Tlingit-Haida Central Council to act as their IRA Council for managing funds, but not as a governing body, the city council performs this function.

Since Yakutat is approximately 200 miles from the nearest regional center (Juneau), many services are provided by local residents, including some health care by a physician assistant (no hospital, doctor, or dentist are present), education, public safety, roads, water, sewer and cargo services. Yakutat's electrical power is 100 percent diesel-generated and has been provided by a private company since 1966. Roads are maintained by the State Department of Transportation and the City of Yakutat, and most homes in the city are connected to city water and sewer. A Public Safety Officer, Alaska State Trooper and Fish and Wildlife Protection Officer are stationed in the community. Telephone service has been provided by the Sitka Telephone Company since 1965. Snow removal, an important service because of the annual average snowfall of 222 inches, is provided by the State Department of Highways and private businesses. The State of Alaska has also provided a small boat harbor with 79 stalls and maintains the airport, constructed during World War II, which accomodates two commercial jet aircraft daily.

Housing in Yakutat includes government housing for certain federal and State workers, owner-financed and built houses, and federally financed houses. Most homes are owner-financed and built. There were 35 houses built in the mid-1970s by the Tlingit-Haida Regional Housing Authority. Most houses are frame construction, with a few log homes, float-houses, and mobile homes present in the community.

# CHAPTER 3

# COMMERCIAL AND WAGE EMPLOYMENT IN THE ECONOMY OF YAKUTAT

## HISTORY OF COMMERCIAL DEVELOPMENT IN THE AREA

Historically, commercial and wage employment in Yakutat typically have been sporadic and seasonal. The following section briefly discusses the history of employment in six areas: the fur trade, commercial fishing, military installations, oil and gas exploration, timber harvesting, and tourism and outdoor recreation. Following this, there is presented information on the source of commercial and wage employment in Yakutat in 1984.

### Fur Trade

During the early Russian period of contact (circa mid 18th century) the Yakutat area was strategically located for trade between Interior and southeast Alaska Natives. Slaves, Haida canoes, and Tsimshian carvings were common items exchanged for copper, furs, and tanned skins from the Athabaskans. Early Russian expeditions to Alaska were made for the purpose of gathering scientific information and investigating new avenues of trade. These early explorations made known to the world the rich sea otter herds found along the Alaskan coast and the wealth in furs brought home by these explorers stimulated further voyages by the Spanish, French and British governments, as well as private trading ventures (de Laguna 1972). The Yakutat people had contact with these

early explorers and traded sea otter and beaver skins for cloth and ornaments (de Laguna, 1972).

The Russians established trading posts first in the Kodiak area and then expanded their operations to Prince William Sound, Cook Inlet and other parts of the Alaskan mainland including the gulf coast. Russian settlements were built and later destroyed in the Yakutat area and fur trading was continued up until the late 1800s when the sea otter population was hunted to near extinction. The trapping and sale of other furbearers was common through the early 1950s until fur prices declined and fur trade became unprofitable.

During the 1930s, 1940s, and 1950s the Federal Government put a $3.00 bounty on seals since they were a major natural predator of salmon. Several key respondents remembered the intensive seal hunting that occurred during that time for the purpose of cash earnings as well as subsistence uses.

Furs from southeast Alaska did not command as high of a price as interior Alaska furs. Generally, commercial fishing and seal hunting for furs and bounties were a more lucrative activity and consequently, trapping of land animals was generally a less prevalent activity in Yakutat. Trapping however has been an important activity in the Yakutat community especially during years when other cash opportunities were limited and it provided the only form of income during winter months. Several key respondents interviewed had trapped in the Yakutat area from the 1920s to the 1950s, but stopped when fur prices fell, available time declined, or alternate sources of income became available.

## Commercial Fishing

During the early 1900s, the Gulf of Alaska was considered one of the richest commercial fishing regions in the state. The first cannery in Yakutat was built in 1904, and commercial fishing and fish processing became an important source of cash income for Yakutat residents. Sockeye and coho were the main salmon species, supplemented by halibut and crab. Numerous different river fisheries contributed to the salmon harvest. By 1970, after a couple of decades of depleted salmon returns, the cannery finally went bankrupt. Salmon catches gradually increased in the 1970s and the local cannery resumed operations (Alaska Department of Community and Regional Affairs 1983).

Although fishing has always been a dependable source of income for Yakutat residents, this dependence is based upon a highly volatile industry with many of the controlling factors beyond local peoples' control, factors such as strength and timing of the fisheries run, changing regulations and weather, and pricing policies of local and international fish buyers. Several key respondents who had made a living fishing during the early 1900s talked about the fluctuating conditions. One key respondent mentioned that the mouth of the Situk in the 1940s had changed and he stopped fishing because of poor salmon harvesting success. Another key respondent said that in other areas of Yakutat the fishing was poor in the late 1930s to early 1940. River courses were continually changing and this often affected the productivity of the salmon fishery.

Yakutat residents worked mainly as fishers, not processors. They used both company gear as well as their own equipment and sold fish to the cannery and other outlets.

The Yakutat commercial fishery is a locally important industry. Of the 164 limited entry permits issued for the Yakutat area, 83 percent were held by Yakutat residents in 1980. The average catch increased from 8,387 pounds in 1975 to 18,548 pounds in 1980, while gross earnings rose from $4,320 to $14,273 in that same time period. The set gill net fishery in the Yakutat area produced about three percent of the salmon landed in southeast Alaska in 1979 (Sealaska Corporation 1981:258).

## Military

During World War II a military air base and associated defense facilities were constructed at Yakutat, housing almost 10,000 men. The base was closed after the war and was turned over to the state for use as an airport (City of Yakutat 1983:27).

After World War II, when the state of Alaska began operating the airport the Alaska Department of Transportation (DOT), the National Weather Service (NOAA) and the Federal Aviation Administration (FAA) opened offices in Yakutat.

The Ocean Cape Loran A Station was operated by the Coast Guard from 1951 to 1978. Long range radio aid to navigation was provided by this facility, which was staffed by 13 people. A "White Alice" communications relay station was operated by the U.S. Air Force from 1960 to 1976; sixteen men lived and worked at this facility (City of Yakutat 1983:27).

Each of these government agencies has employed some local or long term residents of Yakutat, although employees of the Federal agencies more frequently are newcomers to Yakutat who accept an assignment for a few months, or years, and then move on. Additional employment opportunities are often available to Yakutat residents in services providing support for government operations.

## Oil and Gas

The Yakutat area has been involved in the petroleum industry since the early 1900s. The Katalla field near the Copper River was discovered in 1902 and produced oil for thirty years. There have been two competitive offshore lease sales in Yakutat Bay between 1960 and 1967 and several state and federal onshore oil and gas leases issued in the 1950s and 1960s on the Yakutat foreland. Four wells were drilled in the vicinity of Yakutat between 1957 and 1960, but none led to development (City of Yakutat 1983:28).

In 1976 oil exploration took place on seventy-six tracts between Icy Cape and Kayak Island (lease sale #39). The service base at Yakutat employed thirty persons, over half of whom were local residents. Ten more resident workers were employed by the two charter helicopter companies. Exploration operations were stopped in July, 1978. In April of 1983 ARCO began exploratory drilling on Lease Sale #55 but no significant amount of oil has been located and operations to date have been suspended (City of Yakutat 1983:28).

Timber

Timber harvesting in the Yakutat area dates back to 1888, when the Swedish Free Mission built a small sawmill in the community. Timber was used to build docks, the railroad and a cannery to process locally harvested salmon. Since then logging activities have taken place sporadically and on a relatively small scale in the Yakutat area.

A total of 117,000,000 board feet of timber was harvested from Forest Service lands between 1952 and 1976. State lands yielded an additional 30,000,000 board feet during that time period (City of Yakutat 1983:71).

Logging has occurred during various years, from 1952-1957, 1965-1968, 1970, 1971, and in 1972 and all operations employed some local people. According to key respondents, the 1965 logging operation employed about 20 people, six or seven of whom were local. Operations taking place in 1965-1968 employed three local people, while the logging company provided the remaining 16 people. The 1972 Tawah Creek operation employed four truck drivers, four cat operators, and six other equipment operators. A total of 20 people were hired. It is not known how many local jobs were provided.

In 1981 a storm caused scattered blow down on U.S. Forest Service, state, and Yak-Tat-Kwaan land. Because of the reported danger of insect infestation resulting from the concentration of wind thrown timber, the Forest Service, State and Yak-Tat-Kwaan initiated salvage operations to recover down timber and harvest some of the surrounding area. That year the Yak-Tat-Kwaan in partnership with Koncor, a group of village corporations, began a five year contract to log 47 million board feet of

federal timber. The State is also in the process of harvesting 15 million board feet on surrounding state lands.

There is one logging camp located at Sawmill Cove. In 1984, the operation of it was contracted out by Koncor to Silver Bay Logging Company. Approximately five Yakutat residents were employed by the logging operations, out of a total of 50 positions at the Sawmill Cove Camp.

## Tourism and Outdoor Recreation

Unlike many remote Alaskan villages, Yakutat's combination of man-made and natural resources has lead to the development of a recreational industry. The airport left over from World War II has provided convenient commercial jet access to Yakutat, by visitors from outside the region. The passage of Alaska Native Settlement Claims Act (ANSCA) and the Alaska National Interest Lands Conservation Act (ANILCA) generated considerable interest in Alaskan Wilderness. Much of the effort directed at preserving these areas also served to advertise them and increase recreational use. At times the commercial airlines as well as local lodges and outfitters have promoted recreational hunting and fishing opportunities in Yakutat, according to respondents.

Yakutat saw an increase in outdoor recreationists from the early 1970s through the early 1980s and an increase in services to accomodate these tourists. According to key respondent interviews, the number of non-local sports fishers began to increase noticeably during the mid-1970s.

Two recreational lodges were built in the Yakutat area in the 1960s and 1970s. In the past several years, approximately ten fishing guides and six hunting guides have been operating out of Yakutat. The lodges operate at full capacity in the spring, summer and fall, employing local people in positions such as bookeepers, cooks, maids, bartenders, and guides. They operate on a smaller scale with fewer employees and services during the winter months. Hunting and fishing guides also have employed a few local people. However, several guides maintain permanent residence in other cities and bring assistants with them to Yakutat during the guiding season.

## COMMERCIAL AND WAGE EMPLOYMENT IN 1984

This section of the report describes the different sources of commercial wage employment that were available to local residents during 1984. Three general sources of commercial and wage employment were found to exist within the community, harvesting of local resources for sale, wage employment in the public sector, and independent small businesses. In addition, transfer payments from State and Federal programs also provided income to Yakutat residents. Most Yakutat households had members involved in a combination of these four categories, rarely relying on just one as a source of cash income. Many of the households had more than one member involved with cash employment, and often individual working members held numerous jobs during a single year. Considering all members of the household, households in the random sample on the average were found to have had 2.38 different jobs

per household during 1984. The following sections discuss additional information about community employment compiled from the random sample.

## Harvesting of Local Resources

Figure 5 depicts the percentage of Yakutat households who had members working in different job classes. It also depicts the percentage of total gross household income for the community for each job class. Household income was calculated by summing the individual earnings of all household members before taxes, by each job class. All households in the sample were then combined to estimate a total income per employment category.

As shown in Figure 5, 50 percent of the households had members earning cash through commercial fishing, during 1984. Commercial fishing accounted for 25 percent of the total cash income of Yakutat households during 1984, second only to income received from government employment (Fig. 5). This percentage may be lower than in previous years because of reported poor salmon harvests on many rivers in the Yakutat vicinity during 1984. A detailed description of the commercial fishery in the area can be found in Chapter 4.

Commercial fishing provides Yakutat households with a substantial amount of cash income over the relatively short period of June through September. The seasonability of commercial fishing often allows fishers to participate in other cash earning activities, as well as non-commercial resource harvesting. Refer to Chapter 4 for a detailed analysis of factors which influenced harvest outputs among Yakutat households during 1984.

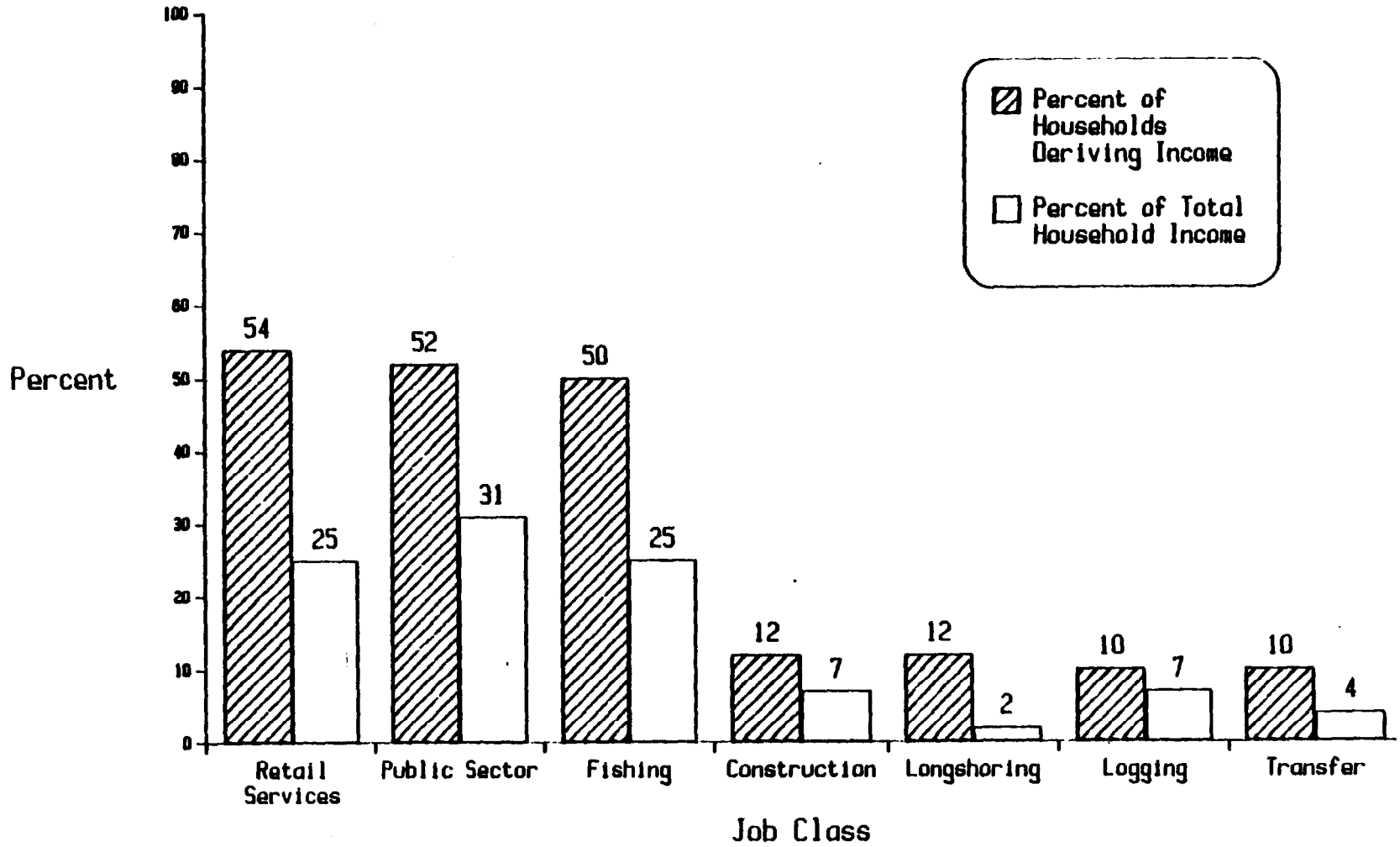



Fig. 5. Percentage of Yakutat households working in various job classes and percentage of total household income by job class (random sample 1984, n=50 households).

## Wage Employment and Small Businesses

Wage employment also provided cash income to Yakutat residents in 1984. Fifty-two percent of the surveyed households had a member who worked for a government supported agency or public sector service. These included the federal government, state government, city government, school district, and other government supported social services. Thirty-one percent of the total cash income from the sampled households was from public sector wage employment in 1984 (Fig. 5). This represented the longest single source of monetary income to households in Yakutat in 1984.

Private retail and service businesses also employed a substantial portion of the community during 1984. These businesses included locally owned and operated supply stores, repair shops, and restaurants that primarily catered to local needs. Since Yakutat is hundreds of miles from retail and service centers such as Juneau or Anchorage, some of the services needed by local residents are provided by these businesses. Other jobs in this group included employment with the airline company, local transportation companies, hunting guides, utility companies, and employment of the village corporation. Also in this group is work associated with local lodges, which have become popular for visitors to the area in the past 10-15 years. Fifty-four percent of the surveyed households received income from this form of employment in 1984, which accounted for 25 percent of the total income for the entire random sample (Fig. 5). Many of these jobs were part-time or seasonal in nature and were often combined with other means of producing income.

Wage employment in construction projects and longshoring each involved 12 percent of the households during 1984 and provided seven and two percent of the total income, respectively. Construction projects, quite often funded by government money, typically are short term and seasonal in nature. Often the preferred construction season is during summer, which conflicts with commercial fishing activities. House construction, although limited in 1984, is an activity sometimes scheduled during the winter months when other forms of employment is slow. In 1984, longshoring occurred for a couple of long busy days each month or whenever a ship pulled in to receive timber. Residents with flexible employment hours in a longer term job would take a couple of days off to help load the ship. Consequently, this activity employed a number of workers but only for a short duration. Yearly income from this activity was low compared to other employment.

The Silver Bay Logging Company, located a few miles northeast of town, employed approximately 50 people during the 1984 summer operation. Most of the workers lived at the logging camp and worked long hours through the summer months when conditions were best for road construction and timber harvesting. Many company employees came to Yakutat from other logging camps in southeast Alaska or the Pacific Northwest and had been in Yakutat one or two seasons. Approximately five of the 50 workers lived in the community of Yakutat and were long-term residents, others had arrived in the past two years. In the random survey, ten percent of the households had members employed in logging operations during 1984. The timber industry accounted for seven percent of all household income for the sample (Fig. 5).

## Transfer Payments

Ten percent of the randomly sampled households (5 households) reported receiving government transfers during 1984. These payments included unemployment benefits, food stamps, aid to families with dependent children, and social security. Two of the households in the sample were young families who were out of work, while the remaining three were older households, members of which had retired from a long and productive working life in Yakutat. Transfer payments accounted for only four percent of the total household income of the 50 randomly sampled households (Fig. 5).

## Combining Employment Types

As previously stated, most households had more than one wage earner, and quite often the individual wage earner participated in a number of different forms of employment through the course of 1984. On the average, Yakutat households held 2.38 different jobs during 1984. Household members combined income sources in a number of ways. One particularly ambitious resident fished commercially during the summer and, when time was available the rest of the year, worked for the City, the Village Corporation and was a longshoreman. Those employed in government service with the city or the school district were often involved in different summer activities such as fishing or construction. Participation in wage employment was more common during the winter months. During the summer months, commercial fishing by those that held a limited entry permit for the area was the most frequent occupation.

In 1984, only eight percent of the households depended entirely on commercial fishing for cash employment, while 26 percent combined wage employment and commercial fishing. Sixty percent of the households were involved only with wage employment during 1984. Very few households relied primarily on government transfer payments (three of 50 households sampled).

## Household Income Levels

The 50 randomly selected households interviewed were asked to estimate their total annual gross income for 1984. Figure 6 shows the annual gross income earned by the percentage of the random sample, grouped into $5,000 ranges. These annual gross households income figures typically included households with more than one cash earner and also include the total amount of income brought into the household before any expenses were paid. In the case of households with commercial fishers or a household that owned a small business, income was determined from all income brought into the household, before expenses or reinvestments back into the business. Therefore, the gross incomes reported do not necessarily reflect the amount of money available to a household for consumptive uses.

The mean and the median 1984 gross incomes for the interviewed households fell in the $40-45,000 range. Eighty percent of the households earned over $25,000 per year. The estimated average per capita 1984 income for Yakutat residents was approximately $14,000 (Alaska Dept. of Revenue 1985). Fishing around the Yakutat area during 1984 was considered to be some of the poorest in recent years, which should be

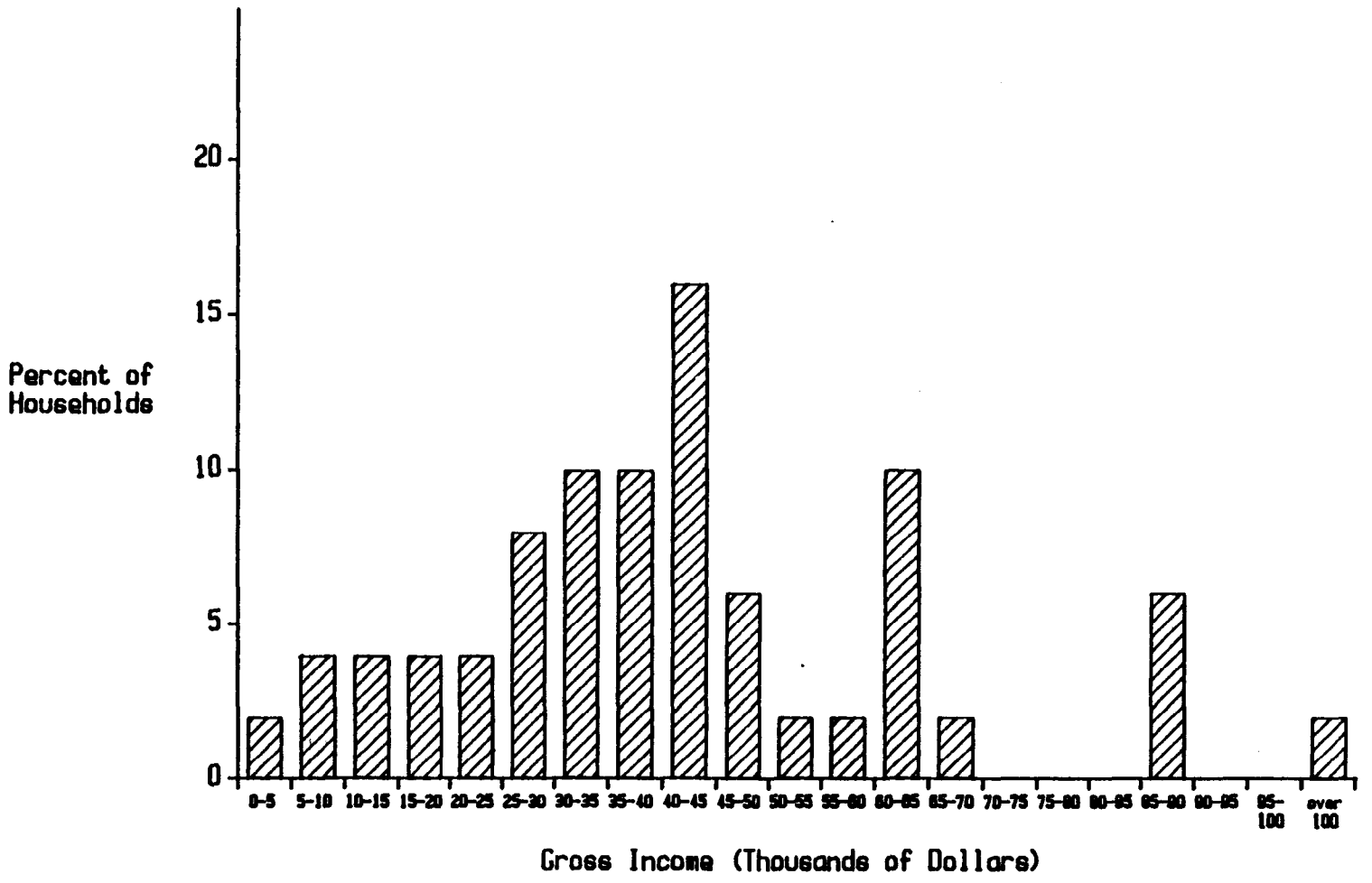



Fig. 6. Gross annual household income in 1984 by percentage of Yakutat households (random sample, n=50 households).

taken into account when interpreting these estimates. The 1984 household income estimate compares with mean taxable incomes in 1981 and 1982 of $17,525 and $17,402 respectively, based on income tax forms returned by Yakutat residents. Mean average deductions per return were $6,325 (1981) and $6,442 (1982) (Alaska Dept. of Revenue 1985). It is difficult to directly compare these income estimates, as multiple workers in a household might file separate or joint returns. If deductions represent about 26 percent of gross earnings (the 1981 and 1982 average), then the average 1984 household taxable income of the sampled households was about $29,600-$34,200. A 1974 survey of 50 Yakutat households conducted by Alaska Consultants Incorporated determined the median income of Yakutat households to be $15,999 with 30 percent of the households having an income less than $10,000 (McNeary 1978:53). While these figures are not explained in detail they quite likely represent taxable income. The 1980 United States Census estimated the median household income for Yakutat at $20,270 (U.S. Department of Labor 1980).

## Capital Equipment Used in Fish and Hunting

It is noteworthy to point out that income earned from commercial fishing, wage employment, and business ventures are often times reinvested into equipment used in the pursuit of fish and wildlife for commercial and non-commercial harvests. Figure 7 presents the percentage of households using different forms of transportation while harvesting fish and wildlife in 1984. Skiffs predominate, being used by 72 percent of all households. Large vessels (enclosed boats) were used by 10 percent of the households. Trucks were used by 76 percent of house-

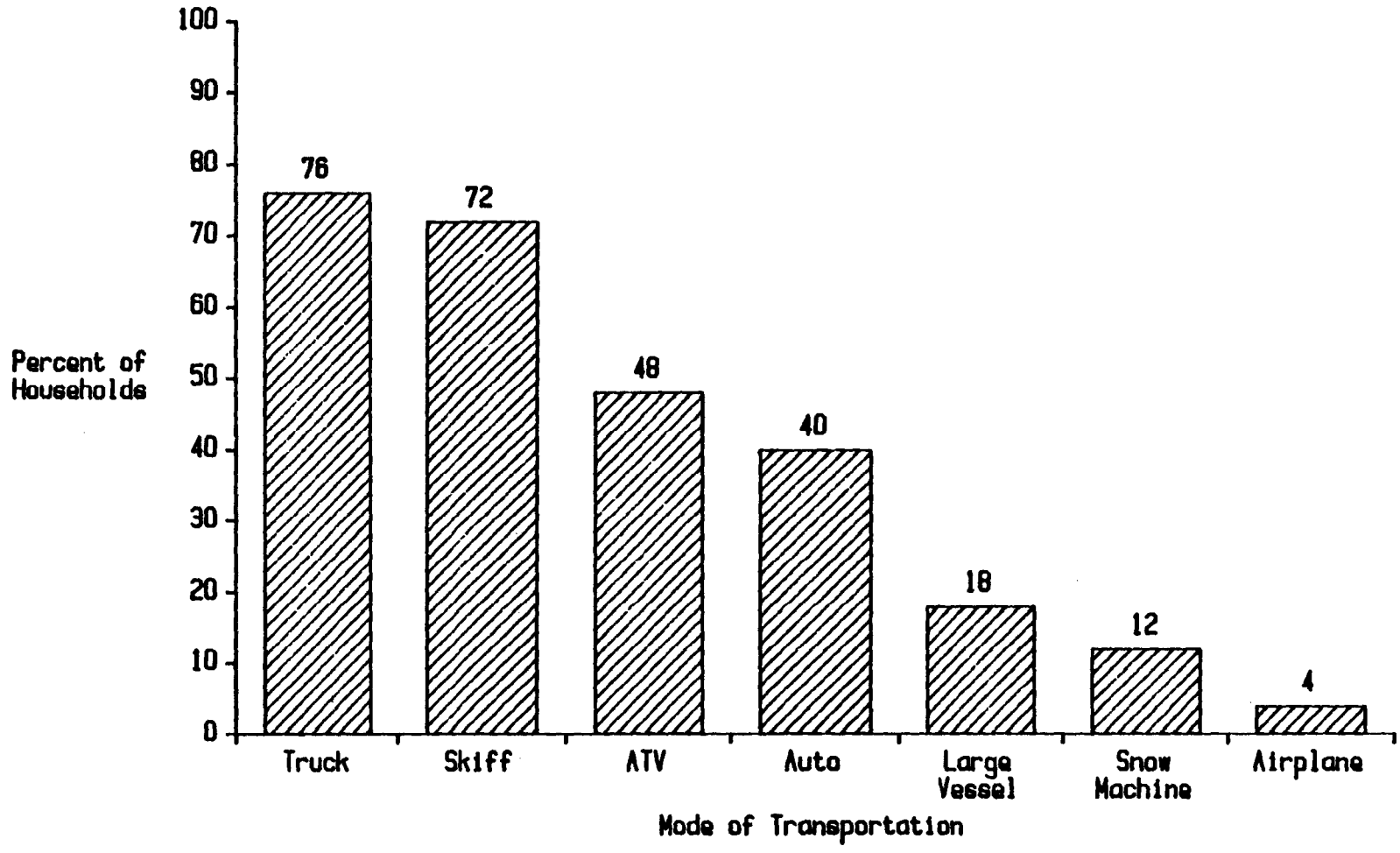



Fig. 7. Percentage of Yakutat households using various forms of transportation during 1984 for harvesting fish and wildlife (random sample, n=50 households).

holds, ATVs 48 percent, and automobiles 40 percent. In recent years highway and off-road vehicles such as three wheelers have become widespread in use. In 1979, 220 passenger cars or pick up trucks in Yakutat were registered with the State Division of Motor Vehicles. In 1984 that number had risen 58 percent, to 348 cars and trucks, or approximately 1.8 vehicles per household. (A rental car company, however, may account for 30-40 vehicles). Airplanes are owned by a few individuals in the community and are used for fishing operations and hunting, especially for moose, wolves and bears. Many of the households used a variety of gear for hunting and fishing during 1984. The subject of transportation and access to fish and wildlife is discussed in detail in Chapter 5.

# CHAPTER 4

# SUBSISTENCE IN THE ECONOMY OF YAKUTAT

## HISTORIC RESOURCE USE

The traditional culture of the Yakutat Tlingit, their relationship to the land and use of fish and wildlife has been extensively studied by Dr. Frederica de Laguna (de Laguna 1964, 1972). In addition Goldschmidt and Haas collected information in the mid-1940s on land use by Yakutat residents for a report to the Commissioner of Indian Affairs. This report documented the possessory rights of the Natives of southeastern Alaska (Goldschmidt, Haas 1946). Both of these reports provide excellent historic information on life in the Yakutat area and should be consulted for cultural and historical background. Because of the availability of historical information, this report focuses on contemporary uses of fish and wildlife of Yakutat residents and some of the changes that have taken place during the lifetimes of today's residents. Through the course of the study, key respondents provided historic information, briefly summarized below.

Many of the interviews that were conducted with Yakutat Native households, young and old alike, typically began with the oral history of an individual's clan and a description of how its people first became established in the Yakutat area. These stories varied depending on the individual's particular clan, since the Yakutat people were established by the settlement of different Native Americans who came from the north

Gulf of Alaska Coast, interior Alaska, Canada, as well as southeast Alaska.

Hunting and fishing territories were established by individual clans and were considered the property of that group of people. One person, presently referred to as a Chief, was named as the administrator of the land and was responsible for the management of the fisheries and wildlife resources of the area. People from outside the clan were allowed to use the land only after receiving permission from this clan leader.

The chief would care for the land by regulating hunting and fishing activities. Key informants explained how this management system used to work on the Situk River. All fishing activities were controlled by the clan chief, and no fishing began until permission was given. Early in the spring before the salmon runs began, the river was "prepared" for the salmon. This was accomplished by traveling upstream and removing any debris from the river that might impede the migration of salmon. Spring bear hunting was combined with this activity and reportedly served a couple of purposes. Moose were not available in the Yakutat area until the 1940s-1950s so prior to this time bears were one of the few sources of meat from land mammals. Bears were hunted along the shores of the Situk River, providing food and furs for the village as well as limiting the populations of a competing predator for salmon. After the bear hunting and stream clearing, salmon fishing was allowed when the chief decided the run was strong enough to fish.

Fisheries and land mammal management has been assumed by the State government in Alaska, with a public advisory system from local community committees. Newcomers to the area since the turn of the century have

operated outside the traditional clan system and do not recognize clan ownership of areas. Traditional land rights remain important to many Native people in Yakutat, however. Numerous present day camps and hunting and fishing areas are reported to have been inherited by individuals from previous clan chiefs. In many cases Native residents continue to use traditional areas which their clan has inherited. The interaction of the traditional system of land use rights and the superimposed Euroamerican system is complex, and was not the focus of this study.

## CONTEMPORARY RESOURCE USE

This portion of the report will describe the resource gathering activities that occurred in Yakutat during 1984. Information was collected during the fall and winter of 1984-85 from two sources:

1) Numerous in depth interviews with twenty-five key respondents, residents of Yakutat who were selected because of their length of residency in the area and knowledge of activities.
2) Randomly selected households representing approximately 30 percent of the households in the Yakutat area, who responded to a standard survey questionnaire.

It is important to keep this single year's description of harvest activities in the historic context of continuity and change in the Yakutat area. Subsistence activities are dynamic. Many of the harvesting activities that have occurred historically in Yakutat continue today. Salmon fishing for subsistence and commercial uses continues as a widespread activity that is vital to the economy of the area. Some

harvesting activities, however, have changed over the past 30-40 years. For example, moose migrated onto the Yakutat Forelands in the 1940s and local people quickly incorporated this new resource into the seasonal cycle of hunting activities, so that in 1984 over 60 percent of the Yakutat households hunted for moose. As the population of moose increased in the Yakutat area in the early 1950s, the use of brown and black bear for food is reported to have decreased. Also, trapping for furbearers has decreased in recent years, largely due to fur market conditions that have made trapping in southeast Alaska largely an unprofitable venture. In the past when trapping was more profitable, it was a common activity for many Yakutat households and considered an important aspect in the subsistence and cash economy of the area. Should market conditions change, and trapping become once again a profitable activity, one could expect many more residents to return to the harvest of furbearers. Thus, subsistence activities are responsive to the particular ecological and socio-economic conditions at any period of time.

## Seasonal Round of Harvesting Activities

The harvest of fish, wildlife, and plants in the Yakutat area follows a regular yearly cycle based upon the seasonal availability of resources and conditions which make harvesting economical and efficient. Often wage employment and other activities are scheduled or modified to allow for the harvest of resources as provided by natural cycles and the changing seasons. The knowledge of these seasonal resource gathering opportunities is widespread throughout the community. The seasonal

appearance of certain wildlife species is an annual reoccurring pattern generally predictable from year-to-year. Yakutat residents monitor a variety of environmental clues that help them predict when and where a resource can be found. The arrival of candle fish to Monti Bay, for example, announces the soon to follow king salmon. Once the king salmon have arrived in Monti Bay local people know that in one or two weeks these fish will be available in the river at Dry Bay. The knowledge of these clues, and the precise prediction of the optimal time to harvest, becomes even more critical with resources such as herring spawn which have a very short harvest period. Since the availability of herring spawn is short lived, residents must learn the clues that instruct them when to place hemlock branches into the water or when to check kelp for eggs.

Even though the seasonal round is a predictable pattern, variations in this cycle occur from year-to-year. The abundance of resources can also change each year depending on ecological factors. The weather conditions that occur seasonally can influence the timing of an activity. Fishing and seal hunting on the ocean is more productive during the spring when the weather is generally better. Snow depth assists a hunter in tracking an animal, or at times concentrates animals in smaller areas, which may help to increase success in harvesting.

In recent years regulations also have had an impact on the location and timing of harvest activities. The seasonal round of activities observed in 1984 was often conditioned by regulations that control the timing of activities. Sometimes these controls correspond to patterns of resource use that have traditionally occurred. Often times, for reasons that may included administrative convenience or efficiency,

regulations restrict an activity to a time period that may not include an entire natural cycle. It is important to recognize these external controls when reviewing seasonal round information. Also, it is important to understand that the information presented here may not fully represent cycles of previous years activities, but was constructed on the basis of information gathered during 1984.

Many of the activities in Yakutat revolved around the timing of salmon runs in the area. Since the late coho run is usually over by the end of January, a good starting point for describing a new seasonal round is February or late winter after most of the late salmon have spawned. At this time the land is typically receiving heavy snows. Figure 8 illustrates the seasonal round of resource harvest activities by individual resources. The illustration begins in January and ends in December, but in reality the cycle is continuous from season-to-season.

## Late Winter (February-March)

Winter weather in Yakutat can be highly variable. In 1985 the month of January brought over 30 inches of rain and mild temperatures but by the end of February the temperature had cooled enough to accumulate close to eight feet of snow on the ground. In February the Situk, Italio, and Alsek rivers begin to fill with runs of eulachon. Depending on the depth of snow, a highway vehicle or snowmachine is used to travel from Yakutat to the Situk River for the netting of these fish. Trapping for furbearers which begins in the fall continues through the late winter. Moose hunting on the Nunatak Bench is an activity that a few

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MAMMALS** | | | | | | | | | | | | |
| Moose | - - - - - | | | | | | | | | ********* | - - - | |
| Black Bear | | | | ********* | | | | | | | | |
| Brown Bear | | | | ********* | | | | | | | | |
| Mt. Goat | | | | | | | | ********** | | | | |
| Wolf | ********** | | | | | | | | | ********** | | |
| Red Fox | ******** | | | | | | | | | | ********* | |
| Lynx | ********** | | | | | | | | | | ********* | |
| Wolverine | ******** | | | | | | | | | | ******* | |
| Land Otter | ******** | | | | | | | | | | ********* | |
| Beaver | ********** | | | | | | | | | | ********* | |
| Mink | ******** | | | | | | | | | | ********* | |
| Marten | ******** | | | | | | | | | | ********* | |
| Seal | ********** | | | | | | | | | | | |
| **SHELLFISH & INTER-TIDAL GATHERING** | | | | | | | | | | | | |
| Clams | ********** | | | | - - - - - - - - - - - - - - - - - - - - | | | | | | ******** | |
| Cockles | ********** | | | | - - - - - - - - - - - - - - - - - - - - | | | | | | ******** | |
| Dungeness Crab | - - - - - - - - - - | | | | ********** | | | | | | - - - - | |
| Tanner Crab | ********** | | | | - - - - - - - - - - - - - - - - - - - - | | | | | | ******** | |
| King Crab | ********** | | | | | | ********** | | | | | |
| Octopus | | | | ********* | | | | | | | | |
| Gumboots | ********** | | | | | | | | | | | |
| Neets (Sea Urchin) | ********** | | | | | | | | | | ******** | |
| Sea Scallops | ********** | | | | | | | | | | | |
| Shrimp | ********** | | | | | - - - - - - - - - - - - - - - - | | | | | ******** | |
| Seaweeds | | | | | ********** | | | | | | | |

********** Primary Period of Harvest
- - - - - Secondary Period of Harvest

Fig. 8. Seasonal round of resource harvest by Yakutat residents for selected species, 1984.

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                    JAN   FEB   MAR   APR   MAY   JUN   JUL   AUG   SEP   OCT   NOV   DEC

FISHING

King Salmon         - - -
```

| PLANTS | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Salmon Berries | | | | | | | ******** | | | | | |
| Strawberries | | | | | | | ******** | | | | | |
| Blueberries | | | | | | | | ******** | | | | |
| Nagoon Berries | | | | | | | | ********** | | | | |
| Cranberries | | | | | | | ********** | | | | | |
| Greycurrent | | | | | | | | | | | | |
| Elderberry | | | | | | | | | | | | |
| Other Plants | | | | | | ********** | | | | | | |
| Mushrooms | | | | | | | | | ******** | | | |
| Firewood | ********** | | | | - - - - - - - - - - - - | | | | ********** | | | |

******** Primary Period of Harvest
- - - - Secondary Period of Harvest

Fig. 8. continued

hardy groups of individuals take advantage of in February. The hunt takes place near Russell Fiord 30 miles north of Yakutat in an area close to the glaciers of the Saint Elias Mountains. Heavy snows in the winter usually drive the moose down to the shoreline where they can be hunted efficiently and packed to a boat. Groups of men travel together in boats and set up camp near the hunting site for usually for a week or two, depending on when the wind, weather, and ice in the bay allow the hunters to return to Yakutat. Aside from this moose hunt and a few trappers who operate out of winter camps, most of the late winter activities are based out of Yakutat.

The islands immediately northwest of Yakutat are often referred to by local residents as the "ice box". The ice box is a dependable source of a variety of intertidal resources, many of which are available year-round. Because of the convenient proximity to Yakutat, many of the resources that are harvested from these islands are not stored in large quantities, but are harvested as needed. During late winter, clams, cockles, gumboots, sea urchins, sea scallops, shrimp, and crab are harvested mainly from the islands area. Marine bottom fish including halibut and cod also are available and are harvested as they are needed through out the year. By late winter herring begin to school near the islands and are netted for food, as well as for bait to be used in salmon fishing. Shortly after the herring arrive winter king salmon are available and are harvested by trolling the waters near the islands. Although the winter king salmon are not available in large numbers, they provide some cash during the winter months for commercial trollers and are a highly desired source of fresh salmon for local consumption. Harbor seal are also harvested in the protected waters of the islands

and nearby haul out areas. Seal are distributed throughout the community to Native as well as non-Native households. Nearly every part of the seal has some use and the knowledge and skills in handling and preparing seal products are prevalent among Native elders of the community.

Fresh fish such as ocean run rainbow trout, known as steelhead, are available in upland rivers during late winter. Many of the rivers of the Yakutat Forelands are free of ice for much of the winter. The Situk River, the most common source of steelhead, has fish available in the fall, late winter, and spring. Ptarmigan are hunted in the unforested areas near the glaciers, although in recent years the success in finding these birds is reported low.

Winter is also a desirable time for many Yakutat residents to locate seasonal cash employment in town. This is especially true for commercial set gillnet fishers who usually do not have their first season opening until June but remain extremely busy through September. Winter jobs are sometimes found with local construction projects, government services, or local businesses in town.

When not active with hunting, fishing or wage employment that may be available around Yakutat, residents spend many hours digging out from the several feet of snow than can fall during late winter. During March of 1985 snow had to be dug away from some window panes to avoid the weight of snow from breaking the glass. In 1972 over 300 inches of snow fell in Yakutat (NOAA 1983).

## Spring (April - May)

With the arrival of the longer days and warmer temperatures of the spring months, the pace of activities in Yakutat begins to pick up. Despite the deep snows that can remain on the ground through spring, preparations begin for the summer fishing season. Clues that help to predict the availability of ocean resources are closely monitored.

Gathering from the intertidal zone around the Yakutat Bay islands intensifies during the spring when additional resources become available. Herring spawn their eggs onto live kelp or branches of hemlock that are placed into the water. The harvest of herring spawn must take place within a few days after the spawning begins during May before the eggs mature. Black and ribbon seaweeds are picked at low tides during May shortly after the spring growth reaches a useable size but before it becomes tough and less palatable. Octopus is also taken at low tide during the spring, and is highly desirable for food, as well as for bait for halibut fishing. Dungeness crab again becomes abundant around the mud flats near Yakutat. In the spring crabs are harvested from the ocean bottom in small pots or picked from beaches during low tides.

Marine bottomfish are harvested as needed and residents begin halibut jigging and setting halibut hooks as this fish becomes more plentiful in the spring. In 1984 the average harvest by households active in halibut fishing was 175 pounds.

In late May king salmon begin schooling around the Situk, Alsek Rivers and the island area, and are caught with troll gear for both commercial and home use. Subsistence nets are placed into the rivers as spawning king salmon begin to travel up river. Rod and reel are also

used to harvest kings from the rivers but usually not until June after the salmon are out of the sloughs and into the river. Past regulations have prohibited subsistence net fishing once the commercial fishing begins in the rivers. It has been important that subsistence fishing households without commercial permits fish in late May and early June, to avoid having to wait until September or October to legally fish with a subsistence net.

Yakutat is located along a waterfowl migratory path so many of the birds that spend the summer in northern Alaska pass through in the spring going north and in the fall heading south. Most of the waterfowl hunting presently takes place during the fall since regulations allow only a fall hunt. Historically, Yakutat people harvested waterfowl on their northern migration during the spring as well. In 1984 an occasional bird was harvested during the spring if a household had a special need at that time. Gulls and terns nest on the beaches and small islands in the area. These birds are watched closely and some of their eggs are harvested shortly after laying, usually during the month of May.

Seals are also harvested during the spring, as they are during other times of the year. Spring brings better ocean weather for traveling and it is possible to safely (but cautiously) travel up Yakutat Bay in a small skiff and hunt seals that are concentrated near the glacier. In 1984 most Yakutat seal hunters traveled to the area for a couple of days or made a day trip to the hunt, returning to Yakutat in the evening.

Yakutat residents report that in years prior to the arrival of moose to the Yakutat Forelands they harvested both brown and black bears

more frequently than they do today. Spring was considered the best time to hunt the bears since they were easier to find and the meat was better tasting. Bears were often taken near their winter dens and occasionally from within their dens by the bolder hunters. In 1984 residents still preferred to harvest bears in the spring shortly after they left their winter den. Both black bear and brown bear meat is eaten although black bear meat is preferred over brown bear. Ten percent of the surveyed households used bear in 1984. Many of the brown bear taken from the Yakutat area were harvested by Alaska residents who live outside the area or non-Alaskan residents who hired guides to assist with the hunt.

## Summer (June-August)

During the summer most of the activities of the community center around salmon fishing. Of the 50 households randomly surveyed, 42 percent said they fished commercially for salmon, and 92 percent used non-commercial caught salmon in 1984. During the spring and early summer these Yakutat households are busy preparing for the approaching fishing season. Set gillnets are repaired, wooded skiffs are refinished and outboard motors tuned. Fish camp cabins that were towed away from the oceans edge for protection from winter storms are relocated along the river mouths and tent frames are prepared for the season.

As mentioned previously, residents who do not have a commercial fishing permit need to harvest salmon prior to the opening of the commercial season. On the Situk River king salmon are harvested in late May and early June and sockeye are caught in early June by means of subsistence set gillnets. The commercial set gillnet fishing season

in recent years has opened in mid-June and continues until October. Often times on the Situk River the subsistence fishers in May and early June are the same people who fish commercially, from June to October. Commercial fishers also the same fishing sites and equipment. Commercial fishing households often retain small portions of their commercial catch for home use, usually fish that are damaged or valued less on the commercial market. However, in 1984 over half of the households surveyed did not have a commercial fishing permit and needed to obtain salmon for home use by means of a subsistence net, usable only when the commercial fishery was closed, or rod and reel, useable at most times. Many of the commercial fishers also fish during the subsistence openings to obtain salmon for home use.

The sockeye runs continue on most rivers of the Yakutat Forelands from June until the first part of August. Commercial fishers in Yakutat often fish the earlier portion of the run close to Yakutat on the Situk River. In recent years, since the runs have been poor on the Situk, many fishers move to other river systems that are considered more productive by July. The East River near Dry Bay or the Italio or Akwe Rivers on the Yakutat Forelands are often the choice. The decision when and if to move from the Situk is often a difficult one because of the expense of the move and uncertainty of the success. For example, in order to move from the Situk River to the East River a fisher must transport gear and camp fifty miles down the coast by air (an expensive trip) or by skiff on open ocean waters (often a dangerous trip). The time lost and expenses of the move have to be considered along with other factors such as other competition for set sites in the area, strength of runs, length of fishing openings, and time spent away from

Yakutat and family. Despite the cost many Yakutat commercial fishers move their camps, often as many as during the course of a season. A survey conducted with fishers of the Dry Bay area in 1981, determined that over three-forths of the Yakutat fishers in Dry Bay fished four or more rivers during the course of one season (Gmelch 1982:54).

Pink and chum salmon are harvested during mid or late summer on a few rivers in the area by the commercial set netters, although sockeye and coho are the mainstay of their livelihoods. By mid-August the effort shifts to the harvest of coho (silver) salmon. Many fishers return to the Situk for a few weeks and then move to camps north of Yakutat, along the Mandby shore, Yahtse River near Icy Bay, and the Tsiu and Kaliak rivers north of Cape Yakataga, in pursuit of coho (Fig. 1). Yakutat residents normally are busy with these fisheries until the end of September or the beginning of October.

A smaller portion of the community is involved in commercial trolling for salmon. This takes place in the ocean waters of Yakutat Bay and the coastal waters near Yakutat. King and coho salmon are the target species of this gear type. In 1984 12 percent of the randomly surveyed households used commercial troll caught salmon for home use.

Along with salmon, most commercial fishing harvests, whether they are set gillnets or troll catches, harvest incidental fish that are not locally marketable to commercial buyers. These fish are often kept for home use and include flounder, trout, Dolly Varden and bottomfish. In 1984 commercial buyers were not purchasing pink salmon, so incidentally caught pinks were also used at home although not in large quantities.

The salmon preferred by local residents are sockeye (red), coho (silver) and kings (chinook). These fish are all harvested by subsis-

tence set gillnets. King and coho salmon are also harvested by rod and reel both from the river systems as well as ocean waters. Pink and chum salmon are used within the community but not in the quantities of the other salmon.

Berry picking also occurs in the summer around Yakutat and near the summer fish camps. A variety of berries are available. The most common include strawberry, salmonberry, nagoonberry, highbush cranberry, blueberry and huckleberry. Other plants that are also harvested during the summer include ferns, beachgreens, mushrooms, wild celery and Indian rice.

Seal hunting continues through the summer and is often conducted along with commercial fishing as the opportunity arises. Dungeness crab and intertidal shellfish are frequently harvested throughout the summer, as are Dolly Varden char and, occasionally, northern pike. Marine bottom fish, especially halibut, are taken in a short commercial fishery in early summer and throughout the summer for home use.

## Fall (September-October)

In the fall a late run of coho salmon known as "red fish" are harvested in small creeks near Yakutat. Red fish are taken through mid-winter and are especially valued by Native residents for their special flavor. During August, September, and October, mountain goats are hunted in a few specific areas away from the community of Yakutat. Goats have frequently been harvested from the cliff areas near Icy Bay. The regulatory bag limit for this area was reduced in 1975 from two animals to one to help conserve the population. This reduced bag limit

and the considerable expense of the 80 mile trip by boat or air for one goat has caused some Yakutat hunters to abandon the hunt. The completion of Forest Highway #10 to the Dangerous River opened up convenient access to mountains adjacent to Harlequin Lake which have supported a huntable goat population. In recent years local and non-local hunting pressure as well as hunter success in this area has been high, and in 1984 the area was closed because of a low goat population. Other areas used by Yakutat residents for goat hunting include the Brabazon Mountains, near Alsek Lake, 60 miles southeast of Yakutat (Fig. 1).

Black bears are still hunted in the fall, although many residents prefer to hunt for bears during the spring because of the reported better tasting meat of bears harvested at this time.

After the salmon season is over many residents prepare for a fall moose hunt. The season opens September 1 on the Malaspina Forelands north of Yakutat Bay, and mid-October or the Yakutat Forelands. Most hunting takes place on the Yakutat Forelands. The newly created road system to the Dangerous River receives considerable moose hunting pressure from local residents and also receives use from non-local hunters. The Yakutat Forelands North of the Dangerous River also is accessible by boat for moose hunting. Areas south of the Dangerous River to Dry Bay are normally reached by small airplane from Yakutat for the purpose of moose hunting. (For more information about moose hunting on the Yakutat Forelands see Chapter 5).

A variety of waterfowl are available on the wetlands near Yakutat during the fall as birds migrate from northern Alaska, south along the North Gulf of Alaska Coast to wintering areas. The waterfowl that are commonly taken by local residents at this time include Canada geese,

White-fronted geese, a variety of ducks, (mallard, pintail, greenwinged teal, scaup, goldeneye). Occasionally sandhill cranes are killed.

In the island area near Yakutat marine resources continue to be available and are harvested when needed. During the fall and winter, king and Tanner crab are targeted by commercial fishers and are shared and distributed within the community. Clams and cockles begin to fatten and become more desirable as winter approaches. Seals are hunted in the island area as needed. Seals are said to float after shooting more frequently when hunted in the fall and winter months than at other times of the year.

Steelhead return to upland river systems where many of them remain during the winter months. They are harvested primarily on the Situk River. During the fall firewood collecting becomes a priority as the air temperature begins to drop. Households that heated with wood during 1984 (50 percent of the surveyed households) on the average reported using 10.5 cords of wood during 1984.

## WINTER (November-January)

During the late fall and winter months the trapping of furbearers begins along rivers and, in recent years, along Forest Highway #10. Most of the recent trapping effort has been directed toward mink, marten and land otter. Occasionally wolf, wolverine, beaver, and fox are also taken. As mentioned previously the percentage of households participating in trapping has declined in the past 20 years due to many factors including declining fur values.

Certain seafoods are abundant during the winter months and are shared and distributed throughout the community, harvested with commercial gear or non-commercial gear. Sea scallops are harvested primarily by a couple of commercial fishers, but are enjoyed throughout the community through sharing, trading, or purchase. Shrimp are harvested with commercial and non-commercial pots and are abundant during the winter months. King and Tanner crab as well as the intertidal species previously mentioned are available as needed throughout the winter from the island's "ice box". During winter residents have more time to participate in employment, providing cash for household items and fishing and hunting equipment that may need replacement. Residents also find time to become more involved in community affairs and other activities that the busy summer may have precluded.

## Harvest of Fish and Wildlife Resources

Information on quantities of resources harvested during 1984 was collected during a survey administered to 50 randomly selected households or approximately one third of all the households in the Yakutat area. Household members were asked to recall quantities of resources harvested and types of resources used, received, and given to others during 1984. Estimated harvest quantities were converted into pounds of dressed weight product using conversion factors listed in Appendix C. The harvests of all resources were summed to determine total pounds of resources harvested per household as well as mean pounds of resources and categories of resources harvested within the community.

Hunting, fishing, and gathering of wild resources by Yakutat residents was common and widely spread throughout the community in 1984. The household interviews included 150 individual household members, who ranged in age from new borns to 80 years old. Table 3 shows the participation by these household members in hunting and fishing during 1984. Over two-thirds of the population had fished and over one-third had hunted during the past year. In the most active age range (19-49 years), 86 percent fished and 52 percent hunted during the past year.

TABLE 3. PERCENT OF YAKUTAT HOUSEHOLD MEMBERS THAT HUNTED OR FISHED IN 1984 (n = 150), FROM RANDOMLY SAMPLED HOUSEHOLDS

| Age Group | Percent of Residents Who Fished | Percent of Residents Who Hunted |
|---|---|---|
| All Ages | 67 | 36 |
| 0 - 18 Years | 40 | 15 |
| 19 - 49 Years | 86 | 52 |
| 50 - Years and Older | 68 | 32 |

It is important to note that these percentages include all household members in the household sample. The 0-18 years group is primarily composed of young children, both male and female. The 19-49 group included many active males but also includes such groups as mothers who may be less active because of child rearing responsibilities. The fifty and over group contains people who are still physically active as well as the many elders of the community depend on younger residents to provide fish and wildlife.

Households harvested numerous types of resources, illustrated in Figure 9. Half of the households harvested between 0-10 resources, 25 percent of the households harvested 10-14 different resources, and 25 percent of the households harvested more than 15 different resources.

From the random sample it was determined that in 1984 Yakutat households harvested an average of 1,107 pounds of local fish and wildlife resources. This represents 369 pounds of wild resources per household member, which is a substantial average harvest considering that not every resident hunts or fishes.

The quantities of wild resources harvested by Yakutat households during 1984 varied greatly between households, from a low of zero pounds harvested to a high of 8,298 pounds. The households with the lowest harvest consisted of a single individual largely dependent on other households for support. The household with the largest harvest had a large number of members (9 members), and also provided food to numerous other households that were considered part of an extended family. (A summary of harvest information can be found in Appendix D).

## Resource Categories Harvested

The interviews revealed that Yakutat households harvested altogether more then 70 different types of resources during 1984. This would translate into more than 150 actual species of animals and plants since often one resource type included many species (for instance, the category "ducks" contains numerous species). A complete list of resources harvested is contained in Appendix D. Eight different resource categories were created to help analyze and understand general patterns

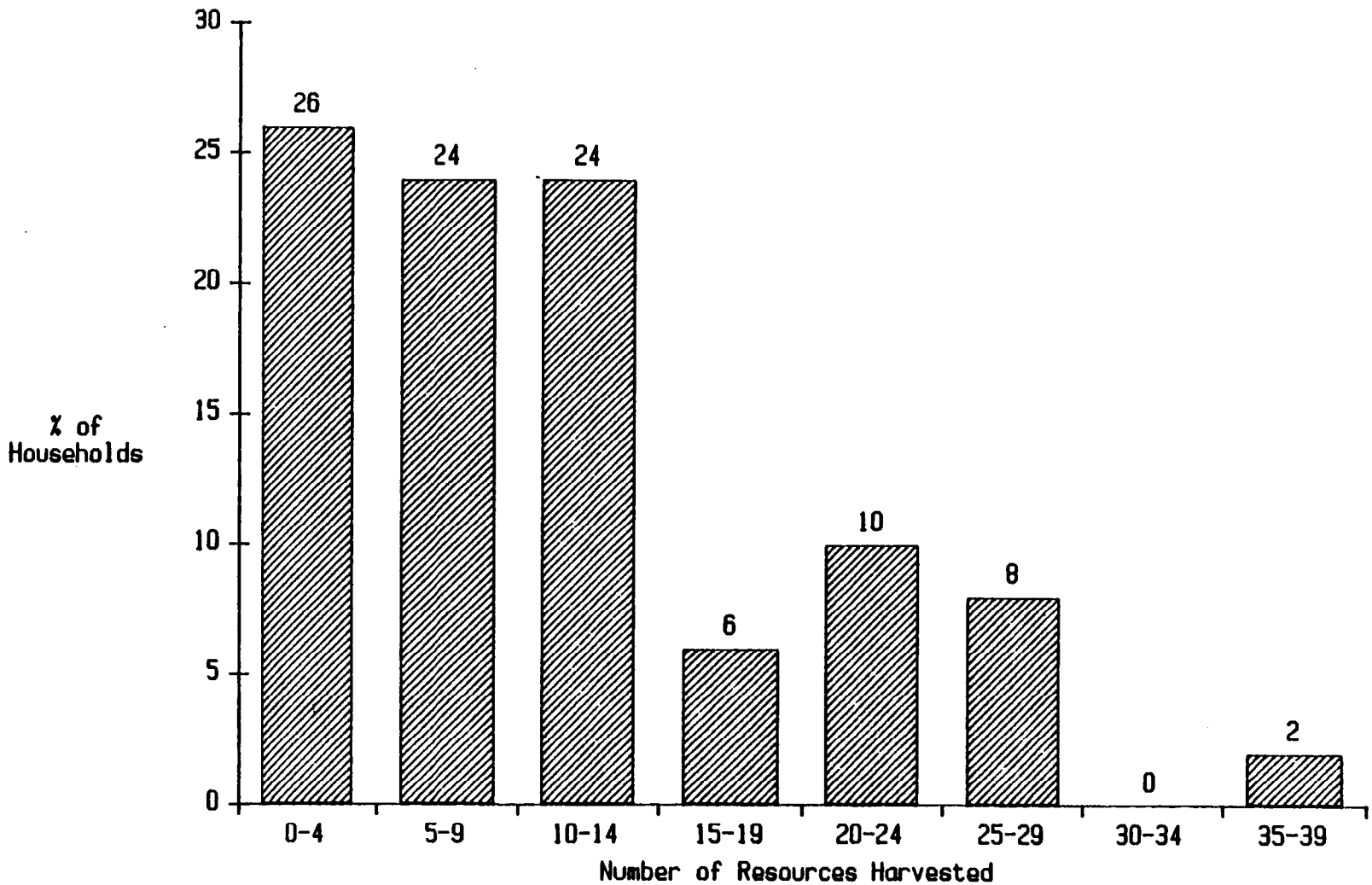



Fig. 9. Percentage of Yakutat households harvesting number of different resources (breadth of resource use) during 1984 (random sample, n=50 households).

of resource use by the community of Yakutat. The discussion that follows is in terms of these categories.

Figure 10 shows the proportion of Yakutat households that successfully harvested particular resources in 1984. While all of the categories are part of the subsistence economy of Yakutat, it can be seen that the harvesting of different resources was accomplished by various segments of the community's households. Plants and berries successfully harvested by almost all of the households in Yakutat (88 percent). Plants and berries could be harvested close to the community by young and old alike without expensive gear or a great deal of strength. However, it does require considerable persistence and sometimes alot of bug repellent. Close to three-fourths of all the households harvested fish and shellfish in 1984. Fish and shellfish are generally abundant in the area and highly desired by local residents. Participation is high, even though special equipment and skills are sometimes needed for a successful harvest. Thirty percent of all households successfully harvested land mammals in 1984. In the case of land mammals, some which are much less abundant than other resources, the percentage of households successful at harvesting was considerably lower than the percent of households attempting to harvest. For example in 1984, 62 percent of all households attempted to harvest moose, but only 22 percent of all households were successful. Certain resources harvested by only a portion of the residents are distributed, by sharing, throughout the community. The inter-relationships of using, harvesting, giving and receiving resources will be explored in detail later in this section.

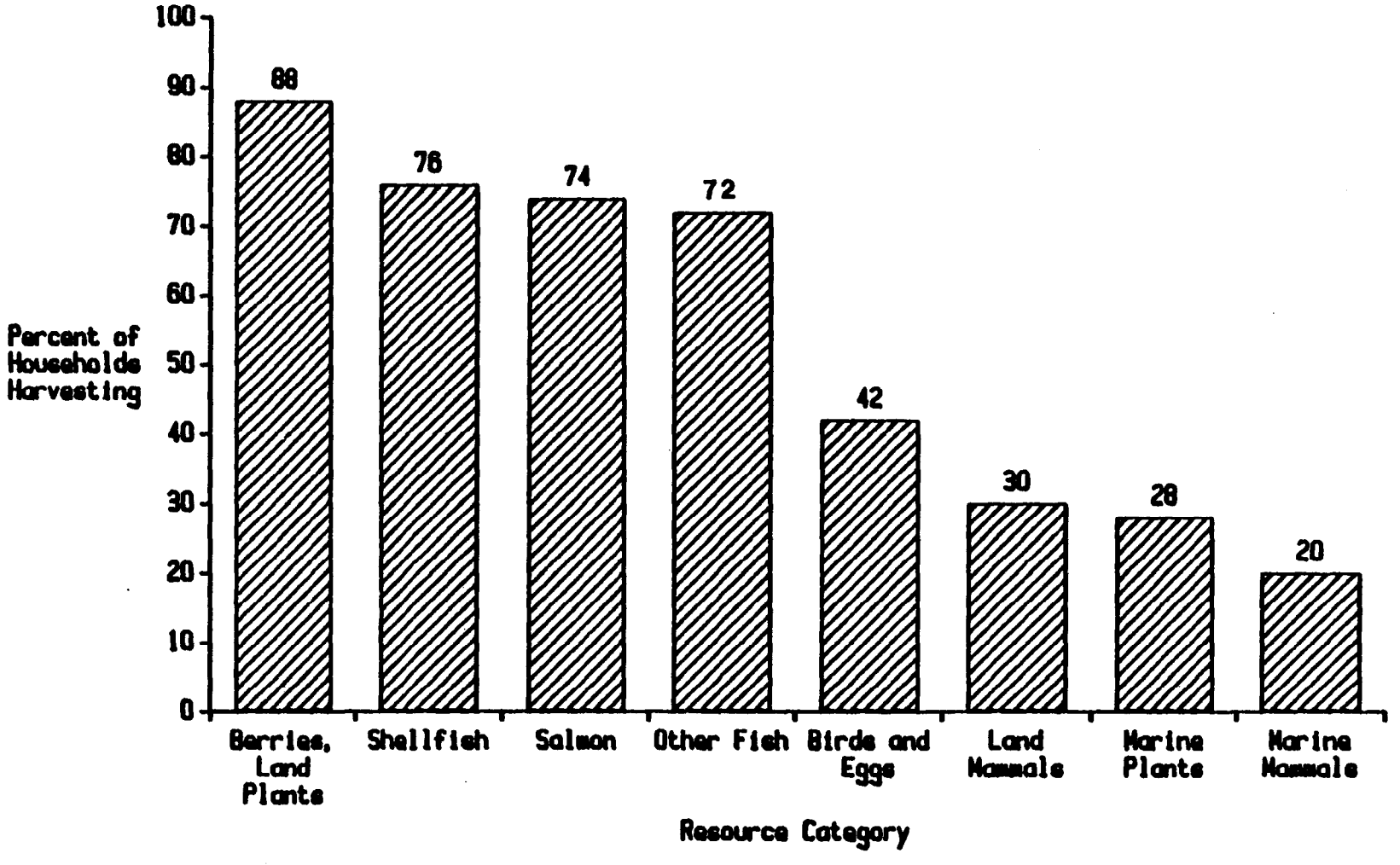



Fig. 10. Percentage of Yakutat households harvesting eight resource categories during 1984 (random sample, n=50 households).

## Resource Harvest Levels

Figure 11 shows the total 1984 Yakutat harvest by weight for the eight resource categories, illustrating the relative proportion that each resource category contributes toward the total pounds harvested. Fish comprised the largest resource category by weight of the total average household harvest, representing 57 percent of the total pounds harvested. By weight, land mammals comprised 14 percent of the total harvests, with moose representing 78 percent of the average land mammal harvest. Shellfish harvests were nearly as large as land mammal harvests in terms of pounds harvested, occupying 12 percent of the catch. The remaining pounds harvested (17 percent of the total harvest) were divided between marine plants, marine mammals, berries and plants, and birds.

Figure 12 depicts these same categories and the average number of pounds harvested for each resource category. In 1984, the randomly surveyed households reported harvesting an average total of 1,105 pounds of wild resources per household. This represents about 369 pounds of wild resources per household member in 1984. The weights recorded are figured in terms of edible (dressed, useable) weights.

These harvest quantities are averages for the entire random sample, whether the household was active or inactive at attempting to harvesting a resource. The average number of pounds harvested by households attempting to harvest these resources are substantially higher than depicted in Figure 12. A good example of this is with marine mammals. Because of regulations prohibiting harvest of seals by non-Natives, and the special equipment and skill required to hunt seals, only 20 percent

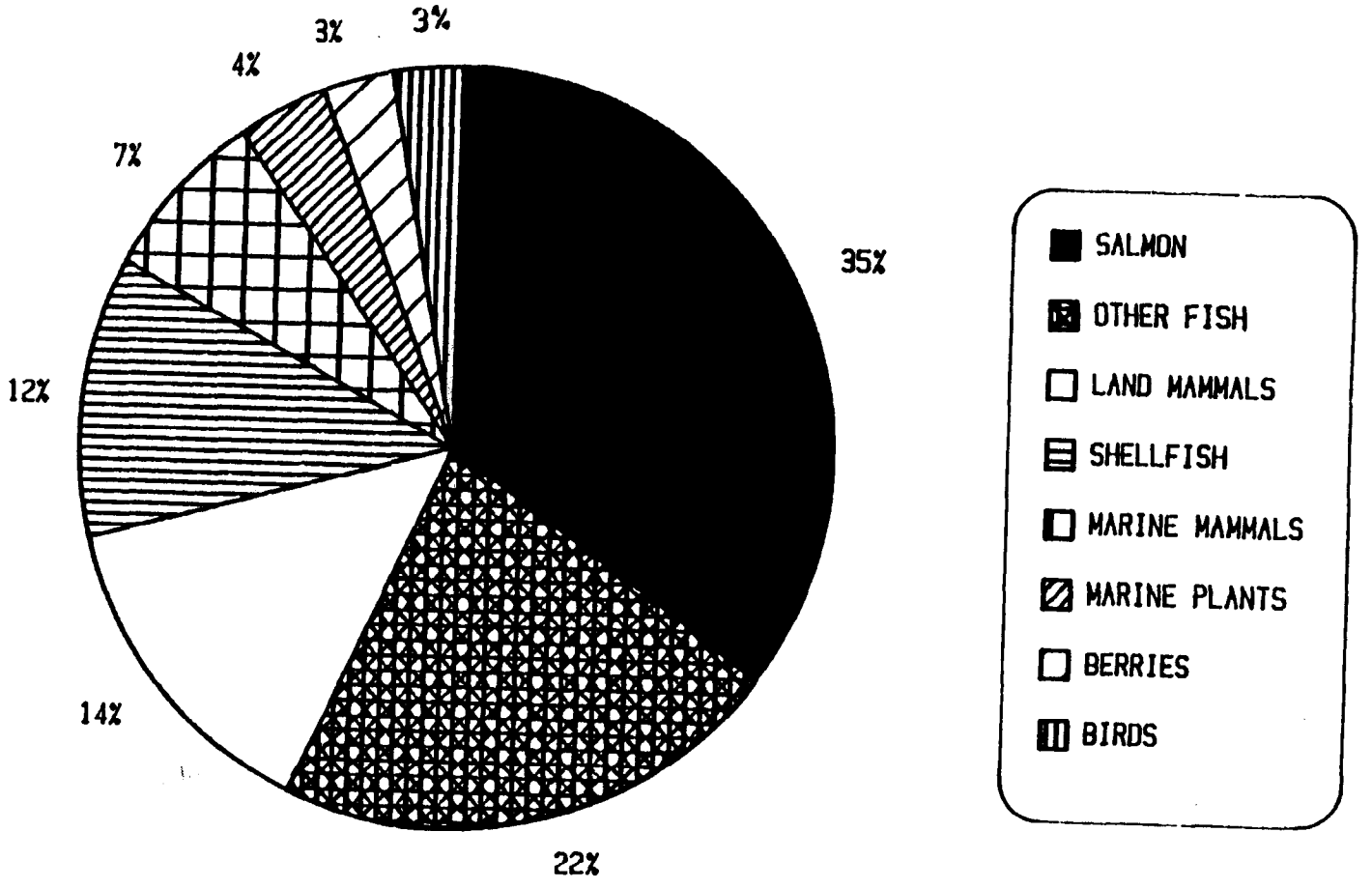



Fig. 11. Total 1984 Yakutat harvest in pounds by resource category (random sample, n=50 households). By weight, salmon comprised 35 percent of the total harvest.

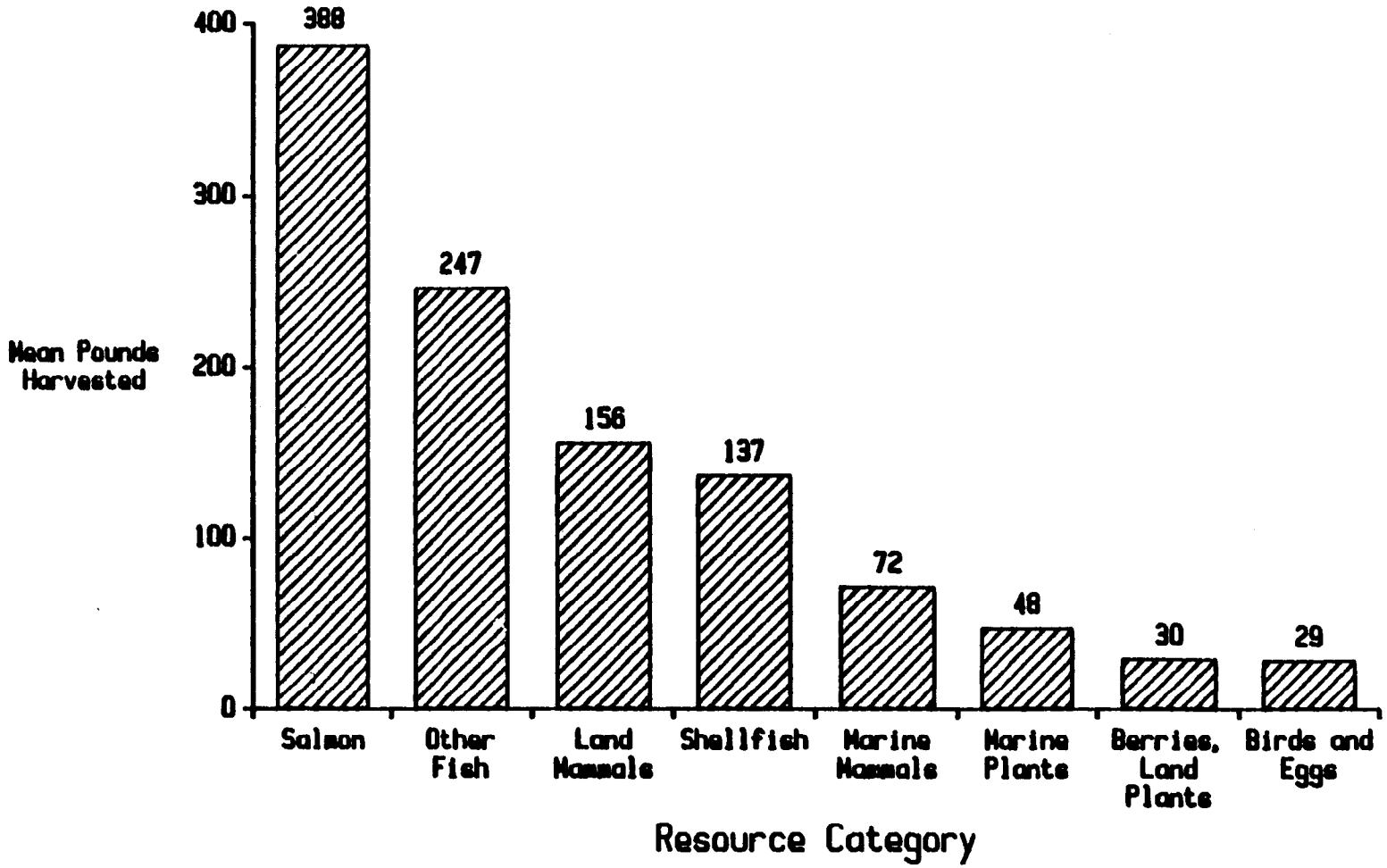



Fig. 12. Mean pounds of wild resources harvested for local use by Yakutat households during 1984 (random sample, n=50 households).

of all households attempted to harvest. Among these households, the mean harvest of harbor seal in dressed weight was 360 pounds per household. This compares with the 72 pounds per household for the entire sample shown in Figure 11. Despite the harvest being by only 20 percent of the households, much of this harvest was shared and 50 percent of Yakutat households reported using seal in 1984. The harvest of shellfish follows a similar pattern. Forty percent of the households harvested dungeness crab and averaged 203 pounds per active household. This compares with 83 pounds per household for the entire sample. The mean number of pounds harvested by all households and active households for each of the resources harvested can be found in Appendix D.

## Salmon Harvest

The harvest of salmon accounted for over one-third of the total average pounds harvested by Yakutat households. Salmon harvesting techniques in the Yakutat area for both commercial and non-commercial uses are quite different than those used in other parts of southeast Alaska. Most of the salmon are harvested in or near the mouths of river systems rather than in ocean waters. In the commercial fishery, most of the salmon are harvested by a set gillnet which is anchored into the river and stretched perpendicular to the shore where it is also anchored. Set gillnets are also used in the ocean just offshore of the breaking surf near the mouths of salmon streams. Commercial trolling for salmon in ocean waters also occurs in the Yakutat area, but not to the degree that is typical in the rest of southeast Alaska. Commercial

seining and drift gill netting did not occur in the area in 1984 or in the recent past.

Non-commercial salmon fishing by residents of Yakutat in 1984 used some of the same methods. Set gillnets were placed in the rivers often at the same locations and by the same individuals who commercial fished. Trolling in the ocean waters by rod and reel (hook and line) was used for the harvest of traveling ocean salmon. In addition to net fishing, rod and reel fishing for salmon was common in the river systems. Occasionally late run silver salmon (red fish) are harvested from shallow streams with a gaff hook or spear.

Figure 13 and Appendix E shows the average number of salmon that were harvested per household for local use in 1984, by gear type for each of the five species present in the Yakutat area, based on the random household sample. Under the listing of commercial harvest by gillnet or handtroll, the salmon harvested represent only those commercially caught fish that were taken home and not sold. The remaining three gear types, gillnet, rod and reel (hook and line), and troll, list fish that were harvested non-commercially. Harvest by means of a gaff hook or spear was reported by one household in the sample and accounted for two silver salmon harvested by this technique in 1984. Figure 14 provides a similar background, but shows only those households who actively fished for a particular species of salmon during 1984 by gear type.

It is apparent from this information, sockeye and coho salmon were on the average harvested in significantly larger quantities than other species by the sampled households. Approximately 21 sockeye salmon and 15 coho salmon per household were harvested across the entire sample.

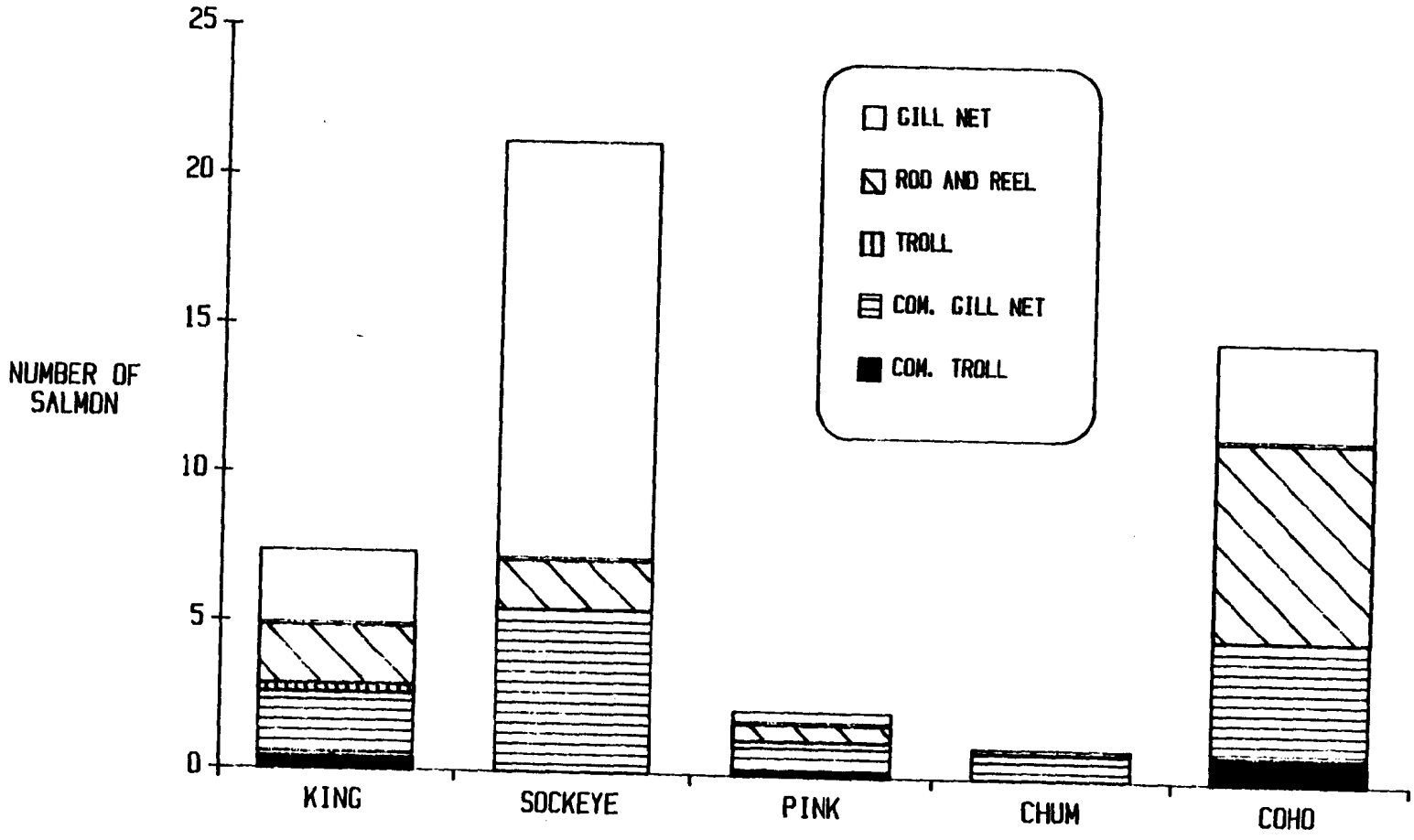



Fig. 13. Mean number of salmon harvested per household by gear type for all surveyed households during 1984 (random sample, n=50 households).

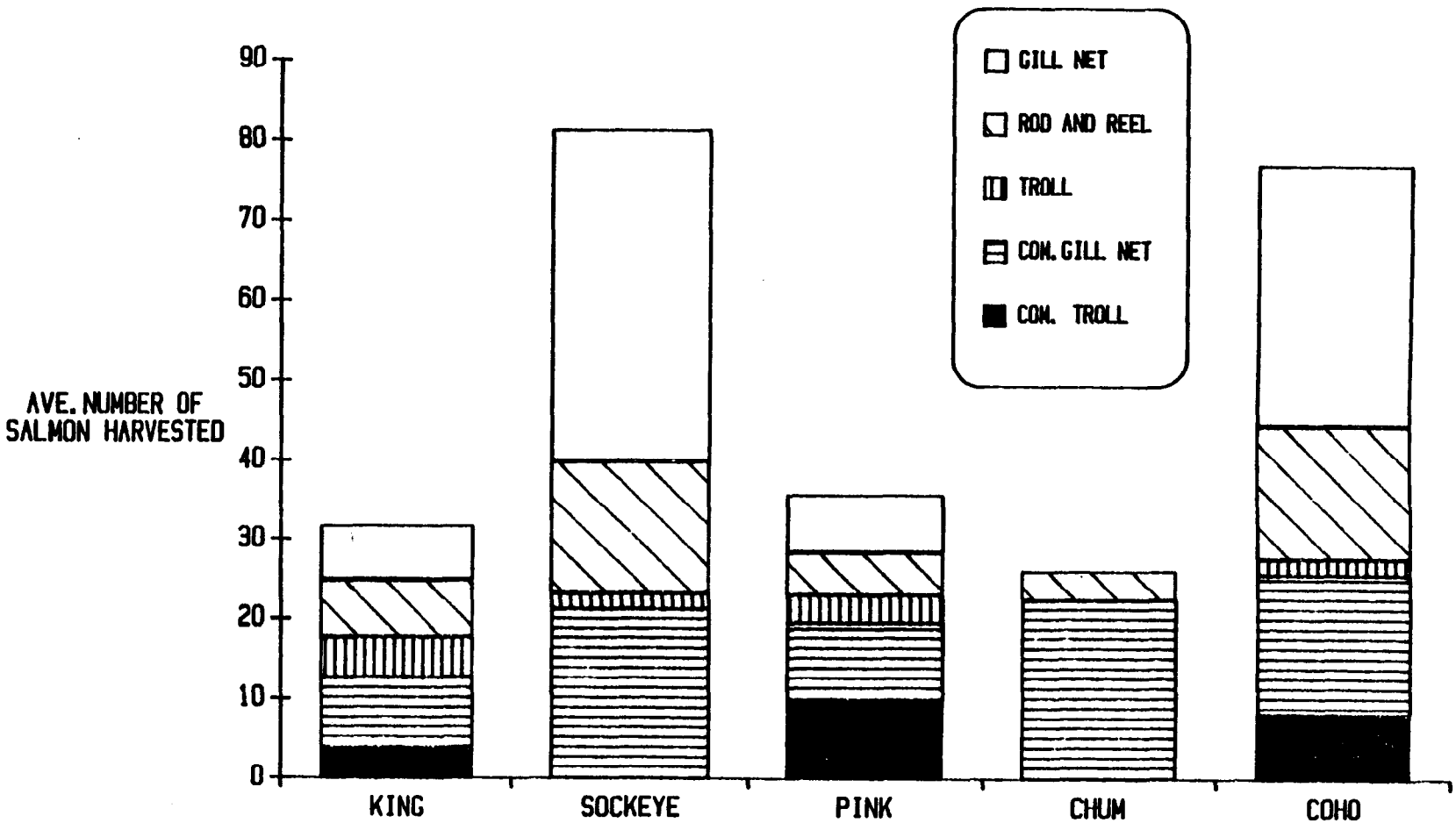



Fig. 14. Mean number of salmon harvested per household by gear type for sucessful households only during 1984 (random sample, data taken from a total of 50 households).

Since salmon species vary in size and weight it is important also to look at the mean pounds of salmon harvested by the individual species. Figure 15 shows that king salmon, sockeye salmon, and coho salmon were harvested in approximately the same amount (by weight) by the sampled Yakutat households in 1984. Each species contributed about 120-130 pounds to the average household harvest. The past couple of years, however, have brought poor runs of sockeye salmon to some of the rivers compared to previous years. Consequently, the harvest of sockeye salmon during 1984 may be unusually low. Pink and chum salmon are harvested in considerably lower quantities and weights than the other three species of salmon.

As shown in Figures 13 and 14, set gillnets (commercial and non-commercial) were the predominate means for harvesting the majority of salmon used by Yakutat households during 1984. Rod and reel fishing for king and coho salmon in the rivers also accounted for a significant portion of the catch for these two species. King salmon are typically caught in set gillnets incidental to the targeted sockeye salmon for which the mesh size was designed to harvest. Rod, reel, hook and line regulations allow the fisher to target king salmon when desired. Coho salmon are harvested by rod and reel techniques in the late summer when the runs are strong and the fish are easily attracted to lures. In 1984 the subsistence net fishing for coho salmon was not opened until after the commercial season was closed in October.

Pink and chum salmon were primarily brought home from commercial gillnet catches. In 1984, local fish buyers were not purchasing pink salmon, and chum salmon prices were not nearly as high as coho, king or sockeye salmon. Despite the higher cash value of coho, king and sockeye

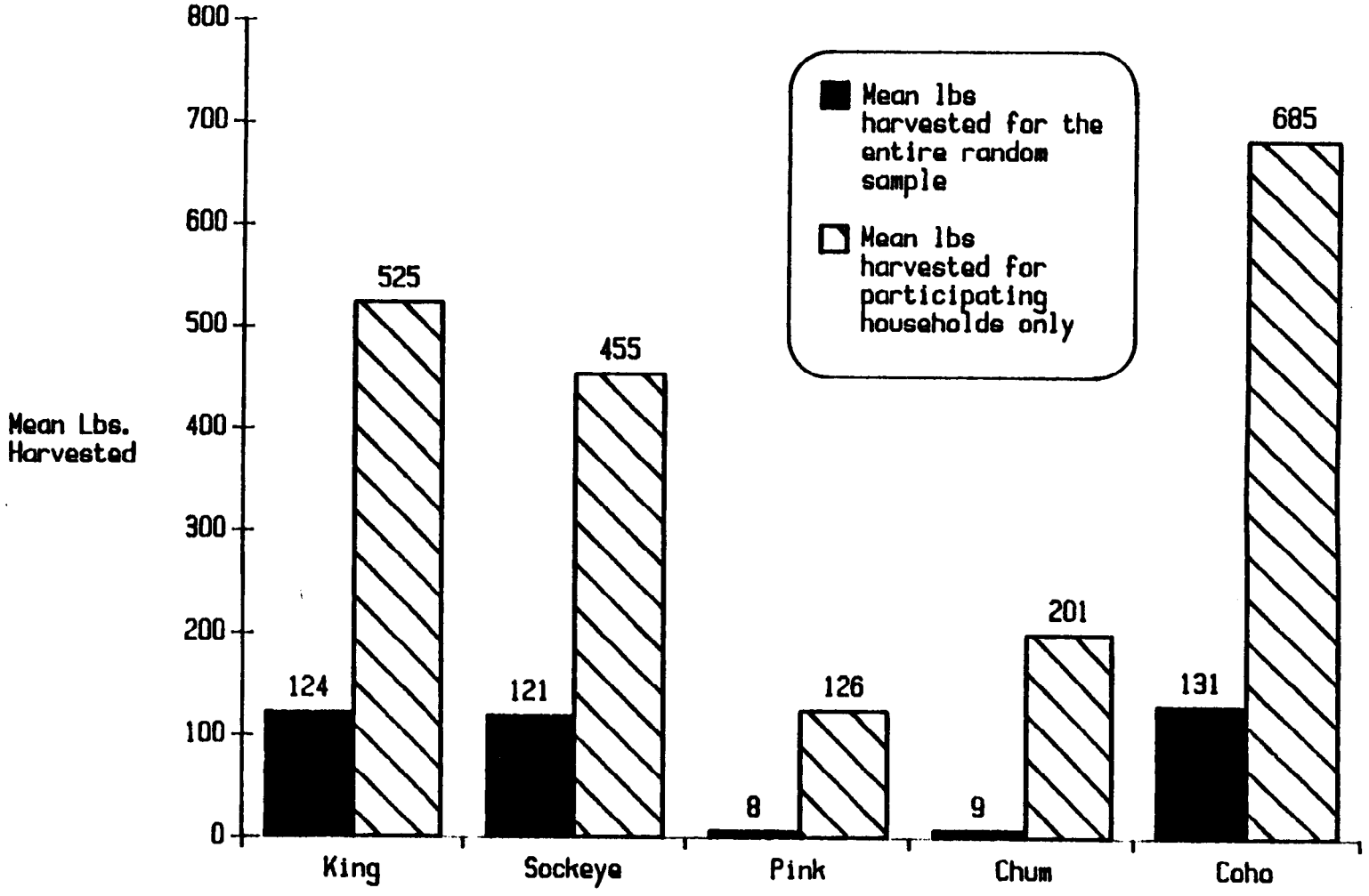



Fig. 15. Mean pounds of salmon per household harvested during 1984 for the entire random sample (n=50), and for participating households.

salmon, these fish were also retained from commercial harvest for home use. Households often chose to keep the fish that were "seal bit" or net damaged, which were rejected or valued less by the commercial buyer.

## Other Resources Harvested

The resource category "other fish" includes a wide variety of freshwater and marine fish (Appendix D). The resources that comprise the major portion of the harvest from this category include halibut, trout, eulachon, capelin, herring, and a wide assortment of bottomfish. All of these resources are used for food and some are also used for bait in harvesting other fishery resources.

As mentioned previously, the majority of the harvest by weight in the land mammals category was moose (78 percent). Other land mammals that were used for food include black bear, brown bear, mountain goat, lynx, beaver, and hare. A variety of furbearers were harvested, but their meat was not used for human consumption.

The shellfish category represented a significant portion of the total average harvest. Sixty-two percent by weight of all shellfish harvested in 1984 were dungeness crab. King crab, Tanner crab, shrimp, clams, cockles, sea urchins, and gumboots also contributed to the shellfish harvest.

Harbor seals were the only marine mammal reported harvested by the sample during 1984. Seals accounted for seven percent of the total pounds of all resources harvested, with an average household harvest of 72 pounds for the entire sample. The marine plant harvest was comprised

of 64 percent sea ribbons, 34 percent black seaweed, and two percent bull kelp.

The categories of berries and plants, and birds and bird eggs, each represented three percent of the mean pounds harvested for Yakutat households. Berries by weight comprised 87 percent of the "berries and plants" category. Ducks represented 76 percent of the pounds of birds and bird eggs harvested.

## Use of Resources

In addition to understanding patterns of harvesting fish and wildlife by Yakutat residents, it is also important to understand how the resource is used after being harvested. Many additional households benefit from one household's harvest, because of the extensive sharing of resources that takes place in Yakutat. Useful measures that help to understand this relationship were collected by asking the randomly sampled households whether they harvested, gave, received, or used a particular resource. Figure 16 presents this information by illustrating the percentage of Yakutat households that responded to these questions and combining the individual resources into the eight resource categories. Similar information for the 73 individual resources can be found in Appendix D.

Resources that were harvested by Yakutat households were used (consumed) within the harvesting households as well as shared with other households. Households that received were given these resources by harvesting households or other households that may also have received a resource from an active harvesting household. In other words, house-

holds that ultimately used or consumed a resource either obtained the product by harvesting it themselves or received it from households that harvested or were given the fish or wildlife.

In Figure 16, household use of resource categories ranges from 12-32 percent higher than the percentage of households that actually did the harvesting. Certain individual resources were harvested by a small percent of the community and consumed or used by a major portion of the community. Scallops and shrimp were harvested by less than 20 percent of the households but were used by over 75 percent of the households. Dungeness crab was harvested by 40 percent of Yakutat households but used by 98 percent. Other resources that were given and received frequently throughout the community are listed in Table 4.

TABLE 4. RESOURCES HARVESTED BY YAKUTAT HOUSEHOLDS THAT WERE FREQUENTLY DISTRIBUTED TO HOUSEHOLDS NOT HARVESTING THE RESOURCE. (RANDOM SAMPLE OF YAKUTAT HOUSEHOLDS IN 1984, n = 50)

| Resource | % of Households Harvesting | % of Households Giving | % of Households Receiving | % of Households Using |
|---|---|---|---|---|
| Dungeness Crab | 40 | 34 | 66 | 98 |
| Shrimp | 18 | 12 | 72 | 86 |
| Scallops | 4 | 0 | 74 | 74 |
| Halibut | 58 | 40 | 58 | 92 |
| King Crab | 8 | 10 | 50 | 50 |
| Tanner Crab | 10 | 10 | 54 | 60 |
| Moose | 22 | 22 | 62 | 70 |
| Seal | 20 | 18 | 34 | 50 |

Moose were successfully harvested by 22 percent of Yakutat households, and all 22 percent shared their harvest with other house-

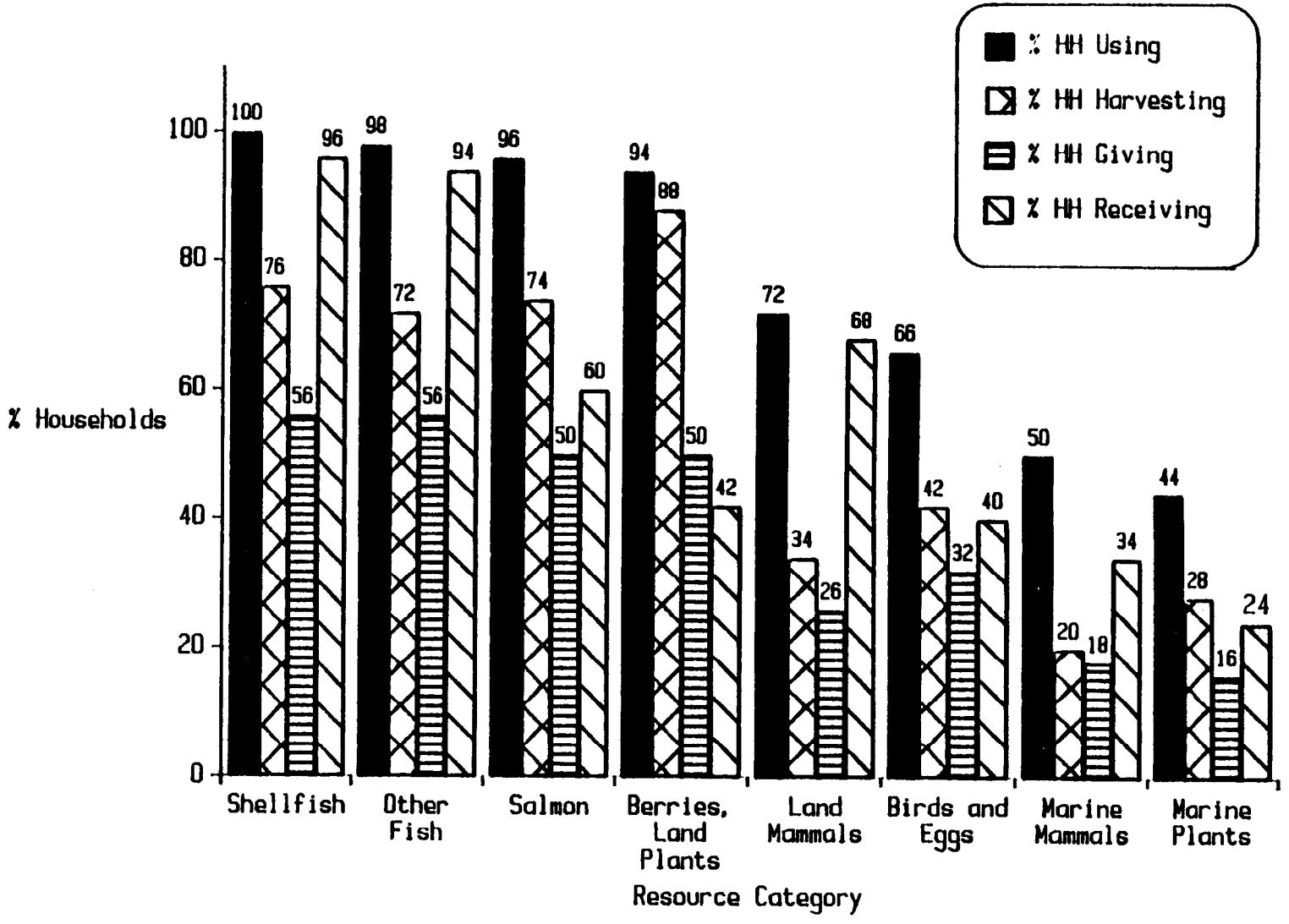



Fig. 16. Percentage of Yakutat households using, harvesting, giving and receiving eight selected resource categories (random sample, 1984, n=50).

holds. Sixty-two percent of the surveyed households reported receiving moose. As is the case with many of the widely distributed resources, even the successful harvesters of a particular resource reported receiving that same resource from another household. Sometimes particular parts of an animal, such as seal liver, were highly desired by a household. Some households would share portions of their harvest with another active harvesting household, knowing that particular parts of an animal were highly desired by their neighbor.

The resource categories most frequently given to others were shellfish, other fish, salmon and berries. These were also the most frequently harvested resource categories, and included those resources that were in abundance and which many households were able to harvest. A surplus of the resource, however, was not necessary before a household would share a harvest. Some households reported harvesting resources that were mostly given to others who were thought to need the item more than the harvester. This was certainly the situation with seal hunting. Many of the younger residents who hunted seals would first make certain the community's elders had sufficient quantities of seal products before keeping any for themselves. Elders would often return the gift at a later day in a processed or preserved form or with resources which they were able to harvest themselves, such as berries.

Resources most frequently consumed or used by a household reflect the combination of harvesting, giving, and receiving. Shellfish were used by 100 percent of the sampled households because of the extensive harvesting and sharing that occurred with these resources. Seven of the eight resource categories were used by 50 percent or more of the

households. The eighth category, marine plants, was used by 44 percent of Yakutat's households.

## Areas Used for Harvesting Fish and Wildlife

### Mapping Methodology

Mapped information was collected on areas used for harvesting fish and wildlife by Yakutat households using two different research strategies. In-depth interviews, which involved numerous meetings, were conducted with 25 key respondents, identified as people from the community who had been residents for more than 15 years, were active hunters and fishers and considered to be knowledgeable of harvesting activities in the area. These people were also selected to represent various age groups, employment types, and ethnic groups that were found to exist in the community. Maps were developed by these key respondents which depicted areas used for harvesting specific resources at recorded time periods during their lifetime. These individual maps were then compiled for all 25 key respondents, by resource groups, for the lifetime of the individuals, creating lifetime composite maps of resources harvested. Additional composite maps were created that displayed areas used for moose hunting and salmon fishing at three different time periods in the community's development. Because of the large area used by Yakutat residents for hunting and fishing it became necessary to divide their use area into three

segments in order to present the mapped information at appropriate detail.

These three areas are defined as:

1) The immediate Yakutat area southeast to the Italio River, north through Harlequin Lake to Nunatak Fiord and east of Yakutat Bay.
2) All lands and water southeast of the Italio River and Harlequin Lake to the Deception Hills.
3) All land and water northwest of Yakutat Bay to Cape Suckling.

An additional mapping effort was conducted with a random selection of 50 Yakutat households representing approximately 30 percent of the total community (the same sample used for the survey). Because of the knowledge of land use acquired from the key respondent mapping described previously, it became possible to divide the entire Yakutat use area into 30 different segments for additional analysis. The randomly selected households were questioned about their general use of these 30 areas over time as well as areas used specifically for moose hunting during their lifetimes. While the two sampling techniques used to collect land use information did involve a major portion of the community's households, it did not cover every resident's use of the surrounding lands. Without a sample of all the households, it's likely that some areas which have been used were omitted. Therefore maps can be considered only a partial representation of areas important to Yakutat residents. For additional information on hunting and fishing by Yakutat residents see the "Seasonal Round" section of Chapter 4.

## Areas Used During the Lifetime of Key Respondents

### Moose

Figures 17, 18, and 19 depict areas used for moose hunting during the lifetime of the key respondents. Since recorded history, moose first began to populate the Yakutat Forelands in the early 1930s by migrating down the Alsek River. Their populations grew rapidly and significant harvest began in the 1950s and continued in 1984. The highest level of harvest was during the 1960s when the moose population peaked.

Moose are usually hunted in open areas and brush field habitats of the coastal forest lowlands. River outwashes, river banks, muskeg and ocean and lake beach areas provide natural openings where moose are often hunted. Residents interviewed seldom hunted for moose in the forest or in man-made clearings, preferring these natural opening adjacent to the forested areas. In 1984, 62 percent of the randomly surveyed households in Yakutat hunted moose, 22 percent were successful and 70 percent of the households used moose meat.

Moose have been harvested throughout the Yakutat Forelands area from Yakutat Bay to the Deception Hills from what may be a number of separate populations. Since the mid-1970s a winter hunt has also occurred on a bench of land north of Russell and Nunatak Fiord and south of the St. Elias Mountain range. The out-wash plain of the Malaspina Glacier along the Mandby shoreline from Bancas Point to Sitkagi Bluffs is used for moose hunting. In the Icy Bay area moose have been hunted from the Tyndall Glacier through the Yahtse River

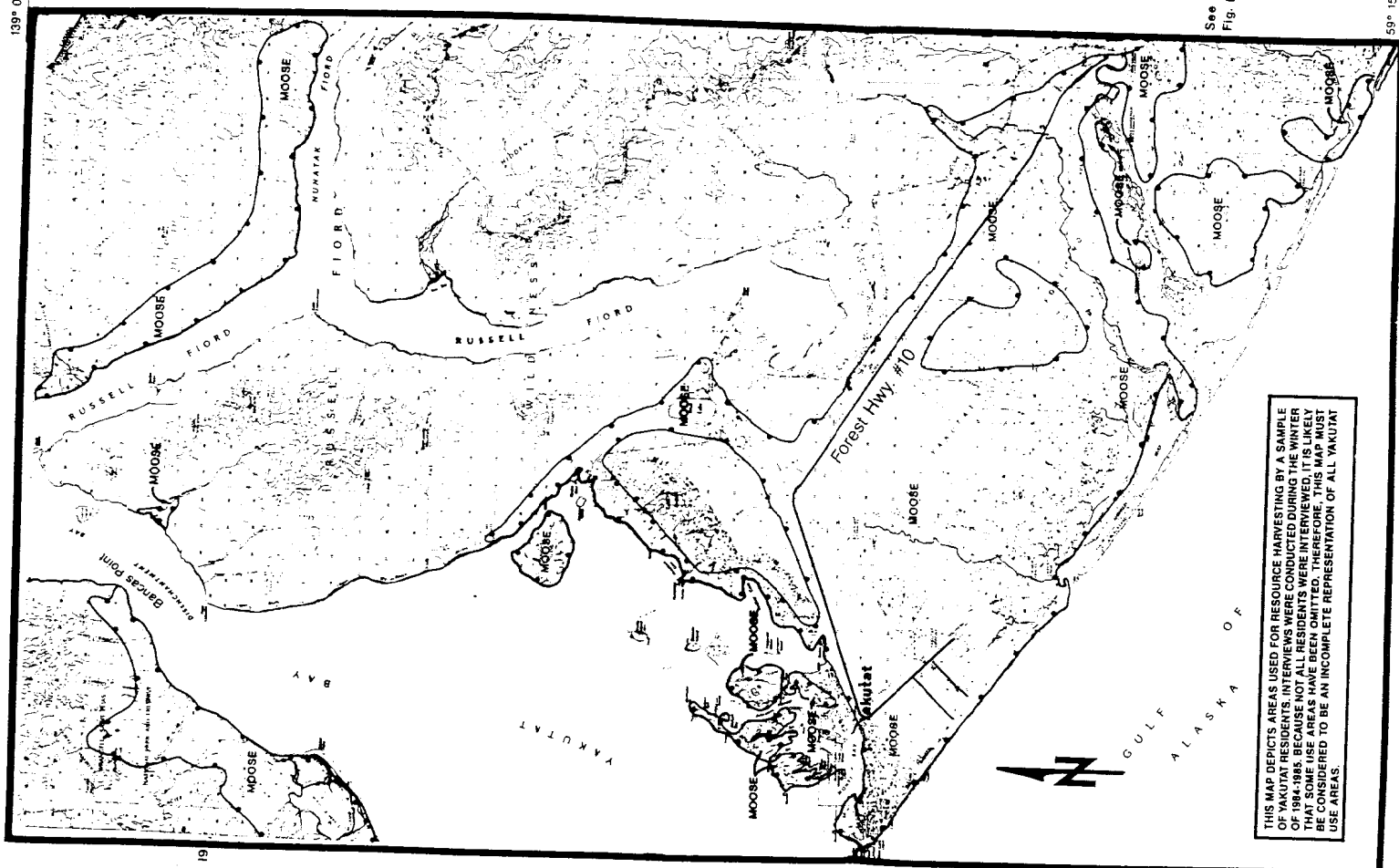



**FIG. 17 AREAS USED FOR MOOSE HUNTING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.**

MOOSE HUNT AREA

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

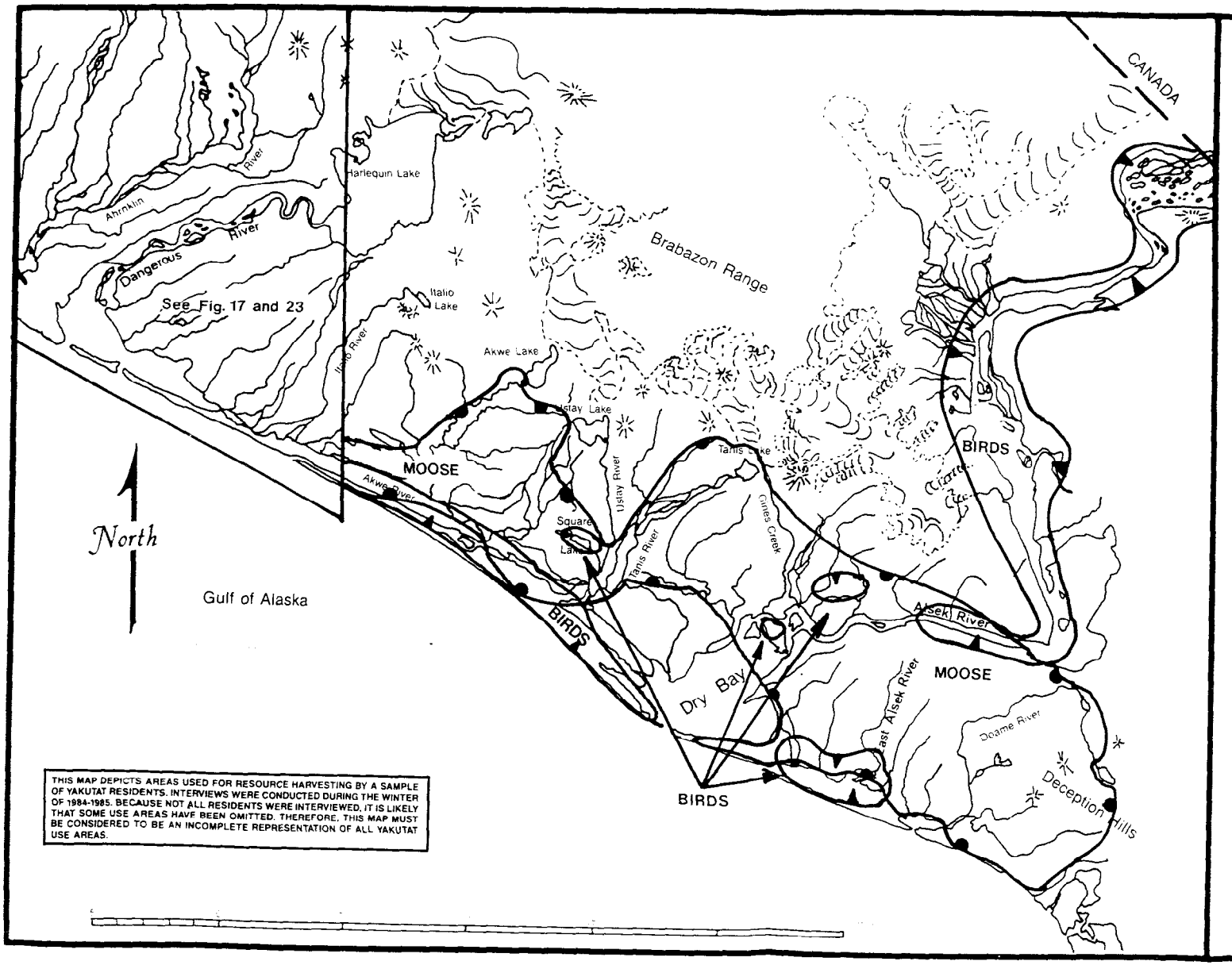
SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM

USFS 1:100,000, Sheet No. 36

0 1 2 3 4 5 6 7 8 9 10 miles

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985




THIS MAP DEPICTS AREAS USED FOR RESOURCE HARVESTING BY A SAMPLE OF YAKUTAT RESIDENTS. INTERVIEWS WERE CONDUCTED DURING THE WINTER OF 1984-1985. BECAUSE NOT ALL RESIDENTS WERE INTERVIEWED, IT IS LIKELY THAT SOME USE AREAS HAVE BEEN OMITTED. THEREFORE, THIS MAP MUST BE CONSIDERED TO BE AN INCOMPLETE REPRESENTATION OF ALL YAKUTAT USE AREAS.

FIG. 18 AREAS USED FOR MOOSE AND BIRD HUNTING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.

MOOSE

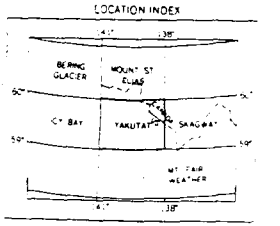
BIRDS

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

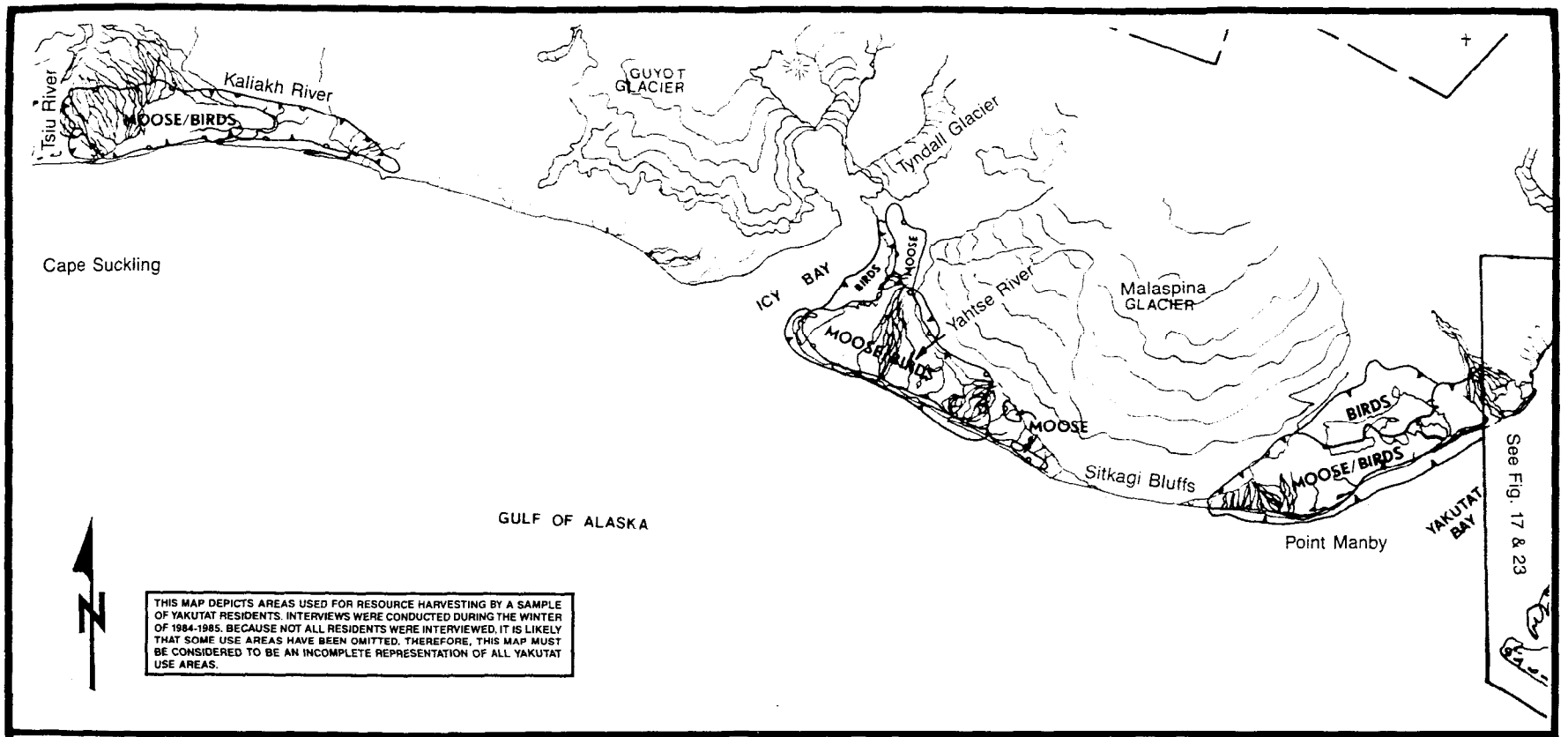
SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS YAKUTAT 1:250,000 QUAD.

LOCATION INDEX




ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985




0 2 4 6 8 10 miles

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS YAKUTAT, MT. ST. ELIAS, ICY BAY, AND BERING GLACIERS QUADS.

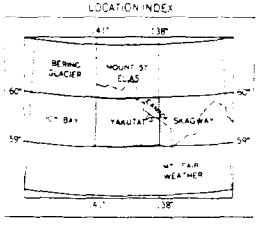



FIG. 19 AREAS USED FOR MOOSE AND BIRD HUNTING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.

MOOSE

BIRDS

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985

out-wash, east to the Sitkagi Bluffs. Moose were also reported harvested while residents commercial fished in the area west of Cape Yakataga to the Tsiu River. A detailed discussion of areas used for moose hunting through time, and changes in access through time can be found in Chapter 5 on transportation and access to fish and wildlife resources.

Bear

Both brown bear and black bear are harvested by Yakutat residents. The number of bears that key respondents remember being harvested before moose arrived to the area were higher than the number presently harvested by Yakutat residents. A few Yakutat residents have served as hunting guides or assistant guides, who are hired primarily by out of state hunters who hunt for both brown and black bear. In 1984, six percent of the randomly surveyed households in Yakutat hunted bears, and eight percent of the households used bear meat.

Bear are hunted along the shoreline of Yakutat Bay and Russell Fiord during the spring when they are feeding on beach greens and roots (Fig. 20). They are also taken along the Situk River from the mouth to the head waters of Situk and Mountain Lakes. Bear are also harvested near the mouths of the Italio and Akwe Rivers and up the river to Akwe Lake (Fig. 21). The entire Dry Bay area was a frequently mentioned bear hunting location, including the Alsek River ten miles above the lake and on both sides of the river below the lake, including most of the area that is now Glacier Bay National Preserve.

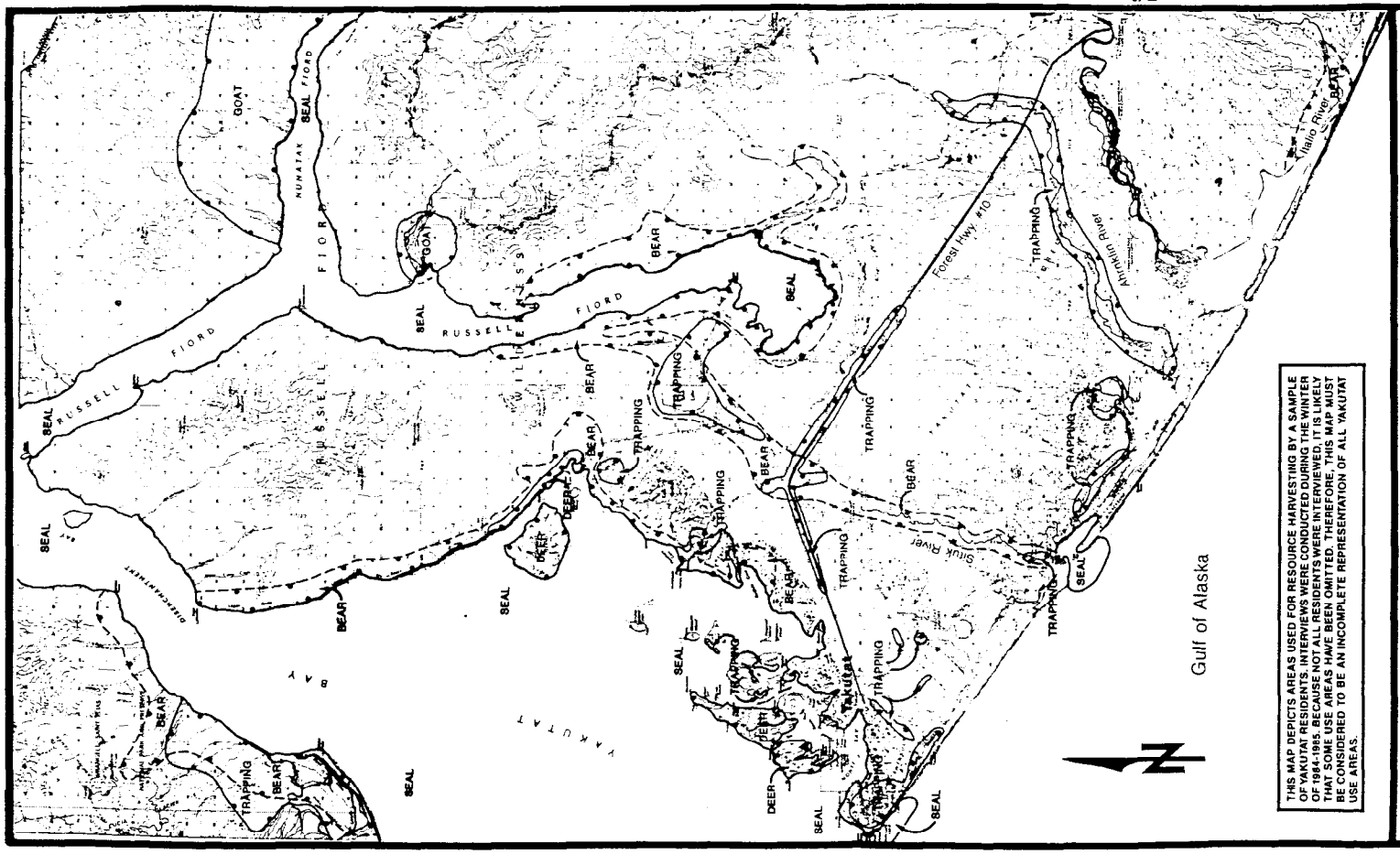



**FIG. 20 AREAS USED FOR MOUNTAIN GOAT, BEAR, DEER AND SEAL HUNTING AND FURBEARER TRAPPING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.**

HUNTING AREA

- Mountain Goat
- Bear
- Deer
- Seal

TRAPPING AREA

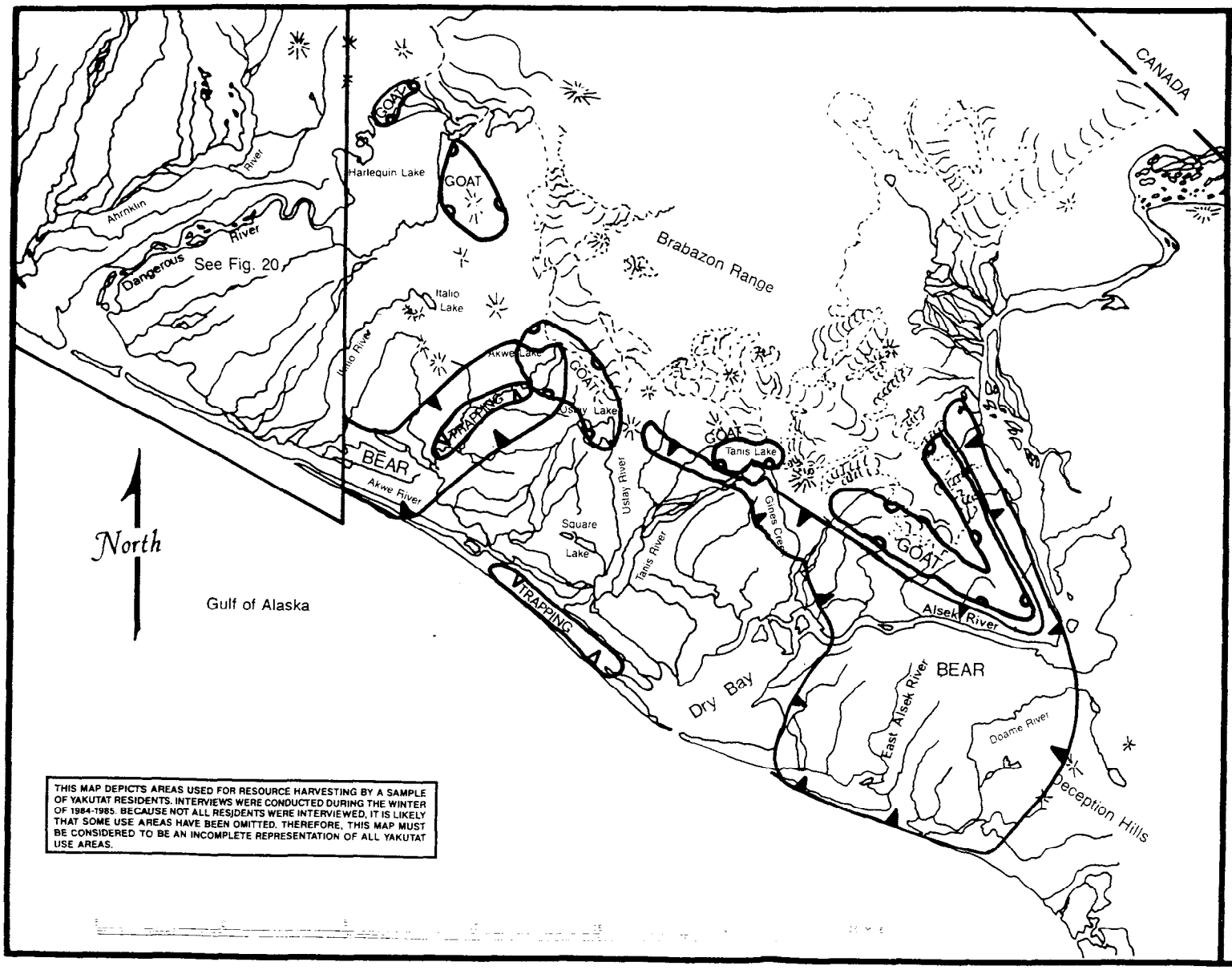
INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USFS 1:100,000, Sheet No. 36

0 1 2 3 4 5 6 7 8 9 10 miles

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985




THIS MAP DEPICTS AREAS USED FOR RESOURCE HARVESTING BY A SAMPLE OF YAKUTAT RESIDENTS. INTERVIEWS WERE CONDUCTED DURING THE WINTER OF 1984-1985. BECAUSE NOT ALL RESIDENTS WERE INTERVIEWED, IT IS LIKELY THAT SOME USE AREAS HAVE BEEN OMITTED. THEREFORE, THIS MAP MUST BE CONSIDERED TO BE AN INCOMPLETE REPRESENTATION OF ALL YAKUTAT USE AREAS.

FIG. 21 AREAS USED FOR MOUNTAIN GOAT, BEAR, DEER AND SEAL HUNTING AND FURBEARER TRAPPING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.

Mountain Goat

Bear

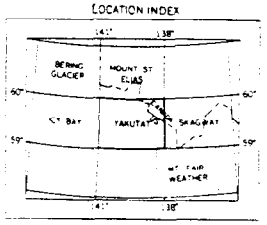
TRAPPING AREA

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS YAKUTAT 1:250,000 QUAD.

LOCATION INDEX



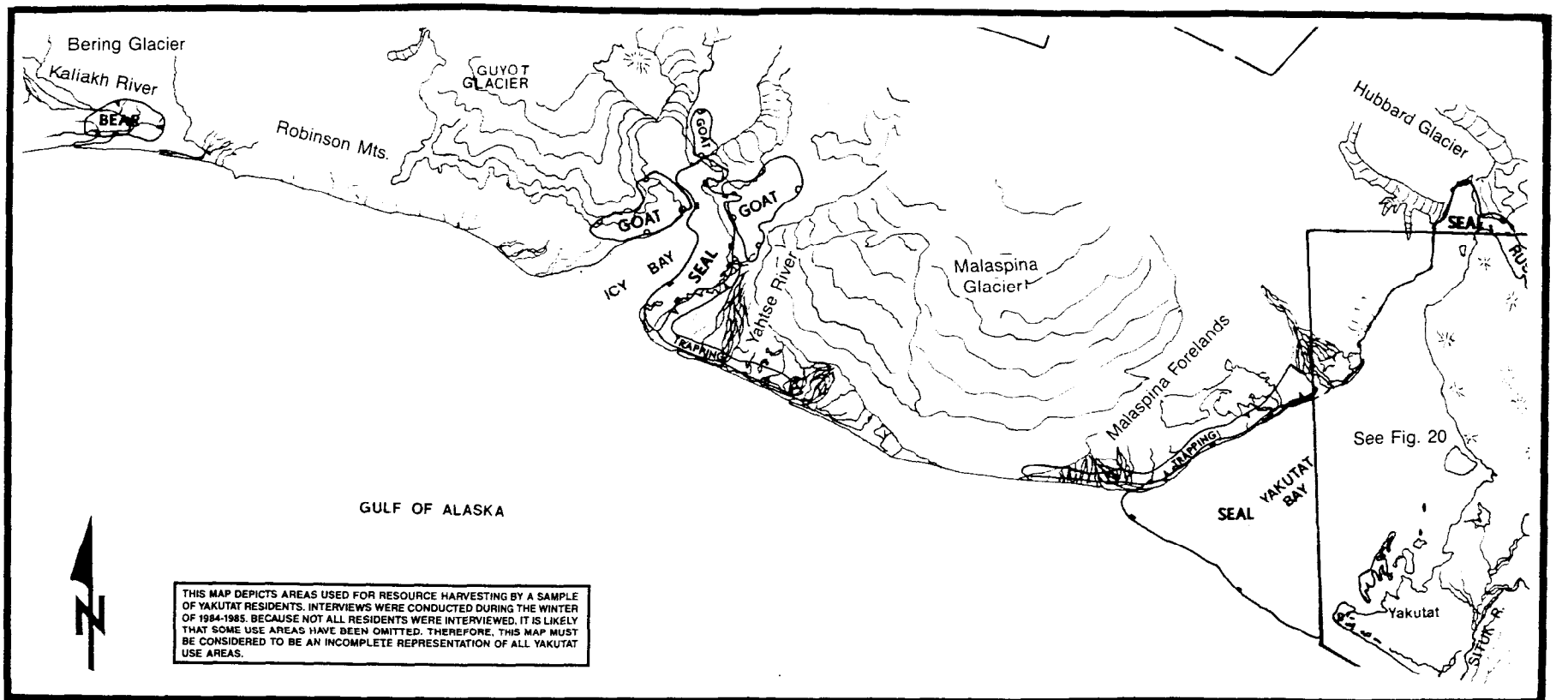

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985

Bears are also taken northwest of the Alsek River along the mountains to Tanis Lake, and to Ustay Lake. Across Yakutat Bay to the north, bears were harvested along the Mandby shore and near the mouth of the Kaliakh River north of Cape Yakataga (Fig. 22).

## Mountain Goat

Historically, Mountain goats have been used by Native people of the area for food, clothing and weaving hair into blankets (de Laguna 1972). Some of the small, numerous villages that were spread along the coastline were located in close proximity to accessible populations of goats, including settlements that were located near Icy Bay, Akwe River and Dry Bay. The centralized population at present day Yakutat requires residents to travel considerable distances to harvest mountain goat. In 1975 a regulation change allowing one goat to be harvested per hunter per year (previously two were allowed), has decreased the number of Yakutat residents who make the long trip to Icy Bay. The closure of the area around Harlequin Lake in 1983 has also decreased participation in goat hunting activities. Eight percent of the Yakutat households surveyed hunted for mountain goat and 12 percent reported using mountain goat in 1984.

Mountain goats were usually harvested in rugged areas with steep rocky cliffs and difficult access. The goats usually inhabitat these areas for protection from their natural predators, wolves and bears. Most goats are taken from these cliff areas but occasionally, during heavy winter snows, goats are also taken along the beach at sea level. One resident reported seeing a goat during the winter on Point Riou,




0 2 4 6 8 10

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

Base map adapted from
USGS Bering Glacier,
Mt. St. Elias, Icy Bay,
Yakutat
1:250,000 Quads

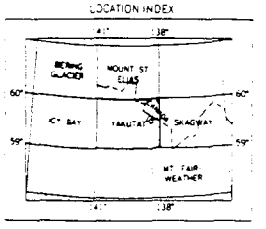



FIG. 22 AREAS USED FOR MOUNTAIN GOAT, BEAR, DEER AND SEAL HUNTING AND FURBEARER TRAPPING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.

HUNTING AREA

Mountain Goat

Bear

TRAPPING AREA

Seal

ALASKA DEPARTMENT OF FISH AND GAME
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near Icy Bay, about 12 miles away from the protection of any cliffs. The season for hunting goats opens in late summer. While the weather is usually easier on hunters at this time, most goats are high on the ridges. A number of Yakutat residents reported they normally wait until the fall when snows often force the goats to lower elevations.

Figures 20, 21 and 22 show areas used, during the lifetime of Yakutat respondents, for mountain goat hunting. Areas that were used include the Deception Hills southeast of the Dry Bay and the Brabazon Mountain range northwest of Alsek Lake. Also the mountainous areas around Ustay, Akwe, and Harlequin Lakes were used as well as the mountain areas on the north shore of Nunatak Fiord. North of Yakutat Bay, the rugged cliff areas around Icy Bay were also used for mountain goat hunting.

## Seal

Historically, seal camps were established near the tide water glaciers of Icy Bay and Yakutat Bay (de Laguna 1972). In the spring when the seals congregated to give birth on ice bergs they were harvested for meat, oil, internal organs and furs. During the 1930s and 1940s the U.S. Government paid a bounty for seals. Yakutat residents, both Native and non-Native, hunted seals during these years for food as well as cash. Since the early 1970s, regulations have limited seal hunting to Alaskan Natives. In 1984, 20 percent of the total random sample and 41 percent of the Native households in Yakutat harvested harbor seal. Fifty percent of all the surveyed households used seal in 1984.

Local residents harvested seals throughout Yakutat Bay, Disenchantment Bay, Russell Fiord and Nunatak Fiord, throughout the year (Fig. 20, 21 and 22). Important areas within these waters which were commonly used as haul out sites include island reefs exposed during low tides. Also, floating ice bergs created by calving glaciers are used by seals for resting and giving birth.

Other areas reportedly used for seal hunting include the entrances to major salmon producing streams along the Yakutat Forelands, where seals are frequently feeding on returning salmon, and Icy Bay where seals concentrate on ice bergs. During 1984, the parts of the entire seal continued to be used by many of Yakutat's residents. Meat, oil, fur and internal organs were used from most seals harvested.

Deer

Sitka Black Tail Deer are not native to the lands around Yakutat but were transplanted to the area in the 1940s by the U.S. Government. They have been hunted on the islands and the shoreline of eastern side of Yakutat Bay, however the population has never been large (Fig. 20). Because of winters with heavy snow, predation, and young post-glacier forests that exist on the Yakutat Forelands, populations deer have been limited to the Yakutat Bay Islands and the mainland near Yakutat. Since 1981 hunting of deer has been prohibited in the Yakutat area because of low populations. In 1984, six percent of the randomly surveyed households in Yakutat hunted deer, primarily on Admiralty,

Chichagof and Baranof Islands, and 22 percent of the households used deer meat.

## Furbearers

As previously mentioned, trapping, which was once a widespread activity among Yakutat households prior to the 1970s, is now conducted by a limited number of households. This decline is in part due to market conditions that resulted in low prices received for southeast Alaskan furs. Trapping does continue on a limited basis in the area and has been an important aspect of subsistence and cash economies during the lives of the Yakutat residents interviewed.

Many of the areas trapped have been informally recognized as being owned by individuals or groups of people. These local land use rights are often similar to traditional clan ownership boundaries. Permission was often sought before an individual would begin trapping in an area that was recognized as belonging to a particular clan or individual. Rights to a particular trapping area were not forfeited when another trapper was allowed to use the area and the land use rights were generally passed down from family or clan members. Presently, this system of recognized land use rights is most apparent among trapping activities and is generally respected within the Native community. As new residents move into the area who are not familiar with traditional land uses and rights, this system of ownership is beginning to change as it has with other resource harvesting activities.

In 1984, 16 percent of the randomly surveyed households in Yakutat trapped furbearers. The most common animals trapped included mink, martin, land otter and wolf. Other furbearers trapped were hare, beaver, lynx, wolverine, coyote, weasel and squirrel. Hare, beaver, and lynx were used as food as well as for their fur.

Figures 20, 21 and 22 show areas used by the Yakutat key informants during their lifetimes while trapping furbearers. The islands of Yakutat Bay, northwest of the community, have been used for trapping. Many of these have local names after people who had or have trapping rights on the island. Trapping also occurred throughout the Ankau slough system, along the Situk River and Lake, near the mouth of the Seal River, Black Sand Island and the entire length of the Ahrnklin River. Trapping has also occurred on the eastern shore of Yakutat Bay near the outlets of rivers. Since the construction of roads, traplines have also been set adjacent to minor logging roads and oil and gas test site access roads as well as along portions of Forest Highway #10. Trapping was also reported along the Akwe River and along the forested beach fringe from the Akwe Slough to Dry Bay. North of Yakutat Bay most of the coastal area of the Malaspina Forelands south of Sitkagi Bluffs has been used for trapping. Also the southeast shoreline of Icy Bay and south down the coast to Yana stream was reported by the key respondents as being used for trapping during their lifetime. The oldest trapper within this group was 72 years old and started trapping with his family in the 1920s.

Birds

During the spring, summer and fall months the sounds of migrating birds often fill the air around Yakutat. Many of the waterfowl that breed in Interior and Arctic Alaska travel through the north Gulf of Alaska coastline on their way north and south. In addition many of these same waterfowl spend the summer on the wetlands that exist near Yakutat. Historically, these birds have been hunted during the spring during the northern migration, through the summer, and the fall during the southern migration. Regulations have prohibited the harvest of spring waterfowl in the area, consequently most of the harvesting in recent years has taken place during the fall. Gull and tern eggs continued to be harvested throughout the area as they have in the past. In 1984, 12 percent of the randomly surveyed households in Yakutat gathered seabird eggs and 32 percent of the households used these eggs for food. Forty-two percent of this same group hunted birds and 66 percent of the households used wild birds for food in 1984.

A large diversity of birds were used by Yakutat residents in 1984. Some of the more commonly harvested birds included: willow ptarmigan, canada geese, white fronted geese, whistling swan, sandhill crane, and snipe. The most commonly harvested ducks included: mallard, green winged teal, pintail, halequin, old squaw, canvasback, goldeneye, scaup, bufflehead, shoveller and widgeon. Birds were generally hunted in the open wet lands and coastal areas through the Yakutat Forelands, Malaspina Forelands and the Tsiu and Kaliakh Rivers flood plain. Ptarmigan were hunted during the winter along river

banks and in open meadows. Waterfowl are hunted near ocean sloughs, lakes, protected ocean waters and the open flats near the mouths of rivers.

Figures 23, 18 and 19 show areas that have been used for harvesting birds or eggs during the lifetime of the key respondents. Willow ptarmigan and waterfowl were hunted up the Alsek River to the Canadian border as well as on the flat open areas of Dry Bay. Waterfowl were taken near the sloughs of the East and Doame Rivers south of Dry Bay and north along the Gulf of Alaska coastline in the many sloughs and lakes from Dry Bay to Yakutat Bay. A few small sandy islands in the middle of Dry Bay were used to harvest tern eggs as were the black sand beaches near the mouth of the Situk and Ahrnklin Rivers. The Yakutat Bay Islands, the wetlands in the vicinity of the Yakutat Airport and Situk Lake were also areas used to harvest waterfowl. Open meadows near Harlequin Lake and glacier outwashes in Russell Fiord are used to hunt willow Ptarmigan. Haenke Island in Disenchantment Bay near the Hubbard Glacier is an important site for harvesting gull and Kittiwake eggs.

North of Yakutat Bay, Yakutat residents harvested waterfowl from the beach and wet land areas of the entire Malaspina Forelands from near Point Bancas to the Situkagi Bluffs including the Malaspina Lake area. Also, near Icy Bay, waterfowl were harvested in the Yahtse River outwash area and Riou Bay. Gull eggs were harvested on small nesting islands near the middle of Icy Bay. West of Cape Yakataga Yakutat key respondents reported taking waterfowl in the wetland areas of the Tsiu and Kaliakh Rivers.

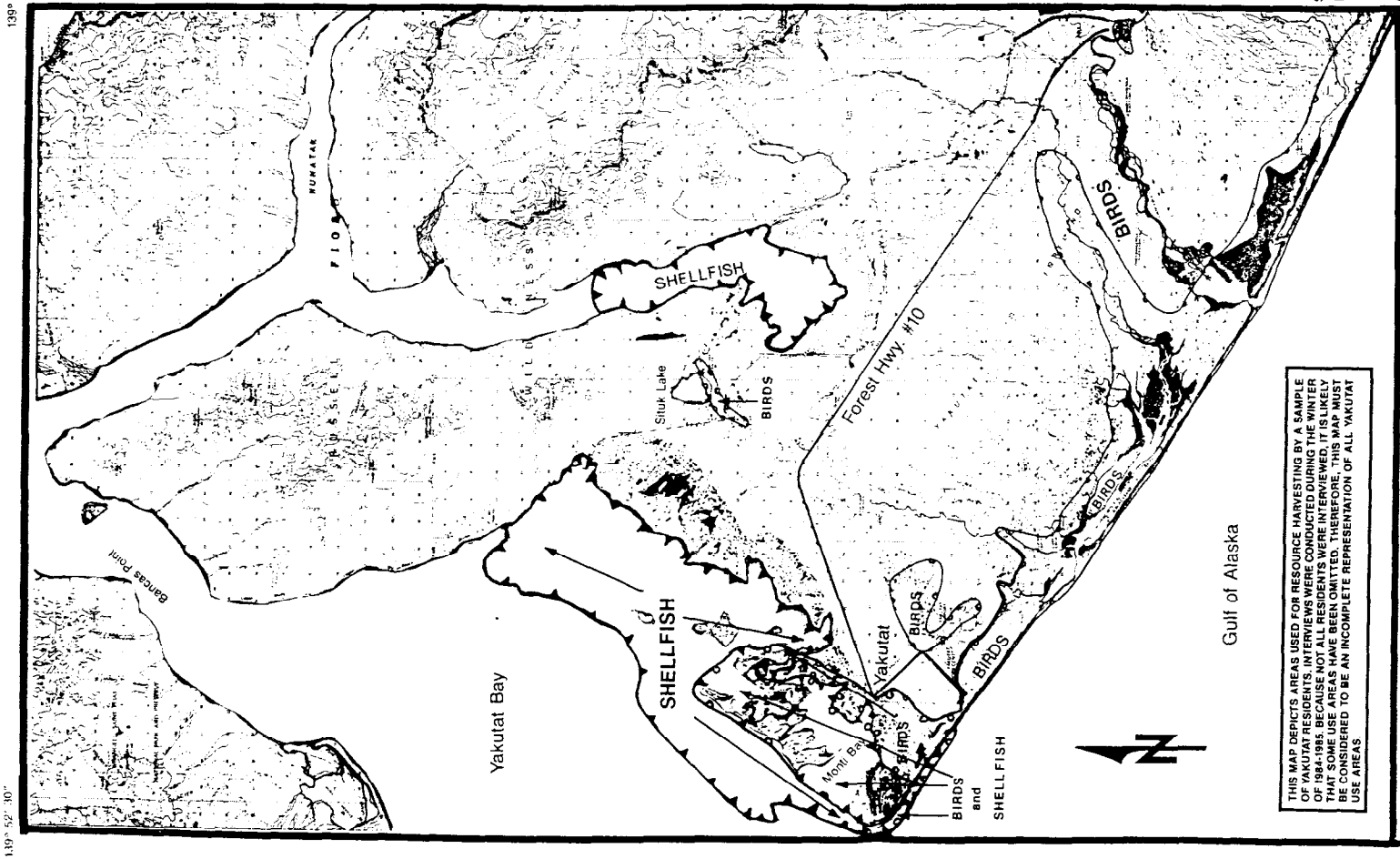



FIG. 23 AREAS USED FOR BIRD AND SHELLFISH HARVESTING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.

BIRD HUNTING AREA

SHELLFISH HARVESTING AREA
Also Includes Marine Plants and Herring Eggs

BIRD AND SHELLFISH HARVESTING AREA

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM
USFS 1:100,000, Sheet No. 36

0 1 2 3 4 5 6 7 8 9 10 miles

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985

Gull and tern eggs, often called "pigeon eggs" locally were considered a highly desired food by many Native households in Yakutat. Harvested eggs were shared extensively throughout the community and especially with Native elders. The hunting of ducks and geese was an activity in which non-Native households participated frequently.

## Shellfish and Marine Plants

The area of the islands and protected ocean waters immediately west and north of Yakutat were frequently referred to as the "ice box" by Yakutat residents. This area has been used for generations by residents for shellfish and "beach food". All of the reported harvesting of shellfish and marine plants by the key respondents took place in and near the Yakutat Bay Islands area (Fig. 23). This area was used year-round as needed for the harvest of :

| | |
|---|---|
| Cockles | Shrimp |
| Clams | Black seaweed |
| Tanner, king, dungeness crab | Sea ribbons |
| Black gumboots | Kelp |
| Sea urchins | Herring eggs on kelp or hemlock branches |

In 1984, 76 percent of the randomly surveyed Yakutat households harvested shellfish and 100 percent of the households used shellfish for food. Marine plants were harvested by 28 percent of the households and used by 44 percent.

The island area is relatively protected from the ocean surges and is easily accessed by small skiffs from many of the resident's homes

or the community boat harbor. Another important shellfish harvesting area near the community is the Ankau Lagoon and lake system across Monti Bay from the city of Yakutat. This area can be reached by skiff or road and provided a diverse abundance of intertidal foods for Yakutat residents.

## Fishing

Fishing has been a vital part of the cash and subsistence economies of Yakutat since the early 1900s. Prior to that time the Tlingit Indians of the Yakutat area had shaped their communities and culture around fishing activities. In 1984 these fishing activities continued to be a vital part of the communities economic, physical and cultural health. Fish accounted for 57 percent of the average total pounds of wild resources that were harvested by Yakutat residents in 1984.

### Commercial Fishing

Commercial fishing by Yakutat residents has been conducted by a variety of techniques since the turn of the century, with most of the effort directed toward salmon fishing. Key respondents began commercial fishing as long ago as the 1920s and recall the Libby cannery operator supplying fishers with the necessary equipment and transportation to fishing sites. Large tender boats would transport groups of Yakutat fishers to Dry Bay where they would drift net for king and sockeye salmon for a number of weeks before being transported back to Yakutat. Company boats were also reported to have taken crews to the

southern portion of Russell Fiord where they seined for pink salmon. The railroad from Yakutat to the mouth of Situk River transported Yakutat residents to the river and fish and people back to Yakutat. In addition the Ahrnklin, Italio, Akwe, Alsek, East and Doame Rivers were major rivers reported to have commercial salmon fishing operations on the Yakutat Forelands.

In the last 30 years commercial salmon fishing operations have become individual businesses with the fisher providing all needed transportation and equipment and selling the fish product to companies who process the fish. Most of the major streams from Dry Bay to Cape Suckling are commercially fished by Yakutat residents as well as non-residents who have obtained limited entry permits. Set gillnets are used to harvest salmon in rivers and at the mouths of rivers immediately outside the surf. King, sockeye and coho salmon are targeted by the commercial set gillnet fishery and limited chum salmon fishing occurs in the Dry Bay area. Many Yakutat set gillnet fishers base their operations near Yakutat by fishing the Situk River area but also travel as far south as the East River near Dry Bay to fish for sockeye and 150 miles north to the Tsiu and Kaliakh Rivers while fishing for coho salmon (Figures 24, 25 and 26).

Other areas that key respondents have used for commercial fishing include the major rivers of the Yakutat Forelands (Akwe, Italio, and Situk sloughs, Fig. 24 and 25). They also have used rivers of the Malaspina Forelands including the entire area from Alder stream near Pt. Manby north to Esker stream (Fig. 26). The Yahtse River and Yana stream near Icy Bay were also used by Yakutat commercial set gillnet fishers. The commercial set net fishery has been a vital part of the

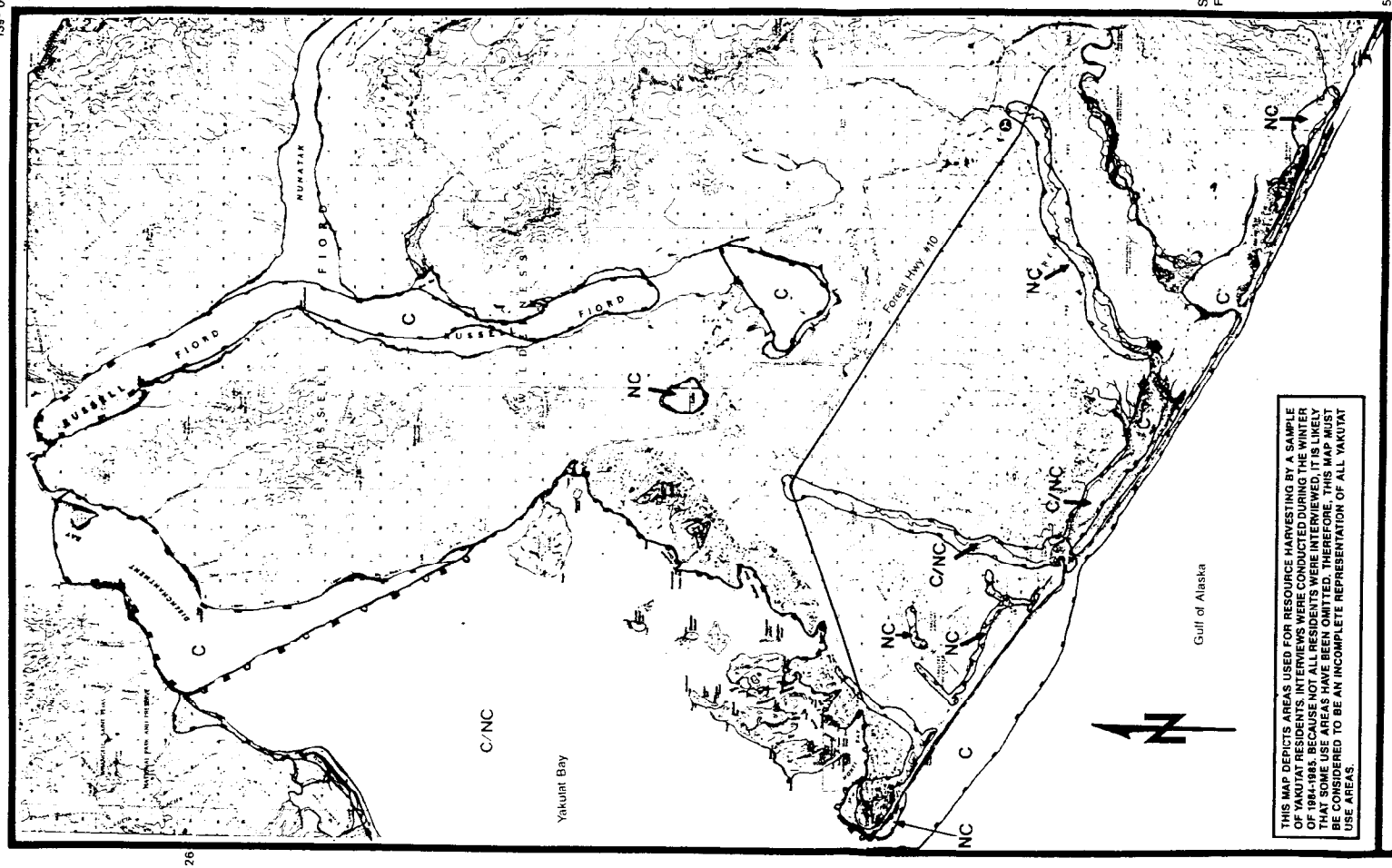



**FIG. 24 AREAS USED FOR COMMERCIAL AND NON-COMMERCIAL FISHING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.**

COMMERCIAL FISHING AREA

NON-COMMERCIAL FISHING AREA

COMMERCIAL AND NON-COMMERCIAL FISHING AREA

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

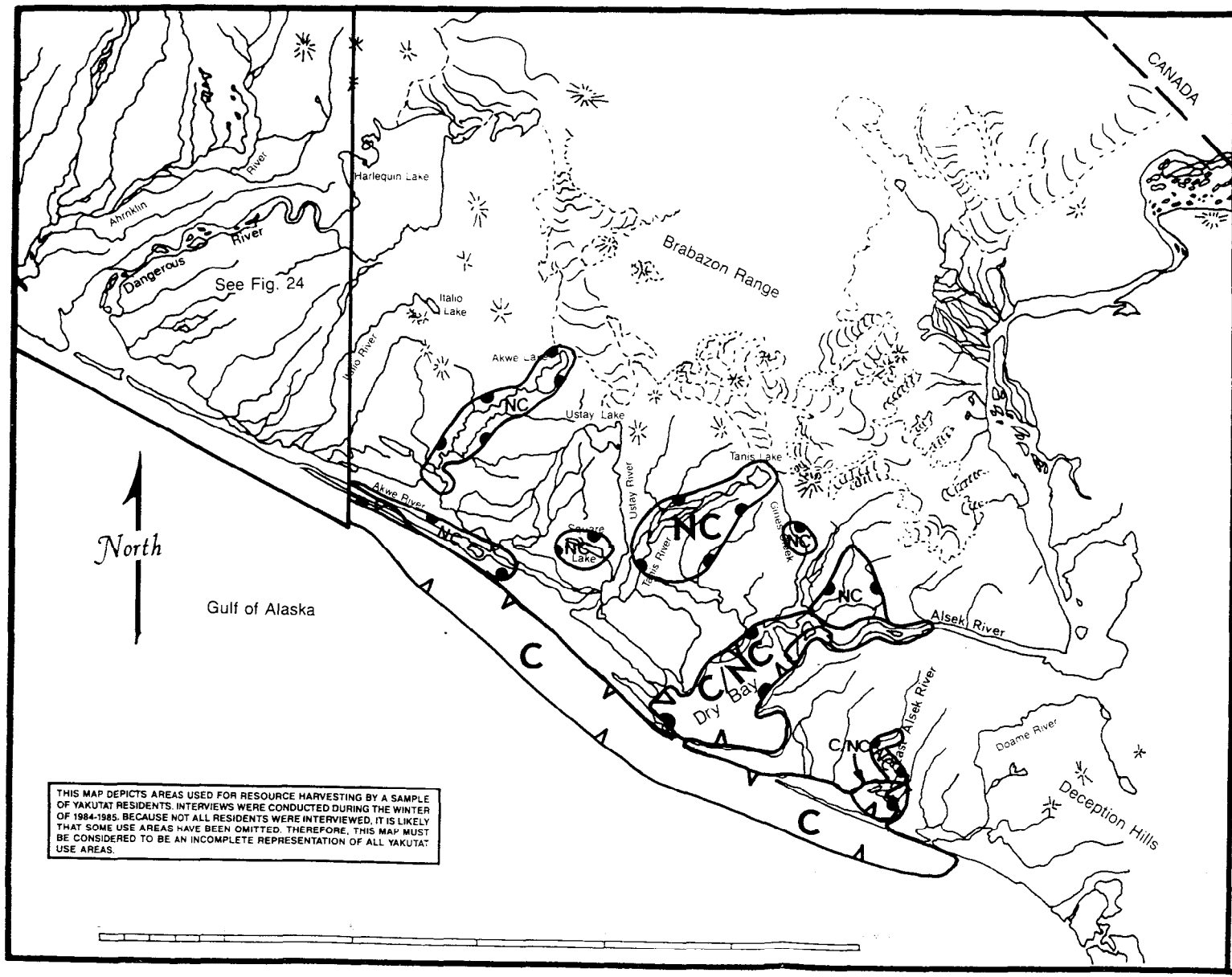
BASE MAP ADAPTED FROM

USFS 1:100,000, Sheet No. 36

0 1 2 3 4 5 6 7 8 9 10 miles

ALASKA DEPARTMENT OF FISH AND GAME

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985




THIS MAP DEPICTS AREAS USED FOR RESOURCE HARVESTING BY A SAMPLE OF YAKUTAT RESIDENTS. INTERVIEWS WERE CONDUCTED DURING THE WINTER OF 1984-1985. BECAUSE NOT ALL RESIDENTS WERE INTERVIEWED, IT IS LIKELY THAT SOME USE AREAS HAVE BEEN OMITTED. THEREFORE, THIS MAP MUST BE CONSIDERED TO BE AN INCOMPLETE REPRESENTATION OF ALL YAKUTAT USE AREAS.

FIG. 25 AREAS USED FOR COMMERCIAL AND NON-COMMERCIAL FISHING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.

NC — NON-COMMERCIAL FISHING AREA

C — COMMERCIAL FISHING AREA

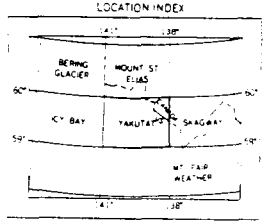
C/NC — COMMERCIAL AND NON-COMMERCIAL FISHING AREA

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS YAKUTAT 1:250,000 QUAD.

LOCATION INDEX

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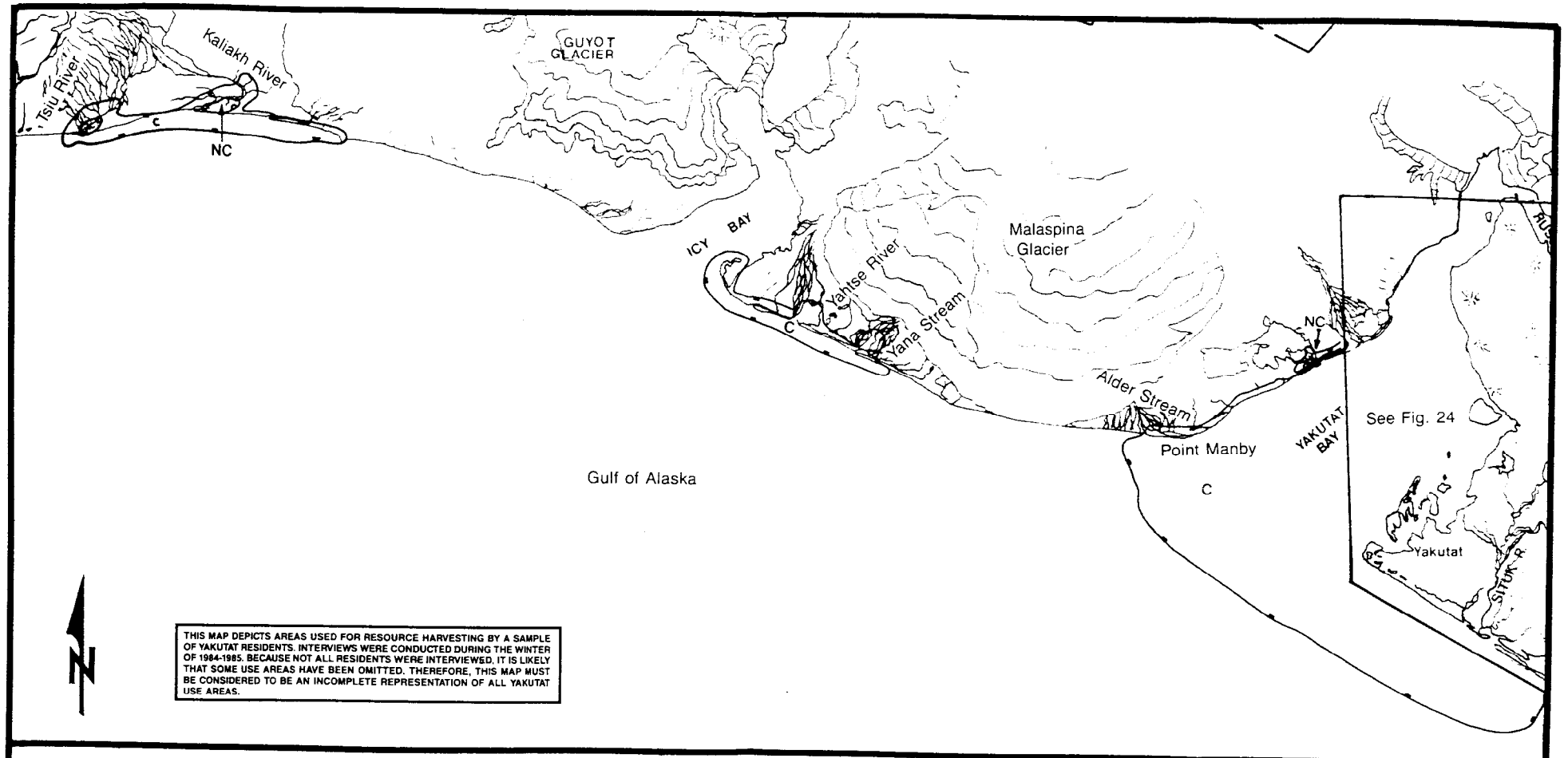


0 2 4 6 8 10 miles

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

Base map adapted from
USGS Bering Glacier,
Mt. St. Elias, Icy Bay,
Yakutat
1:250,000 Quads

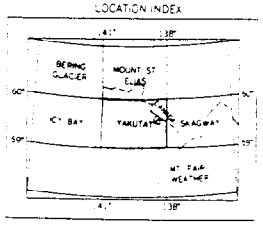


FIG. 26 AREAS USED FOR COMMERCIAL AND NON-COMMERCIAL FISHING DURING THE LIFETIMES OF YAKUTAT KEY RESPONDENTS.

COMMERCIAL FISHING AREA

NON-COMMERCIAL FISHING AREA

COMMERCIAL AND NON-COMMERCIAL FISHING AREA

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subsistence economy of Yakutat by providing cash for the purchase of equipment and supplies for other harvesting activities, as well as providing unsold salmon directly to Yakutat residents for home use.

In 1984, 26 percent of the randomly surveyed households in Yakutat commercial gill netted for sockeye salmon and used a portion of their catch at home. Of the households who harvested sockeye salmon with commercial gillnets, an average of 21 sockeye salmon were brought home from commercial gillnet catches (Fig. 14).

Salmon were also harvested commercially by power and hand trolling in ocean waters. King and coho salmon are the targeted species for these trollers. Key respondents reported trolling the entire waters of Yakutat Bay from Ocean Cape to Disenchantment Bay as well as major portions of Russell Fiord. Trolling also occurred on the Gulf of Alaska coastal waters, when weather permitted, especially near the mouths of the major salmon streams. During most of the winter months, occasional trolling takes place for winter king salmon which are caught in limited numbers from the ocean waters near Yakutat. As the summer approaches, the number of king salmon harvested in this fishery increases. The peak of activity from commercial trolling peaks in late August, when the coho salmon are in abundance in ocean waters preparing to spawn. In 1984, 12 to 14 percent of the randomly surveyed households in Yakutat used coho salmon and king salmon (respectively) at home, caught from their commercial troll catch. This percentage amounted to one half of the number of households that removed king and coho salmon from their commercial set gillnets for home use. However, troll caught salmon were important to overall

household use since some of the fish was harvested during winter months when fresh salmon is scarce.

Other commercially harvested resources that were significant to residents of Yakutat in 1984 include halibut, Tanner crab, dungeness crab, king crab, shrimp and scallops. Halibut fishing was an activity that most commercial salmon fishers also participated in since the halibut season in 1984 lasted only three days and it occurred before the opening of the gillnet season. Most of the fishing occurred in Yakutat Bay especially in the vicinity of the Islands. Fishers with large boats also set halibut skates in the coastal waters of the Gulf of Alaska, north toward Icy Bay and south of Yakutat Bay towards Dry Bay (Fig. 1). A few households reported fishing for halibut even further south, towards Cape Fairweather. Commercial fishing for crab and shrimp by Yakutat residents occurred primarily in the waters of Yakutat Bay and near by coastal waters. Scallop fishing took place in these same waters as well as in the deeper waters off of Yakutat Bay in the Gulf of Alaska. Since the gear used in fishing for crab, shrimp and scallops is specialized and often expensive, the number of households that actually harvested these resources was low but due to extensive trading, sharing and occasionally the exchange of cash, these resources were used by households throughout the community. For example, only four percent of the Yakutat households reported harvesting scallops in 1984, and most of these were harvested commercially. However, 74 percent of the households used scallops during the year. Similarly Tanner crab were harvested by 10 percent and used by 60 percent of the households.

## Non-Commercial Fishing

As explained previously, commercial fishing by Yakutat households often provides fish that is used in the homes of the fishers and is also shared with other households without the exchange of cash. In 1984, approximately one third of the average pounds of salmon harvested, from the randomly surveyed households in Yakutat, came from commercial fishing, the remaining 66 percent of the salmon harvested came from non-commercial activities.

Non-commercial salmon are harvested in a manner similar to commercial fishing operations. The use of set gillnets in the rivers is labeled subsistence fishing by regulation and is conducted in the same manner and in many of the same places as commercial set net fishing but at different times of the week or times of the year, according to regulations. Trolling for salmon takes place in the ocean waters by means of non-commercial skiffs or boats and by using a rod and reel with hook and line. Many of the same areas used by commercial trolling operations are also used by the non-commercial trollers. Rod and reel fishing for salmon take place from the shoreline of rivers throughout the Yakutat Forelands.

The use of a spear or gaff, for taking salmon, reported to be common 20 to 30 years ago, was only occassionally used in 1984. Spears and gaffs were used for selectively fishing for late run coho salmon ("red fish") from small creeks. This technique allowed the fisher to leave the unwanted spawning salmon in the stream and harvest the desired fish by first visually selecting one of desired quality and then hooking it with a spear or gaff on the end of a long pole.

In 1984 this method seemed to be replaced in some cases with the rod and reel technique largely due to a perception by some that the traditional spear and gaff method was illegal.

Yakutat residents also harvested numerous types of fish other than salmon. In 1984 these "other fish" comprised 22 percent of the total pounds of resources harvested by the average household.

Table 5 list the types and quantities of "other fish" harvested by the randomly surveyed households during 1984.

TABLE 5. FISH OTHER THAN SALMON HARVESTED IN 1984 BY A RANDOMLY SELECTED GROUP OF 30 PERCENT OF YAKUTAT HOUSEHOLDS (n = 50)

| Resource | % of HHs Using | % of HHs Harvest-ing | Mean Number Harvested All HHs (n=50) | Mean lbs. per Household Harvested All HHs (n=50) | Mean lbs. per Household Harvested Active HHs Only |
|---|---|---|---|---|---|
| Cutthroat Trout | 18 | 16 | 2.1 | 3 | 20 |
| Dolly Varden | 34 | 28 | 3.2 | 5 | 16 |
| Rainbow Trout | 12 | 10 | 1.6 | 3 | 32 |
| Steelhead | 60 | 38 | 1.3 | 8 | 18 |
| Capelin | 34 | 22 | - | 18 | 83 |
| Eulachon | 64 | 28 | - | 29 | 103 |
| Herring | 28 | 20 | - | 19 | 93 |
| Herring Eggs | 30 | 14 | - | 5 | 34 |
| Sturgeon | 2 | 2 | .1 | - | 2 |
| Eel | 20 | 20 | 1.2 | 9 | 47 |
| Flounder | 22 | 12 | 2.3 | 9 | 77 |
| Sole | 10 | 2 | .4 | 1 | 40 |
| Halibut | 92 | 58 | - | 102 | 175 |
| Ling Cod | 20 | 12 | 2.5 | 13 | 103 |
| Pacific Cod | 8 | 6 | .9 | 4 | 61 |
| Tom Cod | 6 | 4 | 1.2 | 2 | 58 |
| Sablefish | 12 | 4 | .4 | 3 | 66 |
| Unknown Cod | 4 | 4 | .1 | * | 4 |
| Blue Rockfish | 4 | 2 | .1 | * | 4 |
| Red Snapper | 18 | 10 | 2.9 | 9 | 86 |
| Sea Bass | 6 | 4 | .2 | * | 12 |
| Sea Perch | 2 | 2 | .3 | 1 | 30 |
| Unknown Rockfish | 2 | 2 | .5 | 1 | 50 |
| Skates | 2 | 2 | .4 | 2 | 100 |
| Dogfish | 4 | 2 | .2 | 1 | 40 |
| Buffalo Sculpin | 2 | 2 | 1.0 | 1 | 50 |
| Irish Lord | 2 | 2 | 1.0 | 1 | 50 |

H.H. = Households
* = under one pound

Figures 24, 25, and 26 show areas that were used for the non-commercial harvest of salmon and other fish during the lifetime of the key respondents. Areas used include the East River, Alsek River and Cabin

Slough near Dry Bay. Six miles north of Dry Bay the Tanis Lake and River, Gines Creek, Square Lake and the Ustay River were used for freshwater fishing. The Akwe and Italio Rivers and sloughs were also reportedly used by the key respondents. Most of the Situk and Ahrnklin River as well as their sloughs near the ocean have been used extensively for non-commercial fishing by residents of Yakutat. With access provided by the present road system, fishing occurred on Tawah Creek and Lost River as well as in drainage ditches created along the shoulders of roads built near the airport. Salmon have populated many of the man made drainage ditches around the airport. Occasionally during the heavy rains of fall, the water table rises high enough to leave spawning salmon stranded on the Yakutat airport runway.

Just south of Monti Bay and the center of Yakutat, the Ankau Lagoon and lake system and Ophir Creek continue to be important areas for harvesting fish as they have been historically. North of Yakutat, local fishers have used small streams draining into Yakutat Bay, including Humpback Creek. Portions of the Redfield Lakes and Situk Lake were frequently mentioned as fishing areas used by the key respondents. In addition, the protected waters of Yakutat Bay from Monti Bay to Knight Island have been used extensively by Yakutat fishers both commercially and non-commercially. Key respondents reported using drainages northwest of Yakutat Bay including Malaspina Lake and coastal waters of Yakutat Bay to harvest non-commercial fish, as well as the mouths of the Tsiu and Kaliakh Rivers north of Cape Yakataga.

## Plants and Berries

Exact locations of areas used for plant and berry gathering were not recorded during the interviews with key respondents. Because of the insistence by many of the respondents that berry picking and the use of plants was a very important part of living in Yakutat the researchers took notes on this activity. In 1984, 88 percent of the households harvested berries and 24 percent harvested edible plants. Much of the gathering continues to take place along the water front near the community, where it has for generations. A few older residents expressed concern that some of the old berry patches which had been used traditionally have been replaced by development. Plant and berry picking was an activity that all members of a family took part in and required a minimal amount of equipment or investment in transportation. Women reported doing the bulk of the collecting, something that could be done close to home for a few hours in between activities at home or near fish camp between closures or breaks in the fishing.

Below is a list of some of the commonly harvested berries and typical habitat from which they were harvested.

| | | |
|---|---|---|
| Strawberry | - | sandy beaches |
| Salmonberry | - | upland beaches, hillsides exposed to sunlight |
| Nagoonberry | - | beach areas similar to strawberries |
| Blueberry | - | forested areas |
| Huckleberry | - | forested areas |
| Cranberries | - | forests and muskegs |
| Currents | - | edge of beach areas, forest, and along stream banks |

Thimbleberry - upland beaches, hillsides with sun and along road sides

Cloudberries - muskeg areas

In 1984, a household in Yakutat harvested on the average 26 quarts of berries. Some of these were eaten fresh but most were preserved by freezing or made into jam, jelly, pie or sauce.

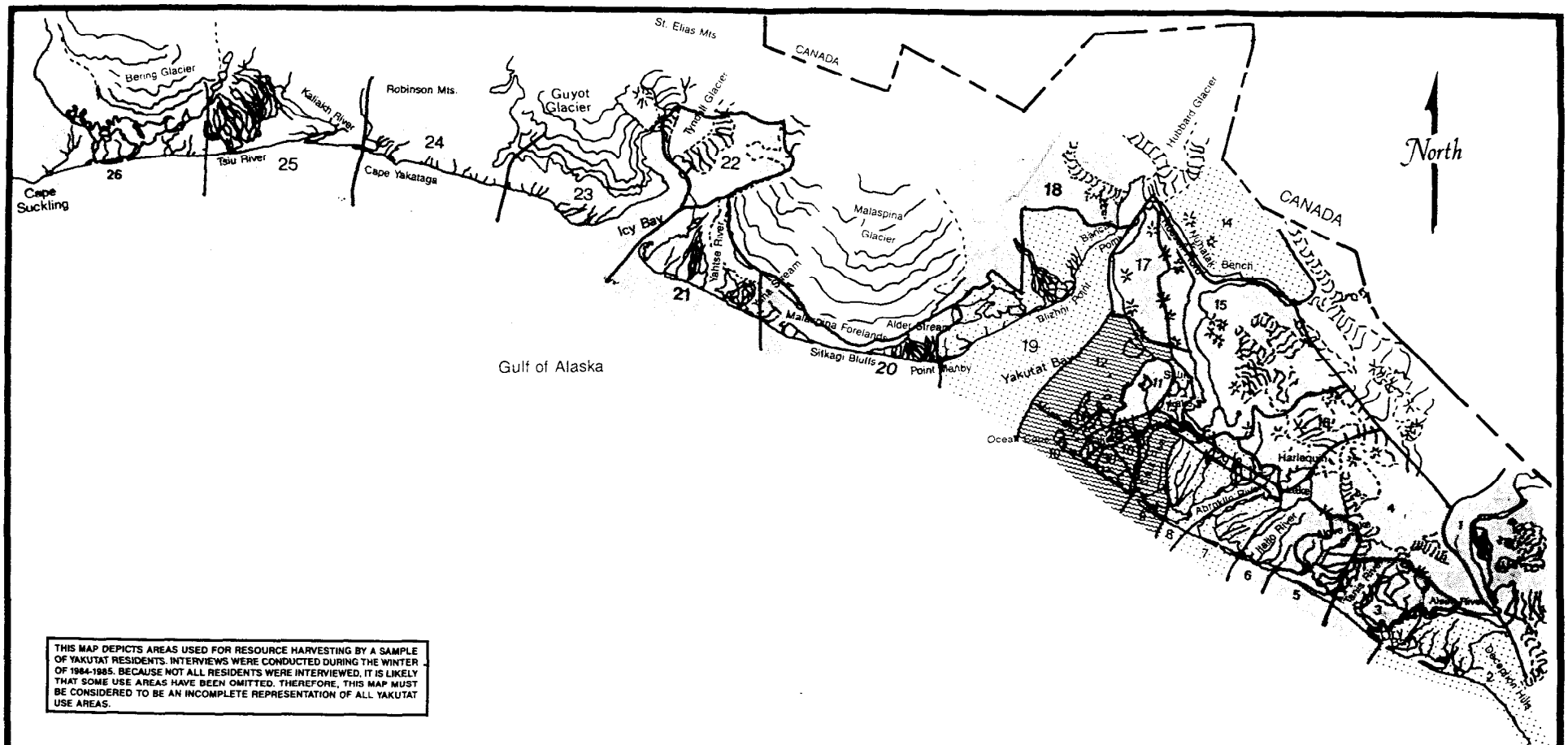
While not harvested in the quantities that berries are, edible plants of various types were used by Yakutat residents. In 1984, 24 percent of the randomly survey households harvested land plants and 32 percent of the households used them. The average number of pounds harvested was 16 pounds per participating household during 1984. Fiddlehead ferns were frequently harvested by this group, usually in May, weeks after the fern first begins to sprout out of the ground. Goose Tongue was also harvested from some beaches near the high tideline. "Hudson's Bay" or Labrador Tea leaves were picked from plants that usually grow in or near muskeg areas. The salmonberry plant was picked as a sprouting plant by a few households and steamed along with fiddlehead ferns. Devils club was occasionally harvested and used as a tonic by some of the Native elders.

In 1984, local firewood was used by 50 percent of the survey households for home heating and occasionally cooking. Through the course of the year these households reported using on the average 5.2 cords of wood. Most of this wood was collected near the residents homes, from areas cleared for construction or from drift logs that became stranded on the beach near a resident's home.

## Percentage of Residents Using Areas During Their Lifetime

In addition to the mapping interviews conducted with 25 selected key informants who had lived in Yakutat 15 years or more, mapping was also conducted with the 50 randomly selected households who were also administered a survey. Because of the wealth of land use information recorded on maps from the key respondents, it was possible to group some of the harvesting activities into defined areas, which often were watersheds. Most of the harvesting activities could be grouped into geographic sub-units with a minimal amount of overlap. For the purpose of recording and analyzing land use information from the 50 random households, 30 sub-units were created. These units cover the entire land and water areas from the Deception Hills near Dry Bay northwest to Cape Suckling. Some of the units are very large, covering up to twenty-five miles of coastline, while other areas, for which more detailed information was sought, are much smaller. Specific areas close to the community were separated into smaller segments so that patterns of use could be more precisely analyzed. Some of these smaller units included the first nine miles of Forest Highway #10 (one mile either side of the road), a separate sub-unit covering the remainder of the roadway to Harlequin Lake, and the drainage of Ophir Creek near Yakutat.

Figure 27 presents these 30 different sub-units and the percentage of randomly surveyed households in Yakutat that have used the sub-unit for any hunting, fishing or gathering during their lifetimes. Table 6 lists the subunits. Use of areas ranged from two to 90 percent of the households. As the map demonstrates, the areas used by

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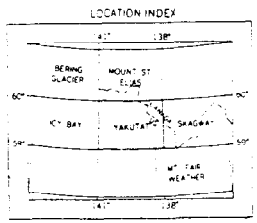
0 2 4 6 8 10 miles

LOCATION INDEX

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BASE MAP ADAPTED FROM USGS YAKUTAT, MT. ST. ELIAS, ICY BAY, AND BERING GLACIER QUADS.

SUB-UNIT USED BY 30 PERCENT OR FEWER OF THE HOUSEHOLDS FOR HUNTING, FISHING OR GATHERING

SUB-UNIT USED BY 31-60 PERCENT OF THE HOUSEHOLDS FOR HUNTING, FISHING OR GATHERING

SUB-UNIT USED BY 61-90 PERCENT OF THE HOUSEHOLDS FOR HUNTING, FISHING OR GATHERING

FIG. 27 SUB-UNITS OF THE YAKUTAT AREA AND PERCENTAGE OF HOUSEHOLDS WHO HAVE USED THE SUB-UNIT DURING THEIR LIFETIMES. (RANDOM SAMPLE, n=50)

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more than 60 percent of the households were located in the immediate vicinity of the community. Seventeen percent of the areas (five areas) were used by more than 60 percent of the households surveyed in

TABLE 6. PERCENTAGE OF YAKUTAT HOUSEHOLDS THAT HAVE USED A SUB-UNIT FOR HUNTING, FISHING OR GATHERING DURING THEIR LIFETIME (RANDOM SAMPLE, n = 50).

| Sub-unit Number and Name | | Percent of Households Using Area | Sub-unit Number and Name | | Percent of Households Using Area |
|---|---|---|---|---|---|
| 1 | Alsek River | 18 | 16 | Slate Peak | 6 |
| 2 | Dry Bay | 44 | 17 | Disenchantment Bay | 22 |
| 3 | Tanis River | 26 | 18 | Turner Glacier | 14 |
| 4 | Brabazon Range | 10 | 19 | Mandby Shore | 40 |
| 5 | Akwe River | 18 | 20 | Malaspina Forelands | 14 |
| 6 | Italio River | 30 | 21 | Yahtse River | 20 |
| 7 | Dangerous River | 36 | 22 | Chaix Hills | 14 |
| 8 | Ahrnklin River | 54 | 23 | Icy Bay | 26 |
| 9 | Situk River | 90 | 24 | Cape Yakataga | 8 |
| 10 | Yakutat Area | 82 | 25 | Tsiu/Kaliakh River | 20 |
| 11 | Redfield Lakes | 30 | 26 | Cape Suckling | 2 |
| 12 | Yak. Bay Islands | 76 | 27 | Ophir Creek | 34 |
| 13 | Situk Lake | 34 | 28 | F.H. #10 Yak. Mile 9 | 62 |
| 14 | Nunatak Fiord | 32 | 29 | F.H. #10 Mile 9 Harl Lk | 54 |
| 15 | Russell Fiord | 28 | 30 | Lost River Airport | 64 |

Yakutat, during the lifetime of the residents. The determination of use of an area included all types of activities from berry picking to hunting and fishing. If specific types of uses were looked at separately, the values on the map would be quite different. Twenty-seven percent (eight) of the sub-units were used by 31-60 percent of the Yakutat households during their lifetime. These areas ranged from as far away as Dry Bay (50 miles) to as close as Ophir Creek, which is about one half mile from the center of town. Important hunting and

fishing areas such as the Ahrnklin River, Mandby Shore and Nunatak Fiord were in the 31-60 percent use group. The remaining 57 percent of the sub-units (17 sub-units) were used by 30 percent or less of the sampled households during their lifetime.

This categorization of percentage of households which have used an area should not be interpreted as a representation of importance of that sub-unit to the community. The information represents the portion of Yakutat households that have used the sub-unit during their lifetime. Other factors, such as access, and the length of time of a respondent household in the community may control the percentage of people that use a particular area. This may have little bearing on the value or importance placed on the resources in that area by Yakutat residents. For instance, about 20 percent of the interviewed households had been in the community five years or less.

Some of the more remote and less used areas may in fact provide certain resources that are difficult to obtain in the higher use areas. A closer look at the areas used by 30 percent or fewer of the Yakutat households is needed to understand the relationship of remote areas to the overall production and distribution of resources within Yakutat. An example of this, in 1984 moose were harvested by 22 percent of the households while 70 percent used moose. From this same sample it was determined that 70 percent (five) of the moose harvested from the Yakutat Forelands were taken from the remote areas south of the Dangerous River, the same areas reportedly used by a lower percentage (about 36 percent) of the households than areas closer to Yakutat. In addition, Yakutat residents who did hunt the more remote and less used areas south of the Dangerous River had a success rate of

62 percent (8 households taking 5 moose) whereas of the residents using the areas closer to town, ten percent were successful (20 households taking two moose). Much of the total moose harvest is taken from these lesser used areas by a small portion of the communities households, but distributed throughout the community, benefiting nearly three-fourths of the community in 1984.

The value or importance of an area to the community compared to another area, can properly be determined only by the community residents. This report makes no such judgements.

## Areas Used for Moose Hunting 1945-1984

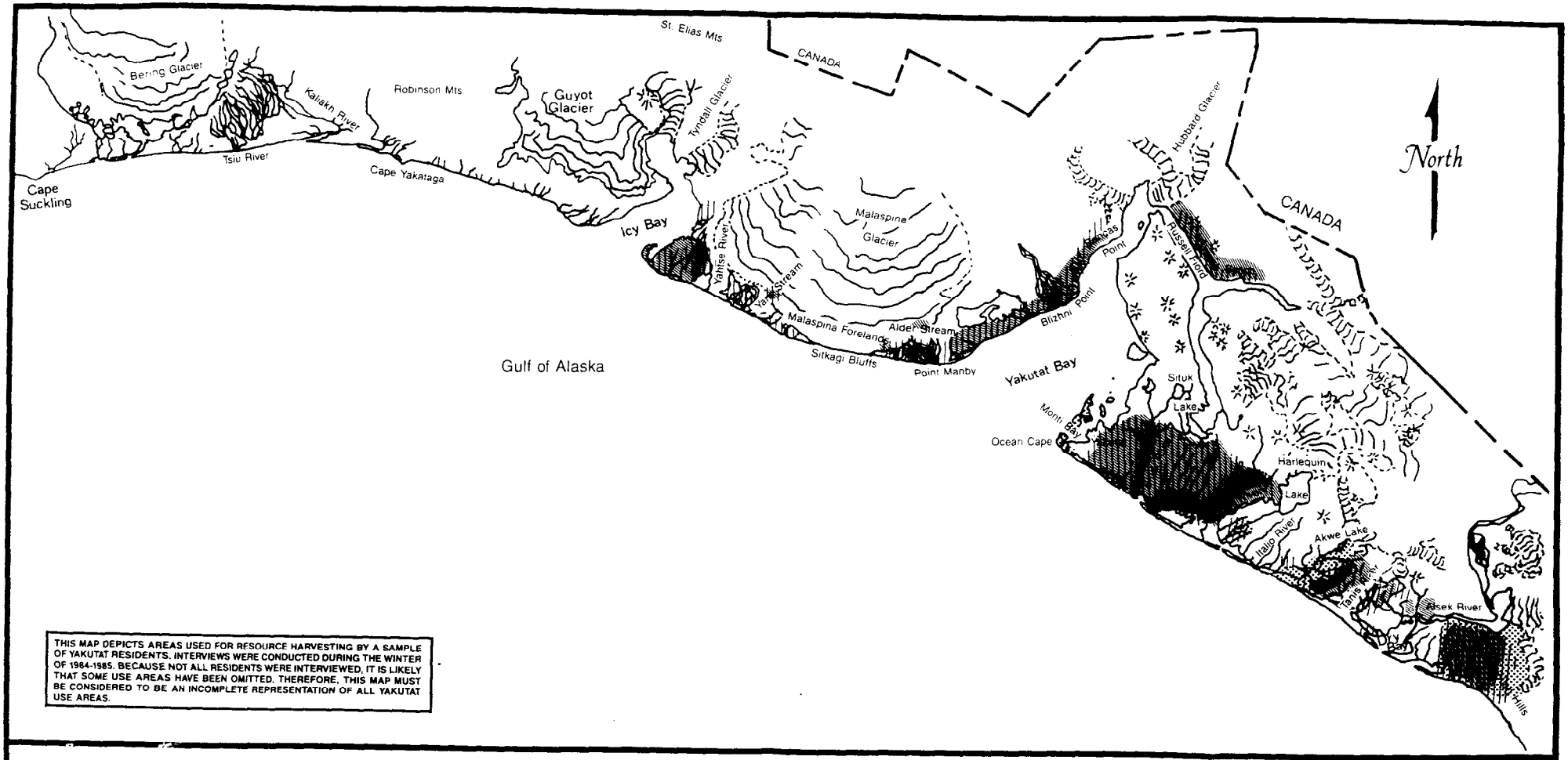
Mapped information collected from the 25 key respondents in Yakutat included not only areas used but also the years that a particular resource was harvested from an area. Mapping of different areas used over time not only provides an understanding of the dynamic nature of resource harvesting but also relationships between events which have taken place near the community and changes in hunting and fishing activities.

Figure 28 identifies the areas used for moose hunting by Yakutat key respondents from when moose first were hunted in the mid 1940s to 1984. The mapping is divided into three time periods: prior to 1962, 1963-1974, and 1975-1985.

## Areas Used for Moose Hunting Prior to 1962

Between the mid-1940s and 1962 moose populations increased rapidly after moose first migrated onto the Yakutat Forelands from interior Canada in the late 1930s. By the early 1960s the moose population was believed to be over 2,000 (Smith and Franzmann 1979). The population of Yakutat between 1950 and 1960 was approximately 300 people, with over 80 percent of the population being Alaskan Native (U.S. Census 1960). Forest Highway #10 had not yet been constructed and only a couple tracts of timber had been harvested near the community of Yakutat. During this time period, a number of on shore test wells for oil and gas were drilled in the vicinity of Yakutat and the Yakutat Forelands.

Areas used for moose hunting prior to 1962 by the key respondents interviewed were confined to the Yakutat Forelands area (Figure 28) since moose did not appear on the Malaspina Forelands until after 1962. The hunting was concentrated along rivers and boats were the primary types of transportation used. Five of the nine key respondents who hunted moose during this time period used the Situk and Ahrnklin River systems to access moose populations. Moose were hunted around the airport on road systems constructed during World War II, as well as on the road to Ocean Cape. The Ankau Lagoon and Summit Lakes were hunted by using boat and road vehicles. Two of the nine residents who reported flying in to moose hunting areas took advantage of airstrips that had been constructed near the Dangerous river and Dry Bay by oil companies during exploration. The Akwe and Italio River areas were used by four of the nine households that were active moose

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0 2 4 6 8 10 miles

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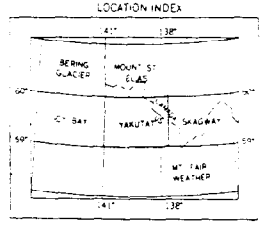


AREAS USES FOR MOOSE HUNTING 1945-1962

AREAS USED FOR MOOSE HUNTING 1963-1974

AREAS USED FOR MOOSE HUNTING 1975-1984

FIG. 28 AREAS USED FOR MOOSE HUNTING DURING THREE TIME PERIODS BETWEEN 1945 AND 1984 BY YAKUTAT HOUSEHOLDS.

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hunters prior to 1962; skiffs were used to move up and down the creeks and rivers in these areas. A moose spotted on one of the islands just northwest of Yakutat was considered an excellent find. By directing the moose to the beach or one end of the island, it was shot and loaded in a skiff with a minimal amount of hauling.

Areas Used for Moose Hunting from 1963 to 1974

Twenty of the 25 key respondents hunted moose between 1963 and 1974. During this time period moose populations and hunter success reached a peak on the Yakutat Forelands. Between 150 and 324 moose were harvested annually in the Yakutat area between 1962 and 1973 by local and non-local hunters (Fig. 29). The peak reported harvest was 324 in 1969 and hunter success in the 1960s was as high as 95 percent (ADF&G 1970). All moose harvests in the Yakutat area were reported as being taken in unit 5 until 1974 when the area was divided into unit 5A (Yakutat Forelands) and 5B (Malaspina Forelands). Moose did not inhabit the Malaspina Forelands until the 1960s, therefore most of the moose taken in the area came from the Yakutat Forelands (unit 5A). Since 1974 an average of 15 moose per year have been harvested from the Malaspina Forelands (unit 5B).

Liberal seasons and bag limits continued through the early 1970s (one moose, either sex, 113 day season) despite indicators that the population had peaked and was declining. Biologists felt the moose population had exceeded carrying capacity and a decline in moose was inevitable because of lack of moose browse. In 1966, of the 206 moose hunters who reported successful harvest in the Yakutat area 47

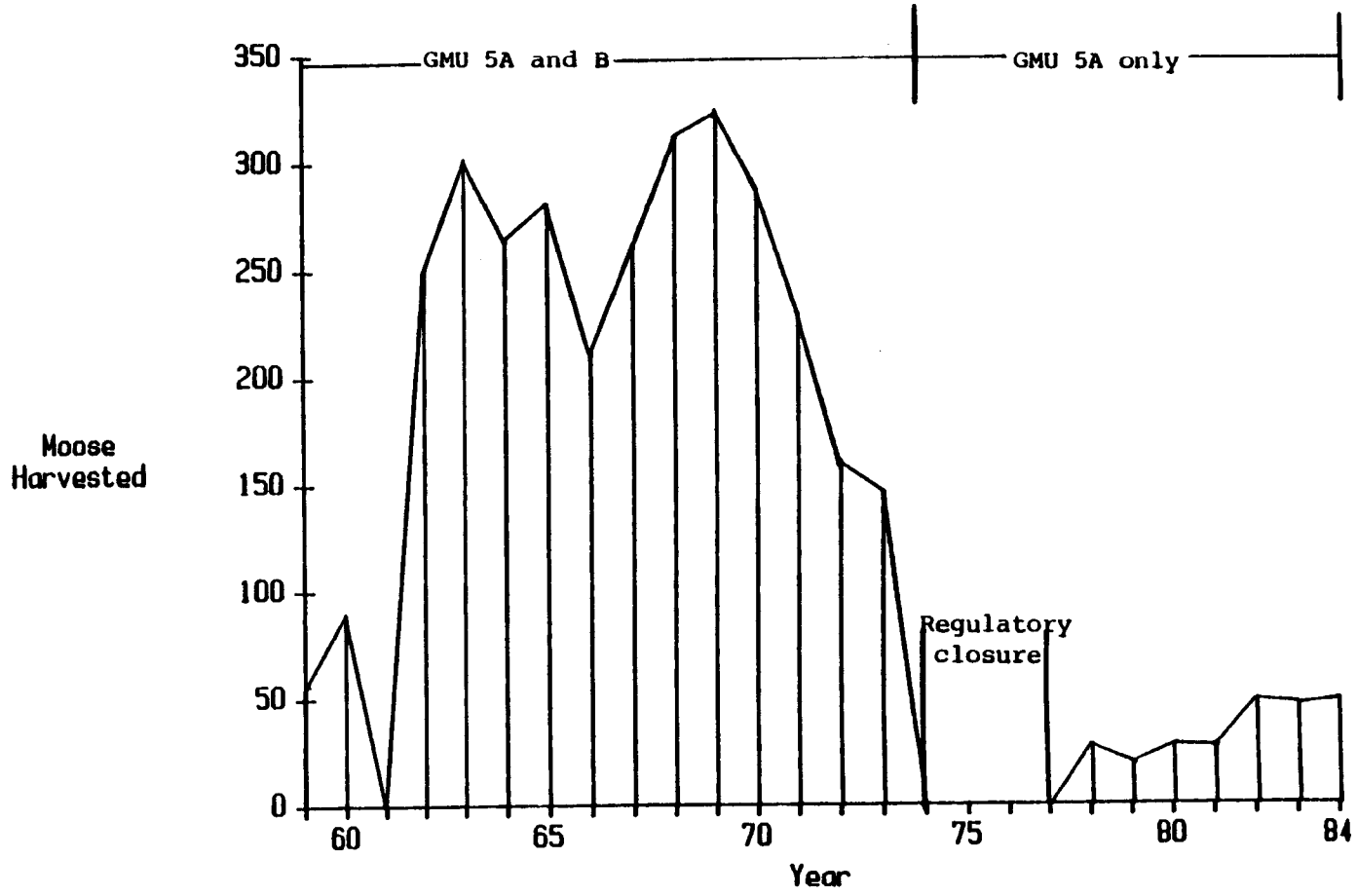



Fig. 29. Reported moose harvest for the Yakutat area for local and non-local hunters, 1959-1984 (ADFG permit information).

were from Yakutat, 118 were from other parts of the state, and 46 were from outside the state (ADF&G 1970). In the early 1970s the Yakutat area experienced several severe winters with snow falls of over 300 inches (NOAA, 1983). Biologist and local residents felt that during these severe winters the moose population suffered relatively high mortalities. By the fall of 1974, moose had reached a low of 400-600 animals on the Yakutat Forelands (ADF&G 1975). The area was then closed to moose hunting for the following four years, 1974-1977. This dramatic decline of moose has been attributed to the severe winters, excessive harvests, hunting of cow moose, over utilization of habitat, parasites, and predation by wolves and brown bear. The degree to which these factors contributed to the decline of moose on the Yakutat Forelands has yet to be assessed.

Also during this same time period, the population of Yakutat grew and changed in composition. The construction of Forest Highway #10 and the logging that followed brought in new residents to work on the projects. After completion of the projects some of the workers decided to remain in Yakutat and found employment through commercial fishing, private business or small construction projects. Between 1970 and 1980 the population of Yakutat city grew from about 190 to 449 and the percentage of Alaska Natives within the city limits decreased from 82 to 62 percent (City of Yakutat, 1983). In 1973 the city boundaries were enlarged and are partly responsible for this increase.

Areas used for moose hunting by the 25 key respondents in Yakutat changed dramatically after 1962. As Forest Highway #10 was constructed it became a corridor of access for hunters to areas that pre-

viously had little use. Twelve of the 20 residents who hunted moose between 1963 and 1974 used this new road system to reach adjacent hunting areas. Between 1963 and 1974, hunters traveled much farther than did residents prior to 1962. Twelve of the 20 key respondents reported hunting moose on the Malaspina Forelands, an area that was not used by the respondents prior to 1962. The key respondents also reflect the change in population that was taking place during the 1970s. Many of the residents that reported using different areas than those reported prior to 1962 were new to the community since 1962. Some of these changes were due to increasing populations of moose on the Malaspina Forelands and Nunatak Bench where previously few moose were available.

The Nunatak Bench was another area that began receiving use after 1962, three of the 20 hunters reporting using the area between 1963 and 1974. The Yakutat Forelands south of the community continued to be used as it was prior to 1962 with a few additional areas reported. The Tanis River area received use by four of the twenty key respondents and the Dangerous River began receiving fly in hunters to specific areas which an aircraft could land. The area between the Situk River and the newly constructed Forest Highway #10 also showed more use by moose hunters.

Key respondents reported using the road system and logging roads to access muskeg areas north of the airport. Off the road vehicles began to be used in the early 1970 by a few individuals, to access some of these more remote muskeg areas between the Situk River, the Forest Highway and the airport.

The declining moose populations during the early 1970s, in addition to increased hunting competition and new residents moving to the Yakutat area, most likely resulted in the observed expansion of areas used for hunting moose, and the increase in the variety of vehicles used to access moose populations.

Areas Used for Moose Hunting from 1975-1984

Twenty-three of the 25 key respondents hunted moose between 1975 and 1984. Because of low populations of moose on the Yakutat Forelands the area was closed to hunting between 1974 and 1977. This closure forced those Yakutat residents who were able, to travel greater distances to hunt moose. The Malaspina Forelands and the Nunatak Bench were two areas that began to receive more hunting pressure during this time period (Fig. 28). The Nunatak Bench was used by 12 of the hunters and the Malaspina Forelands used by 11 of the 23 key respondents who hunted moose. Many of the residents who were unable to make these trips by boat over open ocean water or by plane were not able to hunt during these years.

Moose populations on the Yakutat Forelands never returned to the levels present during the 1960s, even after the four year closure. Smith and Franzmann (1979) made examinations of 42 captured cows in 1978. Their findings concluded that although physical condition and pregnancy rates were normal with the captured moose, the moose were nonetheless suffering from nutritional stress. The researchers concluded that the condition of the moose indicated that they were either not finding enough food or the nutritional quality of the

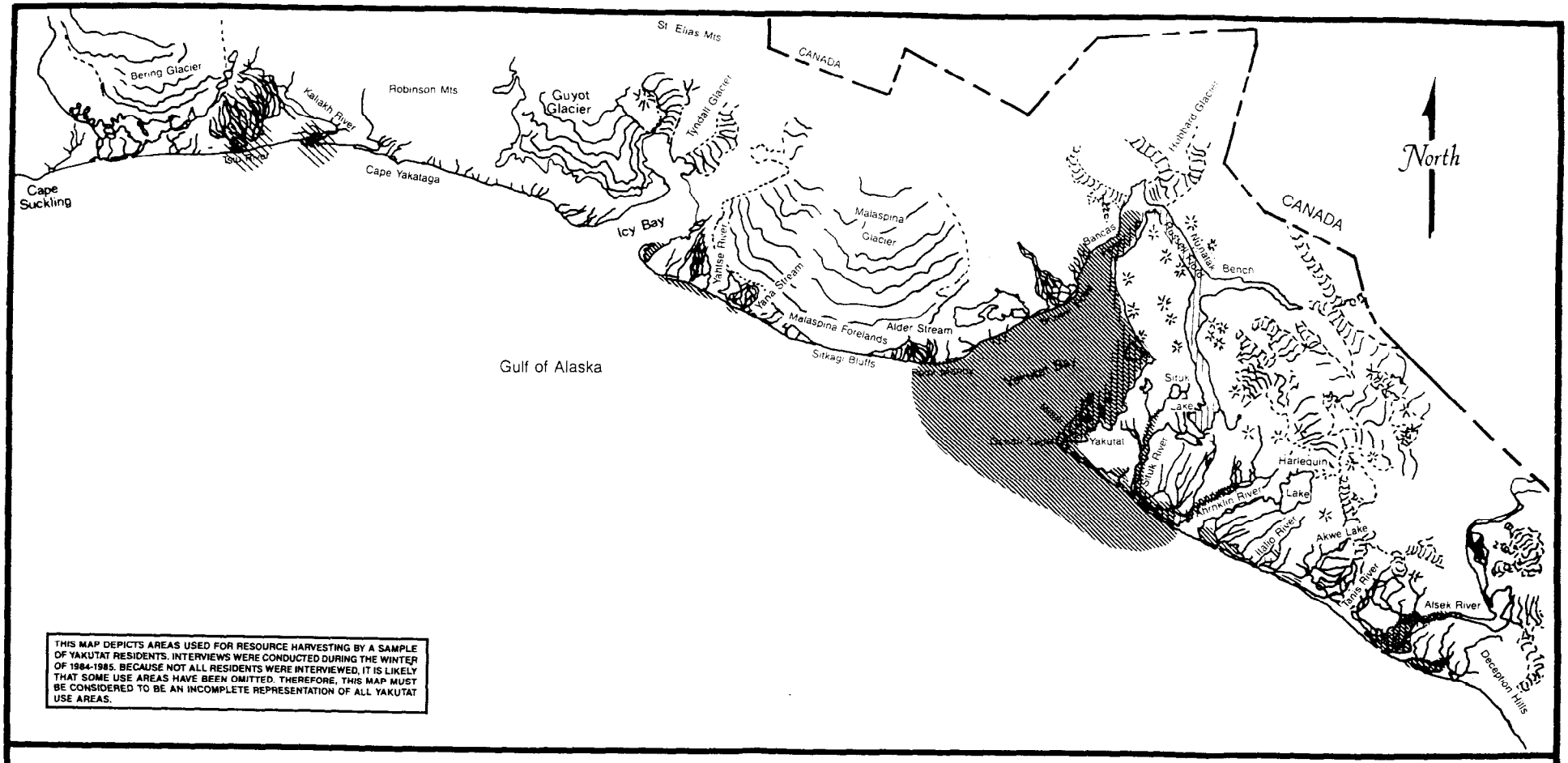
available food was low. They also added that the lack of information on timing and causes of calf losses made it "impossible to ascertain the actual role of nutrition, predation or other factors on calf survival. The question of why the same area at in the 1960s supported over three times the number of moose it supported in 1984 is thought by some to be related to post glacial plant succession in the area. Long-term residents have reported rapid change in habitat in the area including a transition from willow and alder communities to cottonwood and spruce. In addition, changing drainage patterns also resulting from earthquakes or post glacial isostatic rebound of the earth may reduce the growth of available willow, a preferred food source of moose.

In 1978 hunting was again opened when moose populations were estimated at 600 animals (ADF&G 1985). Between 1978 and 1981 the season was closed each year when 25 bulls were harvested from the Yakutat Forelands. From 1982 to 1985, the limit was raised to 50 bulls. Strategies for successful moose hunting became more complex in the 1980s. Because of the 25-50 bull limit and an average of over 200 registered hunters from Yakutat and other parts of the state and outside the state, moose hunting became more competitive. A variety of transportation methods were used to access hunting areas, including highway vehicles, off road vehicles, boats, airplanes and combinations of these vehicles (see Chapter 5, for detailed information for 1984). The use of the road systems has become an increasingly common means for accessing moose hunting areas. Seventeen of the 25 key respondents used Forest Highway #10 for moose hunting during the late 1970s to 1984. They also continued to use areas which were used in previous

years, including the drainages of the Situk, Ahrinklin, Dangerous, Italio, Akwe, Tanis and Alsek Rivers (Fig. 28). During the 1980s the key respondents also continued to use the Nunatak Bench and the Mandby Shore of the Malaspina Forelands in similar proportions as the period 1963-1974. The Yahtse River area near Icy Bay however, received less use by key respondent moose hunters from 1975-1984 than from 1963-1974 (Fig. 28). (For more information on areas used for moose hunting and success of hunters see Chapter 5).

## Changes in Areas Used for Salmon Fishing

Figure 30 shows areas used by the 25 Yakutat key respondents for both commercial and non-commercial salmon fishing before and after 1962. Commercial and non-commercial fishing areas were considered together since, as described previously, Yakutat residents typically use the same locations for both activities. Subsistence net fishing and commercial set gillnet fishing share fishing areas as do commercial and non-commercial trolling. Rod and reel fishing for salmon takes place in freshwater, often in areas where commercial fishing does not occur. Many of the areas shown inland on river systems such as the Situk and Ahrnklin Rivers represent rod and reel fishing. The year 1962 was chosen as a dividing point for similar reasons presented in the analysis of moose hunting patterns through time. Shortly after 1962 and into the 1970s, Yakutat's population grew and changed in composition as a result of development activities occurring near the community, including road building, timber harvesting, and housing construction.



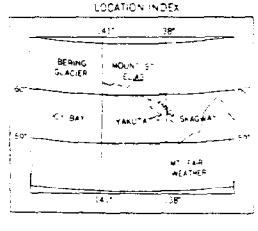

THIS MAP DEPICTS AREAS USED FOR RESOURCE HARVESTING BY A SAMPLE OF YAKUTAT RESIDENTS. INTERVIEWS WERE CONDUCTED DURING THE WINTER OF 1984-1985. BECAUSE NOT ALL RESIDENTS WERE INTERVIEWED, IT IS LIKELY THAT SOME USE AREAS HAVE BEEN OMITTED. THEREFORE, THIS MAP MUST BE CONSIDERED TO BE AN INCOMPLETE REPRESENTATION OF ALL YAKUTAT USE AREAS.

0 2 4 6 8 10 miles

INFORMATION COLLECTED FROM 25 KEY RESPONDENT HOUSEHOLDS BY DAVE MILLS AND ANNE FIRMAN, DURING THE WINTER OF 1984-1985.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131, FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS YAKUTAT, MT. ST. ELIAS, ICY BAY, AND BERING GLACIER QUADS.




AREA USED FOR SALMON FISHING PRIOR TO 1962

AREA USED FOR SALMON FISHING AFTER 1962

FIG. 30 AREAS USED FOR SALMON FISHING BY YAKUTAT RESIDENTS BEFORE AND AFTER 1962.

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985

Changing patterns of salmon fishing activities before and after 1962 do not appear to be as dramatic as land based activities during the same time period. However, there have been significant changes. Figure 30 shows that fishing in the Yakutat area prior to 1962 by the key respondents was primarily concentrated in the river systems and associated sloughs of the Yakutat Forelands and the sloughs of the Malaspina Forelands. Fish were harvested by means of set or drift gillnet on the Situk, Ahrnklin, Alsek and East Rivers. The Ankau lagoon, Sumit lakes and Ophir Creek as well as the Yakutat Bay Islands were also used by eight of the 13 key respondents who fished prior to 1962. In addition four respondents mentioned that they used upper Yakutat Bay and Russell Fiord, mostly while working with cannery boats during 1930-1940. Three key respondents had camps on the northwest shore of Yakutat Bay along the Malaspina Foreland and one on the Kaliakh River north of Cape Yakataga (Fig. 30). The majority of the areas used were fished by means set gillnet, drift gillnet or seine net.

Since 1962, use of most of these areas by key respondents continued, except for the significant decrease in subsistence use of Ophir Creek (see Chapter 6). Net fishing was limited to set gillnet fishing by regulation and limited entry set controls on the number of people fishing commercially with set gillnets. Key respondents who commercially fished salmon with gillnet have maintained similar sites since prior to 1962 and have expanded slightly to areas north of Yakutat around the Yahtse River near Icy Bay and the Tsiu River north of Cape Yakataga.

The greatest overall change comes in the increased troll fishing in the ocean waters in Yakutat Bay and the Gulf of Alaska immediately south of Yakutat. Many of the new residents who have arrived in Yakutat since 1962 were originally drawn to the area by wage employment opportunities from temporary projects. After the projects were completed many of the workers decided to stay and make Yakutat their home. Many looked to commercial fishing as a means to earn cash. Because of the difficulty in obtaining a gillnet permit and possibly the lack of familiarity with set gill netting, many of these newer residents began trolling for salmon. The number of Yakutat residents, as well as fishers from other areas of southeast Alaska, who are trolling for salmon is thought by local residents to have increased significantly in recent years. Local residents observed that trolling increased in the area when limited entry of the set gillnet fishery began and when some of the river systems were closed after 1980. Of the Yakutat households sampled, one third of the households that commercial fished during 1984, participated in the troll fishery. Trollers fishing the open ocean waters catch salmon as they migrate down the coast toward the inland waters south and east of Cape Spencer.

# CHAPTER 5

# TRANSPORTATION AND ACCESS TO FISH AND WILDLIFE RESOURCES

## TRANSPORTATION HISTORY OF THE YAKUTAT AREA

This chapter provides a background description of historic and contemporary transportation used by Yakutat residents while accessing fish and wildlife resources. The chapter focuses on the development of roads in the area and changes that have resulted in patterns of moose hunting and transportation used for hunting and fishing.

Prior to 1900 the Yakutat area was primarily inhabited by Tlingit Indians who lived in villages on major salmon streams along the Gulf Coast. Settlements were said to exist on the Bering, Kaliakh, Yahtse, Lost, Arhnklin, Italio, Akwe, Alsek, and Doame rivers. Settlements also existed on the eastern shore of Yakutat Bay (de Laguna 1972:58-106). These year-round villages had ownership rights to specific areas nearby the village. Hunting or fishing was allowed in areas outside one's village or tribal area only with permission from the appropriate tribe.

The Tlingit traveled the length of the Yakutat Forelands by means of canoe in a series of rivers and lagoons immediately inland from the breaking surf of the Gulf of Alaska. These inland water ways allowed safe travel from Yakutat Bay to Dry Bay without having to be subjected to unpredictable weather and the open ocean. Rivers in the Yakutat Forelands were traveled by pushing the canoe upstream with a long pole. Ocean travel by canoe was also common, especially in Yakutat Bay during

seal harvest season. Travel by Yakutat residents on the ocean waters of the outer coast also occurred to the north, as far as the Copper River. The Tsimshian Indians were known to travel from Northern British Columbia to Icy Bay to hunt sea otters, seal and trade cedar canoes.

Life in these villages revolved around cycles that existed in nature and were generally related to the availability of fish and wildlife. Many of the residents of these settlements traveled from their permanent or "winter homes" to temporary camps as the seasons and cycles of wildlife dictated. The knowledge of the timing of natural cycles made for efficient harvest of a variety of resources with a minimal amount of transportation because temporary camps were established when the resource became available for harvesting. Travel far from villages was not needed to harvest salmon, since each village had its own salmon streams. Trading of fish and wildlife occurred between villages and tribes for specific resources, but each village was said to be largely self sufficient (de Laguna 1972).

In 1903, F.S. Stimson of Seattle built a salmon cannery at the modern site of Yakutat and constructed a railroad from the cannery to the Situk River near the village of Situk. A lumber company was created to provide railroad ties and material for building docks and buildings. Because of these developments and encouragement from missionaries, the Tlingit people began to move from the smaller dispersed villages to the modern site of Yakutat. By the mid-1920s the more remote village sites had been abandoned as winter village sites, but were still used as seasonal camps (McNeary 1978:50).

From the turn of the century until World War II, Yakutat remained predominantly a native fishing community supplying salmon to the

canneries. Transportation in the area was primarily by boat, skiff, railroad, and an occasional float plane that landed in Monti Bay. An additional fish-haul railroad was constructed on the Yakutat Forelands from the Akwe River to the mouth of Dry Bay.

World War II helped change the transportation system of Yakutat. In 1940 construction began on an airbase at Yakutat and barracks were built that housed up to 8,000 soldiers, according to key respondents. Road construction began in the area of the airport and from the airport to "Cannon Beach" on the ocean. A road was also built from the airport to the village. After the end of World War II most of the military personnel left and the village continued providing salmon to the cannery by means of the railroad. Eventually a road was constructed that connected Yakutat to the Situk River, and the railroad ceased operation.

## CONTEMPORARY TRANSPORTATION AND ACCESS PATTERNS TO FISH AND WILDLIFE IN YAKUTAT

Although the railroad is no longer a mode of transportation available for hunting, fishing or gathering in the Yakutat area, the construction of roads has provided a new form of access to traditional harvesting sites as well as to areas that previously had infrequent use. In 1962 the United States Forest Service (U.S.F.S.) began construction of Forest Highway #10 (F.H. #10). Beginning at Mallot Avenue near the cannery site and the junction of the airport road, the road construction headed in a northerly direction through the flat forested area of the the Yakutat Forelands for about 8 miles until it reached the upper waters of the Situk River (Fig. 17). This section of the road was built

in stages and timber was harvested from both sides of the road at a number of sites. In 1967 a bridge was built across the upper portion of the Situk River and road construction continued in a southeast direction paralleling the mountain range in the direction of the Dangerous River. This portion of the road was built in a number of stages through the early 1970s and ended at the Dangerous River in 1973. Timber harvesting was not conducted along this section of the road at the time of construction. In 1975 a bridge was constructed over the Dangerous River, however, road construction has not continued any further.

During this time other roads were also being constructed in the area. The Lost River Road (Fig. 17) was constructed by the U.S.F.S. in 1968 and connected the airport road to the mouth of the Situk River. This road was upgraded in 1972 when the U.S.F.S. cut timber near Tawah Creek, halfway between the airport and the Situk River. Also, the Colorado Gas and Oil Company constructed roads in the 1950s in an area immediately northwest of the airport.

In addition to road building, other forms of hunting and fishing access have been developed. The U.S.F.S. and the Alaska Department of Fish and Game (ADF&G) in the early 1960s constructed and improved small aircraft landing strips in six areas on the Yakutat Forelands and eventually built cabins near these strips as shelters for hunters and fishers (Fig. 1). In addition to the increase in air access on the Yakutat Forelands, commercial jet flights from Juneau and Anchorage began providing jet access to Yakutat daily from the north and the south in the 1970s.

Prior to 1962 and the construction of many of the roads now in Yakutat, highway vehicles were used only by government agencies and a

few local individuals. One key respondent recalled that in the 1950s, vehicles were so few that if a person planned a drive out to the airport (approximately 4 miles), word would spread around town and a full car could be assured each trip. Since the construction of the additional roads the number of vehicles used in the area has risen dramatically. Today most households have some form of highway transportation.

Residents of Yakutat continue to rely upon boats as a major means of access for hunting and fishing. However, highway vehicles are also used, as are airplanes and off the road vehicles (Fig. 31). Approximately 76 percent of randomly selected households used a truck for hunting and fishing in 1984. Skiffs were used by nearly as many households and off road vehicles and autos were used by nearly half of the households surveyed. Large enclosed boats, snow machines and airplanes were used by 20 percent or fewer of the Yakutat households. Combinations of various modes of access are also occasionally used. A household may use a highway vehicle to transport a skiff to a river or the ocean and then load an off-road vehicle into a skiff for use at a beach area at the end of a skiff ride.

Increased access options have resulted in more people from outside Yakutat fishing and hunting in the area. In 1984 there were approximately 30 rental cars and trucks available in the Yakutat area which were normally rented by out of town fishers or hunters.

Figure 32 lists areas around Yakutat that the randomly surveyed households felt had significantly increased in use since they have resided in Yakutat. For example, close to 50 percent of Yakutat households mentioned the Situk River as an area where use has increased. The Situk River is now road connected both at the mouth of the river and

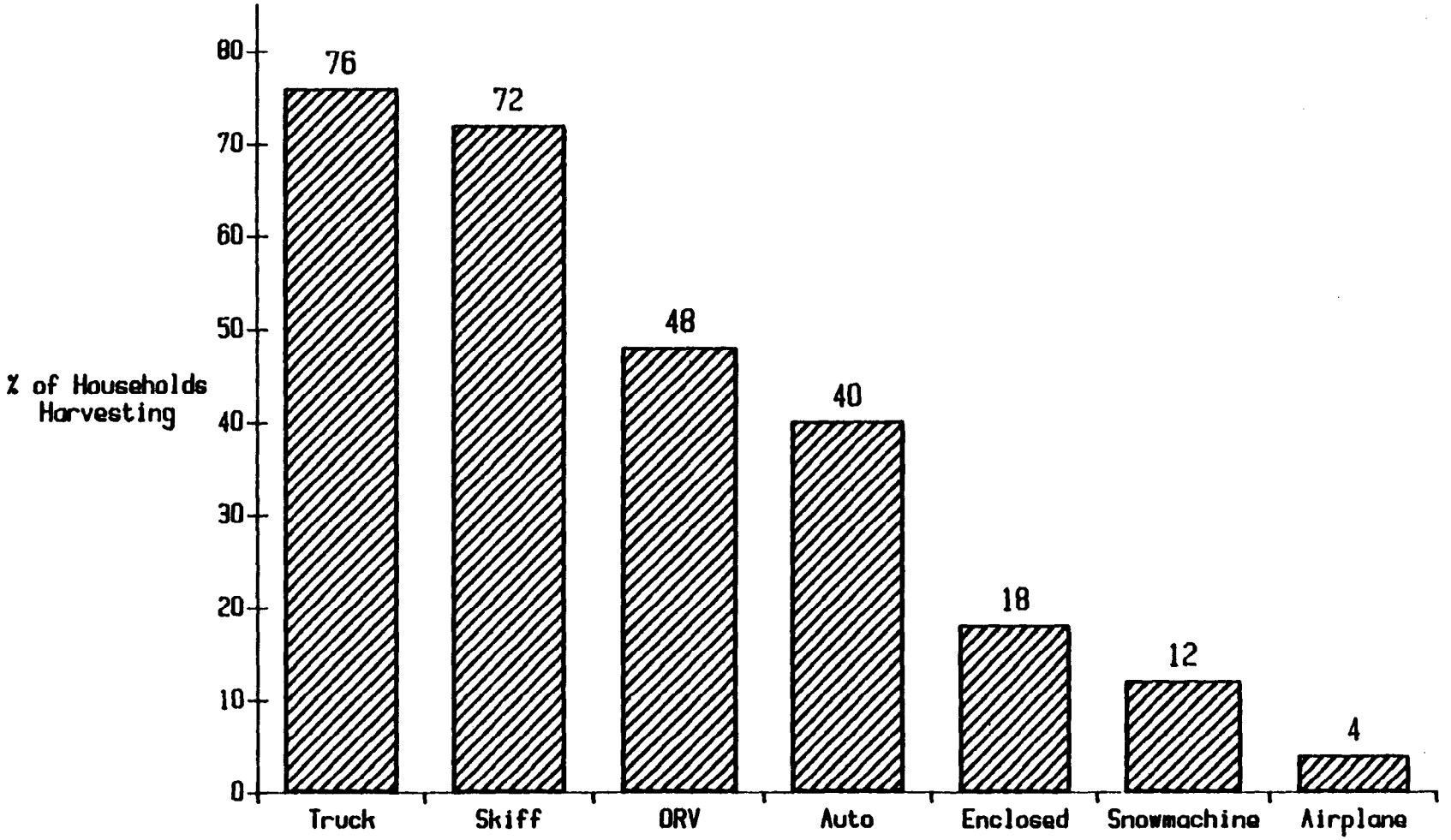



Fig. 31. Percentage of Yakutat households using various forms of transportation for hunting and fishing during 1984 (random sample, n=50 households).

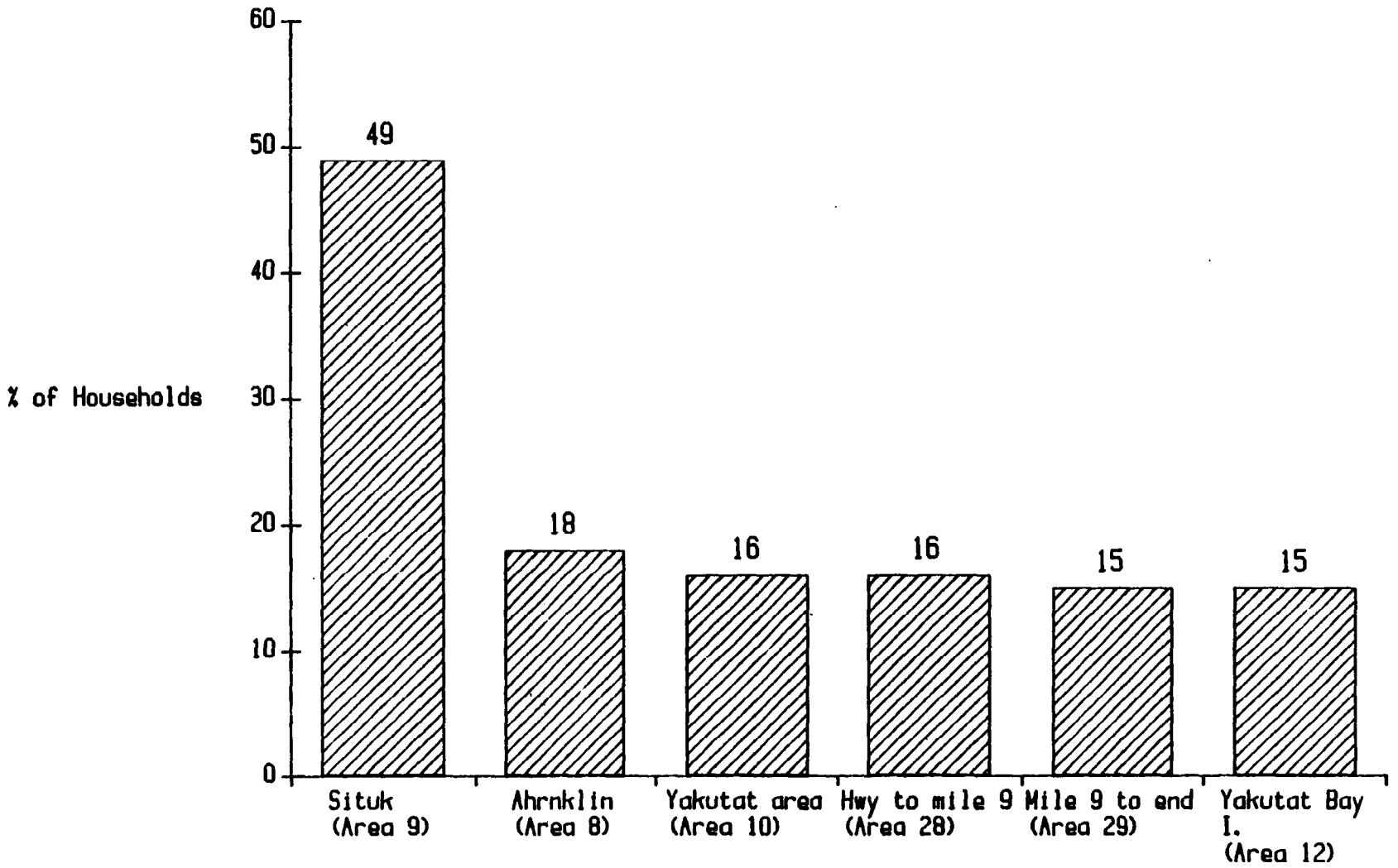



Fig. 32. Percentage of Yakutat households who identified an area as having increased in resource use during their lifetimes (random sample, 1984, n=50 households).

upstream, making fishing float trips a very popular activity. Because of this inexpensive and easy access to the Situk River, and the resulting large number of people using the river for fishing, many Yakutat residents who have traditionally used the area for non-commercial fishing now report that they often avoid the area. Commercial fishing use activity along the Situk River and the increasing use by the sport fishery has often resulted in conflicts over use of an area and appropriate forms of transportation on the river.

Other roaded areas also have experienced increased use for hunting and fishing. Use of the Ahrnklin River, which is easily accessible by a road near a slough that leads to the the mouth of the river as well as upstream, was reported to have increased in years prior to 1984. Other areas showing recent increased use are also associated with road systems, with the exception of the Khantaak Islands which were thought by survey respondents to be receiving more use due to an increase in travel of boats to the area.

## Use of Roaded and Non-roaded Areas

For the purpose of understanding how modes of access to wild resources in the Yakutat area have changed, it is helpful to first look at information available on moose hunting on the Yakutat Forelands. Moose is a good resource to examine for a number of reasons. First, moose in 1984 were an extremely important resource to Yakutat residents in terms of the total average pounds of resources that were harvested. Of the 156 pounds of land mammals harvested by the average Yakutat household in 1984, 121 pounds was moose alone (Appendix D). On the average moose provided about the same number of pounds of food that coho

or king salmon provided to the Yakutat household. Second, since a successful moose hunt and the resultant work required in transportation and preparation of the meat is usually a memorable experience, it is possible to obtain accurate information from respondents on areas used for moose harvests since the 1940s. Third, moose spend their entire lives on the Yakutat Forelands and have potential for being affected by land based development.

Figures 33, 34, 35 show the proportion of Yakutat households that have used areas of the Yakutat Forelands for moose hunting and how that proportion has changed over the past 22 years as a result of road construction. The Yakutat Forelands area was divided into three groups consisting of a total of 9 sub-areas (Fig. 27). These groups and sub-areas are as follows:

A) Areas which are roaded. These areas extend one mile either side of the road.

   1) Airport area (#30)

   2) F.H. #10 to mile 9 (#28)

   3) F.H. #10 mile 9 to Harlequin Lake (#29)

B) Areas which can be accessed by roads (road connected areas). Road connected areas are areas which do not have roads within their boundaries but are adjacent and accessible to areas which do have roads. The road connected areas are accessed from roaded areas by means of highway vehicles and a boat used to float down a river into the road connected area.

   1) Situk River (#9)

   2) Ahrnklin River (#8)

   3) Dangerous River (#7)

C) Areas which are not connected to the Yakutat road system.

1) Italio River (#6)

2) Tanis River (#3)

3) Dry Bay (#2)

There are many factors which can influence the numbers of residents using one of these areas for hunting or fishing during a specific time period, including a person's history of involvement in commercial fishing in the area, or ownership of a cabin. However, as shown below, road access exerts a significant influence on the number of people using an area. Roaded areas (Group A above) display two patterns of use depending on the age of the road (Fig. 33). The older roads (like the airport and Tawah Creek area) have stabilized at a low but fairly consistent level of use since 1962. Residents continue to hunt the older roads but the relative proportion of the effort is low (approximately 15-25 percent of the households). Newly roaded areas show a rapid increase of use for moose hunting after road construction. The two new segments of Forest Highway #10 increased in use from less than 10 percent of all households to a use that is now approaching 60 percent of all households (Fig 33). Many of the residents from these households mentioned they usually combined other activities with moose hunting while using these roaded areas.

Distinct from roaded areas, areas peripheral to road areas, but easily accessed by roads (Group B above) have shown slight decreases in the community use of those areas for moose hunting (Fig. 34). These areas often contain sites that have received long term, traditional use by local Yakutat residents. A number of key informants recalled that when Forest Highway #10 was constructed moose hunting shifted away from

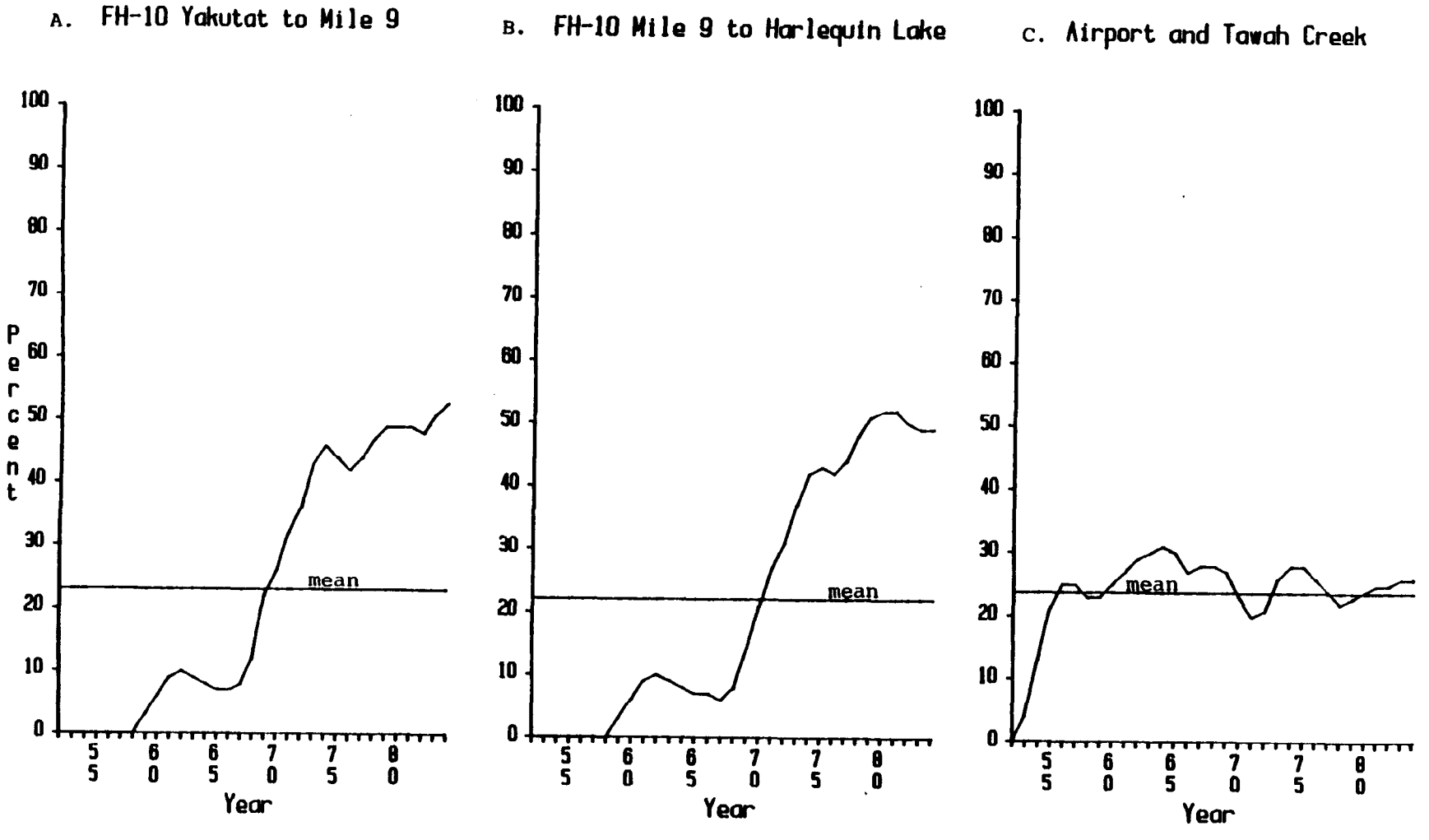



Fig. 33. Percentage of Yakutat households using roaded areas for moose hunting by year (1952-1984) (random sample, 1984, n=50 households). A and B show rapid increased use following the construction of roads into an area. C illustrates relatively lower stabilized use for moose hunting in an old roaded area.

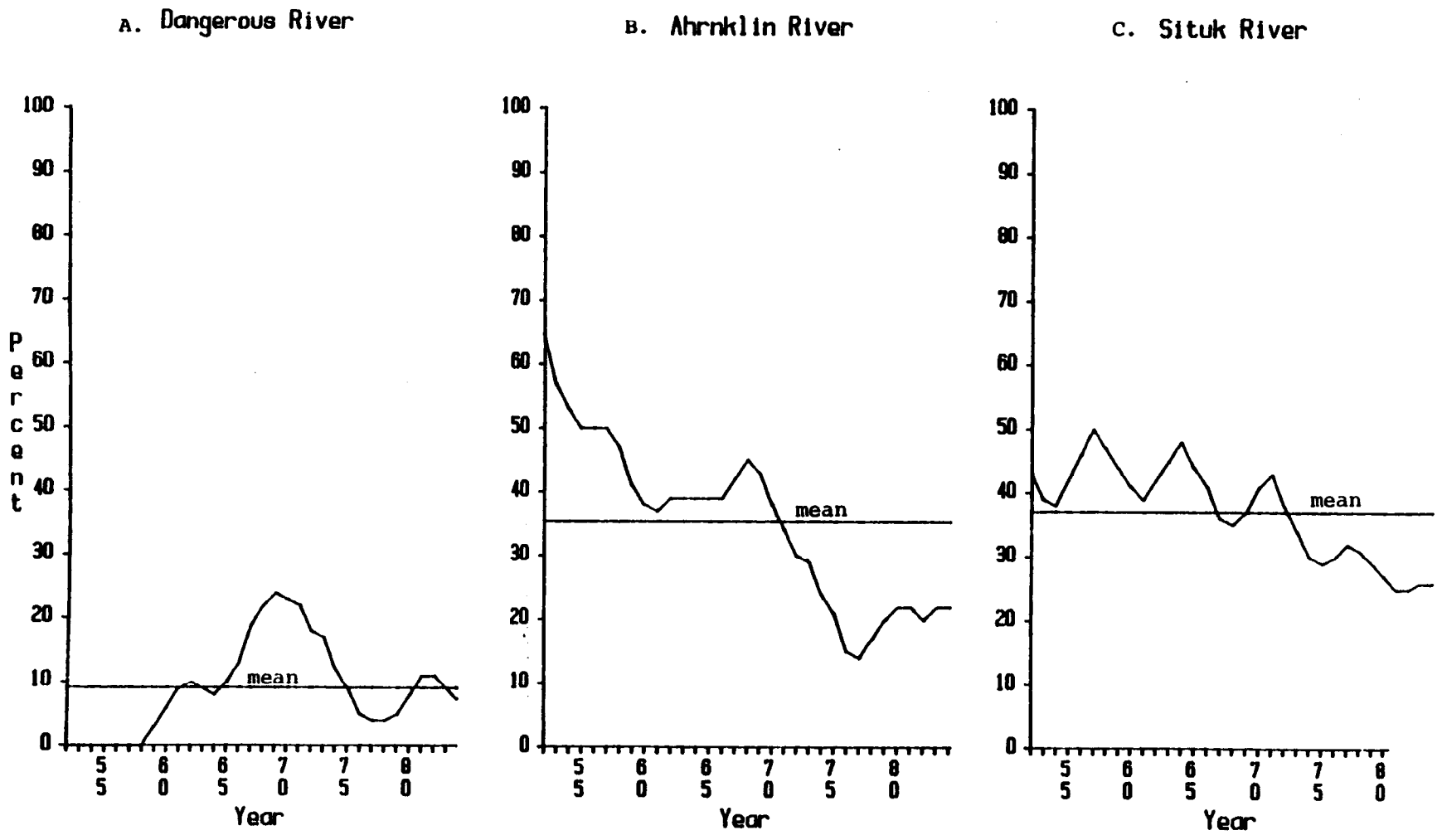



Fig. 34. Percentage of Yakutat households using areas without roads, but peripherally accessible by roads, for moose hunting by year (1952-1984) (random sample, 1984, n=50 households). B and C show decreasing use, apparently due to shifting pressure to roaded areas, among other factors. A shows a more complex use pattern whose cause is less clear.

these more traditional areas because it was easier and more convenient to hunt immediately alongside the road system. As shown in Figure 34, use of the Ahrnklin River decreased from about 60 percent to about 20 percent in a 20 year period, rebounding slightly in recent years. The Situk River fell from about 45 percent to 25 percent in household use. In recent years some residents are beginning to return to more traditional areas to hunt.

Areas that are not presently connected to the Yakutat road system include the areas south of the Dangerous River to the Deception Hills (Fig. 35). Of these areas, the Dry Bay area shows the most significant decline of use for moose through time, from about 35 percent to 10 percent use by households. Dry Bay has been and continues to be an extremely important commercial fishing area for Yakutat residents, and these fishing activities have provided opportunities for other resource harvesting such as moose hunting. However, visits to the area, especially during the fall near moose hunting season, are reported to have decreased in recent years. This is primarily due to changes in fishing practices resulting in Yakutat residents spending less time in and around Dry Bay in the 1980s than during the 1960s. The Tanis River area which is adjacent to Dry Bay has also experienced a slight decrease in use from approximately 10 to 15 percent of the community during the 1950s-1960s to 5 to 10 percent during the 1970s-1980s. This decline has also contributed to the decrease in commercial fishing time spent on the Alsek River by Yakutat residents. Moose hunting on the Italio River has fluctuated through time with an average of nine percent of Yakutat households using the area between 1955 and 1984.

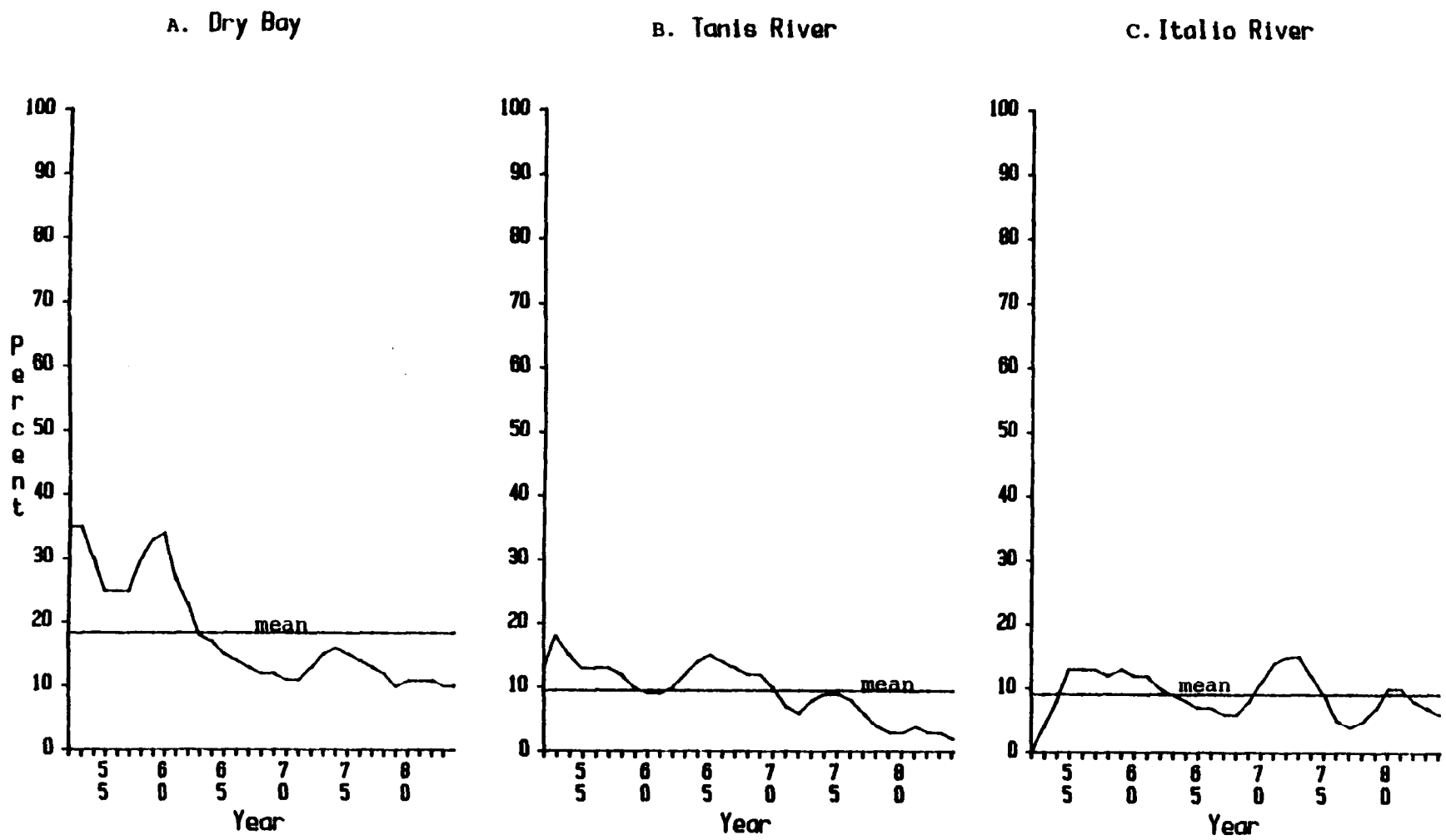



Fig. 35. Percentage of Yakutat households using unroaded areas for moose hunting by year (1952-1984) (random sample, 1984, n=50 households). A and B show decreasing use, while C shows a more complex use pattern.

Figure 36 depicts all areas on the Yakutat Forelands that were used for moose hunting by Yakutat residents before road construction of Forest Highway #10 (1952-62), and after road construction of Forest Highway #10 (1963-84). As shown in Figure 36, there has been substantial increase in use of road areas brought on by road construction. These include areas around Forest Highway #10, and the Dangerous River. Secondly, areas that are more easily accessed because of road building but do not actually contain roads have shown an overall decreased use, in part because the development of a road system on the forelands has provided more convenient access to other harvesting sites. These areas include the Situk and Ahrnklin River areas. Third, use of non-roaded, non-road accessible areas also generally have decreased since the construction of roads along the forelands. These include Dry Bay and the Tanis River. As stated above, the decreased use in some of these areas is due to factors other than roads, such as changing locations of commercial fisheries.

## Characteristics of Successful Moose Hunting

The portion of community households using an area for moose hunting is one gauge for measuring the level of hunting activity by a community in an area. However, this measure does not provide information on where hunters succeeded in harvesting moose. In 1984, 56 percent of all households hunted moose on the Yakutat Forelands, though only 14 percent were successful. Table 7 shows the success rate by area on the Yakutat Forelands by the randomly selected group of households that were surveyed in 1984. In Table 7, the roaded and the road connected groups

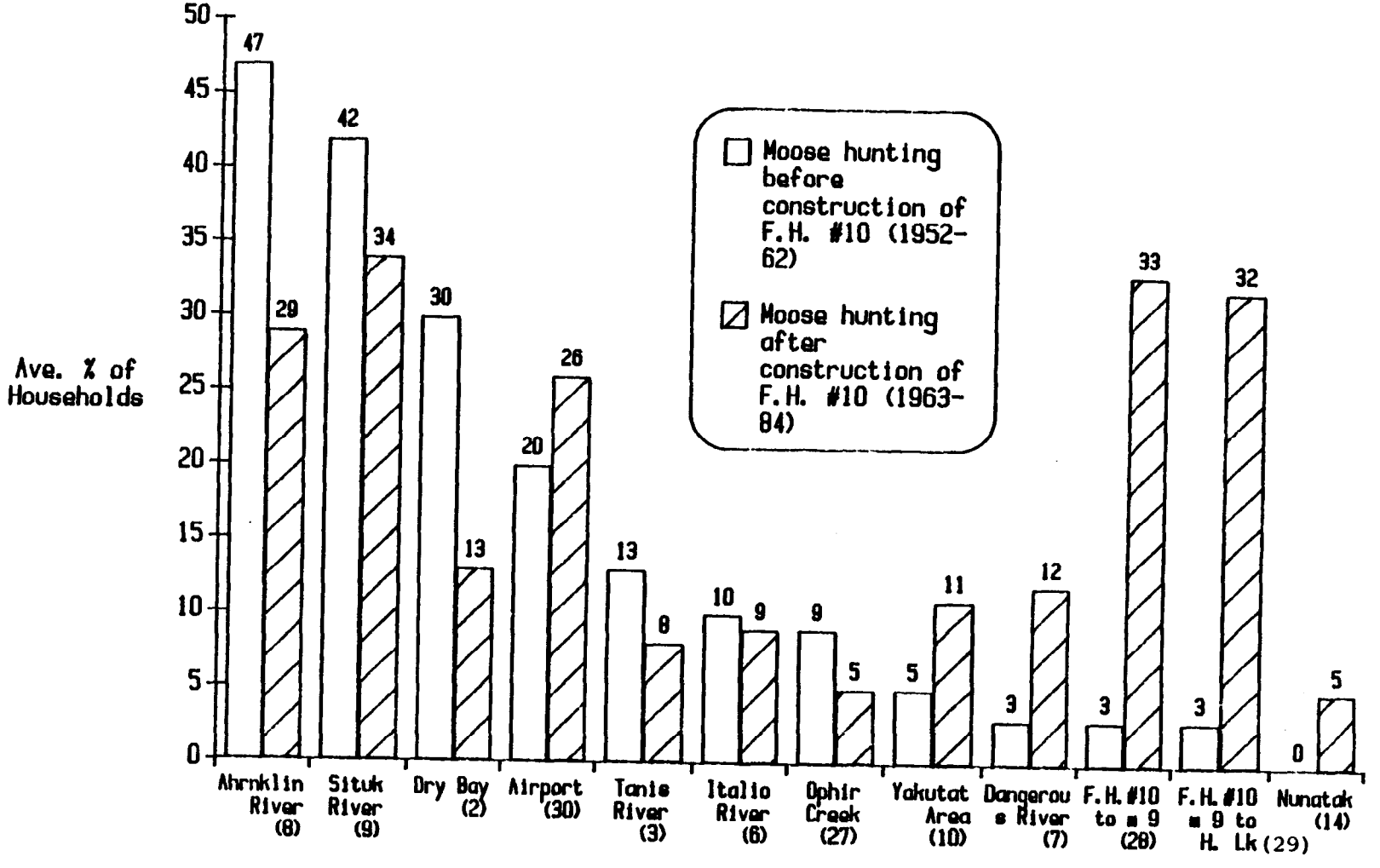



Fig. 36. Average percentage of Yakutat households moose hunting selected sub-units before and after construction of Forest Highway #19 (random sample, 1984, n=50 households) (Yakutat Foreland areas only). Numbers in parentheses are the sub-units.

have been combined and represent the areas north of the Dangerous River. The non-roaded areas include the areas south of the Dangerous River.

TABLE 7. MOOSE HUNTING SUCCESS RATE PER HUNTER AND PER SQUARE MILE ON THE YAKUTAT FORELANDS 1984 (RANDOM SAMPLE, n = 50)

| | Successful Households | Total Households Attempting | Moose Harvest Per Hunting Household | Square Miles of Area | Moose Harvested Per Square Mile |
|---|---|---|---|---|---|
| Roaded and road connected areas | 2 | 20 | .100 | 299 | .0067 |
| Non-roaded areas | 5 | 8 | .625 | 262 | .0190 |

As shown in Table 7, hunters using the non-roaded areas of the Yakutat Forelands had a higher success rate of moose harvests (.625 moose per hunter) than hunters using roaded and road accesible areas (.100 moose per hunter). Even though effort in the roaded and road connected areas was much greater, significantly more moose were harvested in the non-roaded areas in 1984. The rate of success per hunter in the non-roaded areas was about six times greater than that of the roaded areas. This pattern of success was reported by key respondents to be the general pattern for the recent past.

Figure 37 shows the percent of households using particular modes of access for moose hunting in 1984, broken out by level of success. Highway vehicles were used by 54 percent of the sample, but this mode of access provided only three percent of the total moose harvest (a hunter success rate of six percent). Other modes of access were significantly more successful. Households using airplanes were 82 percent successful,

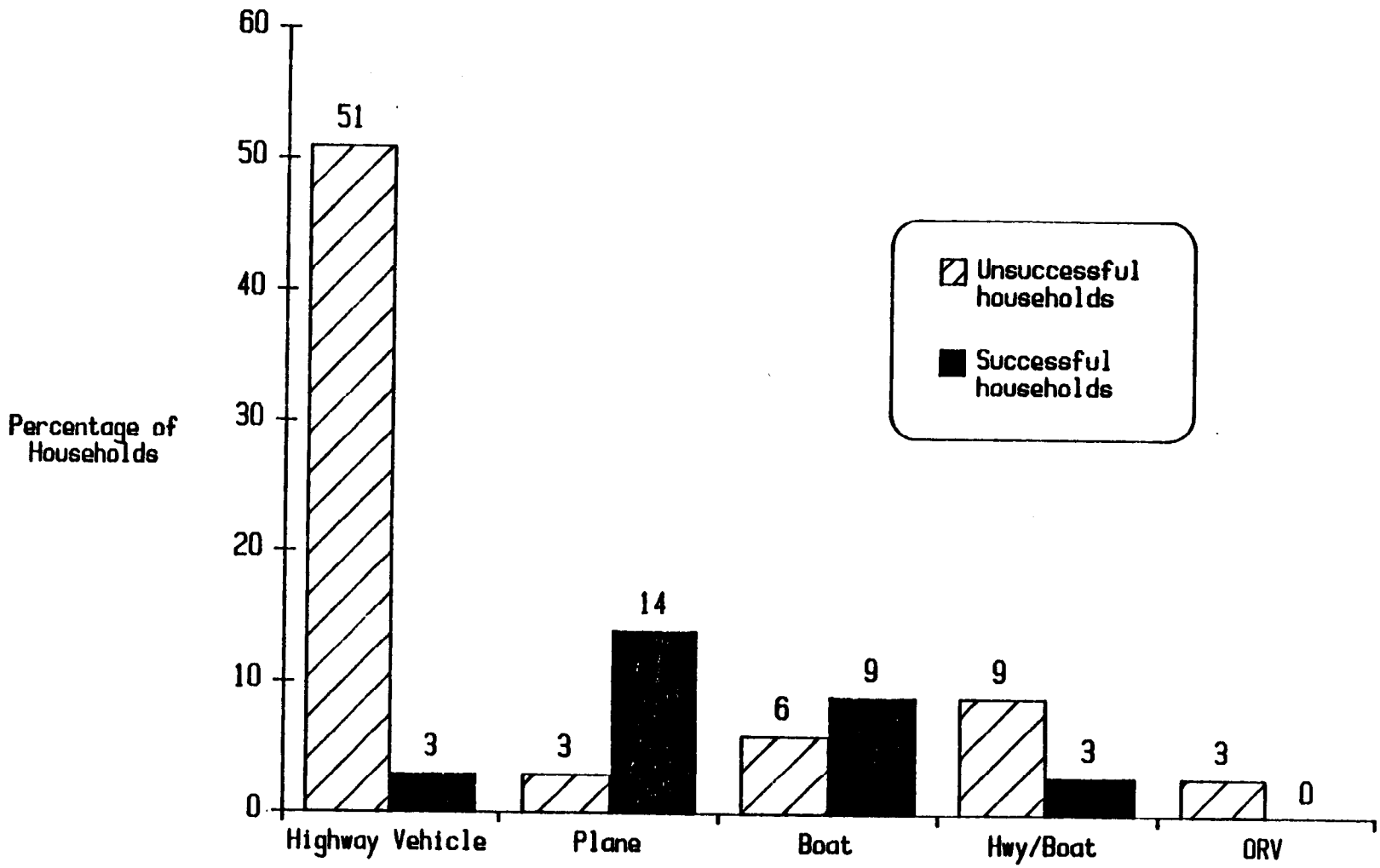



Fig. 37. Percentage of Yakutat households using particular modes of access for moose hunting in the Yakutat area, by level of success (random sample, 1984, n=37 households).

households using boats 60 percent successful, while hunters using a combination of highway and boat access were 25 percent successful.

A similar pattern of success was found to exist when all successful moose hunters (both Yakutat residents and non-residents) were considered, based on returned ADF&G moose hunting permits in 1984 (Fig. 38). Hunters using highway transportation accounted for 13 percent of all moose harvested while those using airplane and boat transportation accounted for 50 percent and 26 percent, respectively. Those using off-road vehicles accounted for 11 percent of the harvest in 1984. These trends seem to be consistent with patterns of successful moose hunts from 1978-84 on the Yakutat Forelands (Fig. 39). Of moose taken during these seven years, 51 percent were taken by plane, 28 percent by boat, 15 percent by highway vehicle, and 8 percent by off-road vehicle. Hunting by highway vehicles only accounted for 5 to 26 percent of the moose harvested per year.

## Changes in Access of Fish and Wildlife Resources

Other indicators of changing patterns of resource harvesting by Yakutat residents are the changes that have taken place in modes of transportation. Figure 40 illustrates how transportation used for moose hunting has changed since the early 1960s. The early 1960s was repeatedly mentioned by key respondents as a point when considerable changes began taking place in the community of Yakutat. The development of the road, the new people it brought into town, and the timber harvesting which began shortly after, all significantly affected the social, economic and physical conditions in Yakutat. As shown in

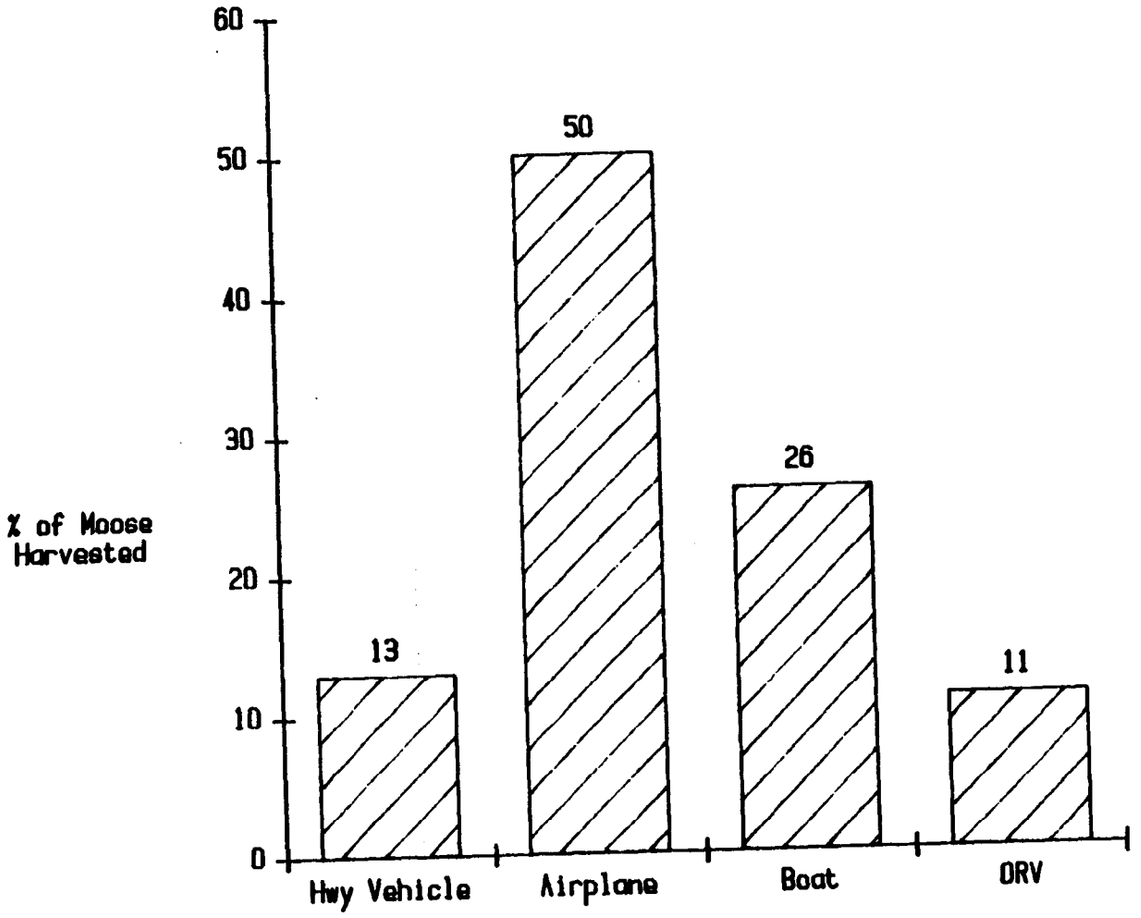



Fig. 38. Percentage of moose harvested on the Yakutat Forelands in 1984 by all hunters, and mode of access used (ADFG permit information, n=46).

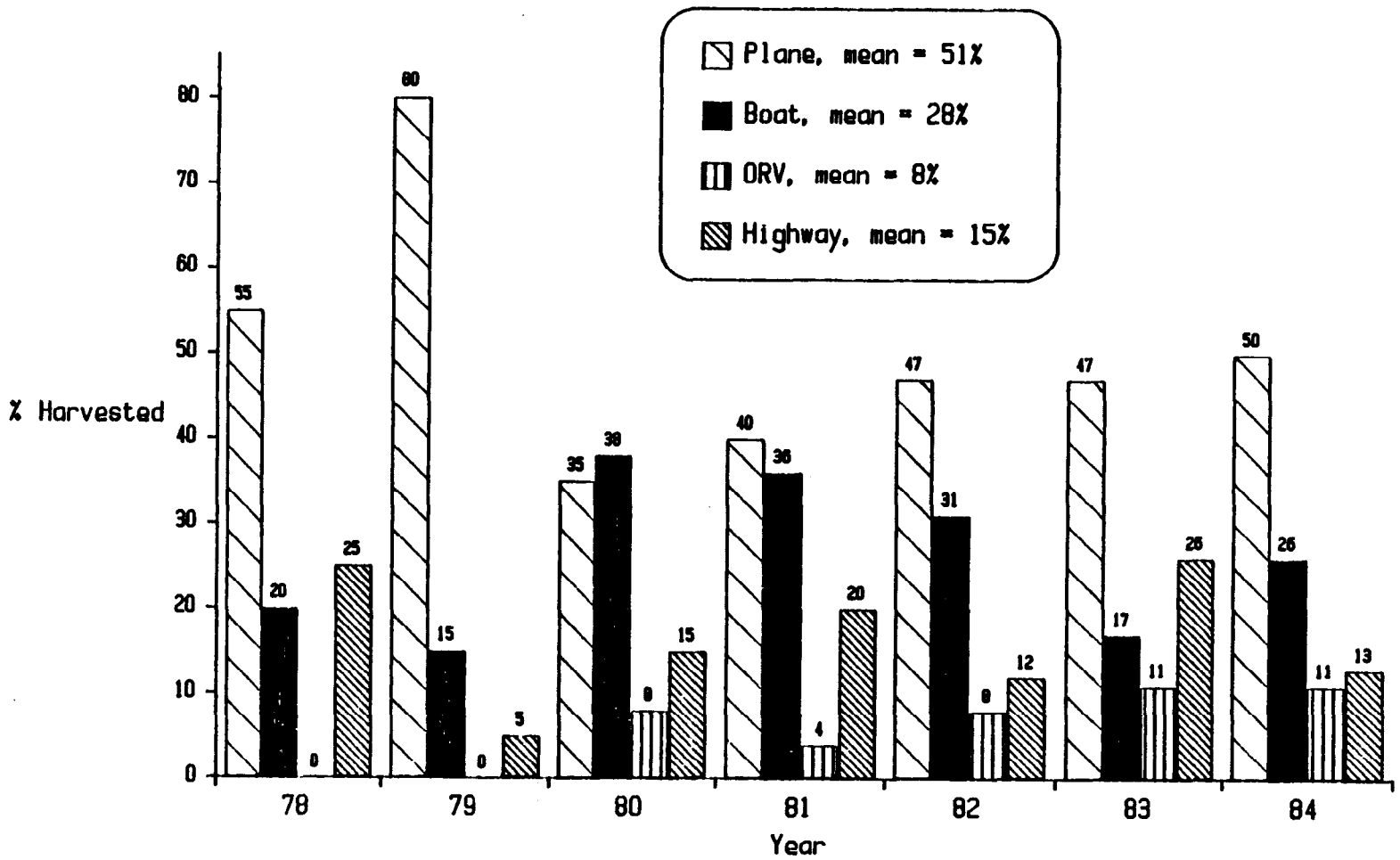



Fig. 39. Percentage of moose harvested on the Yakutat Forelands by all hunters, and mode of access used (ADFG permit information, 1978-84).

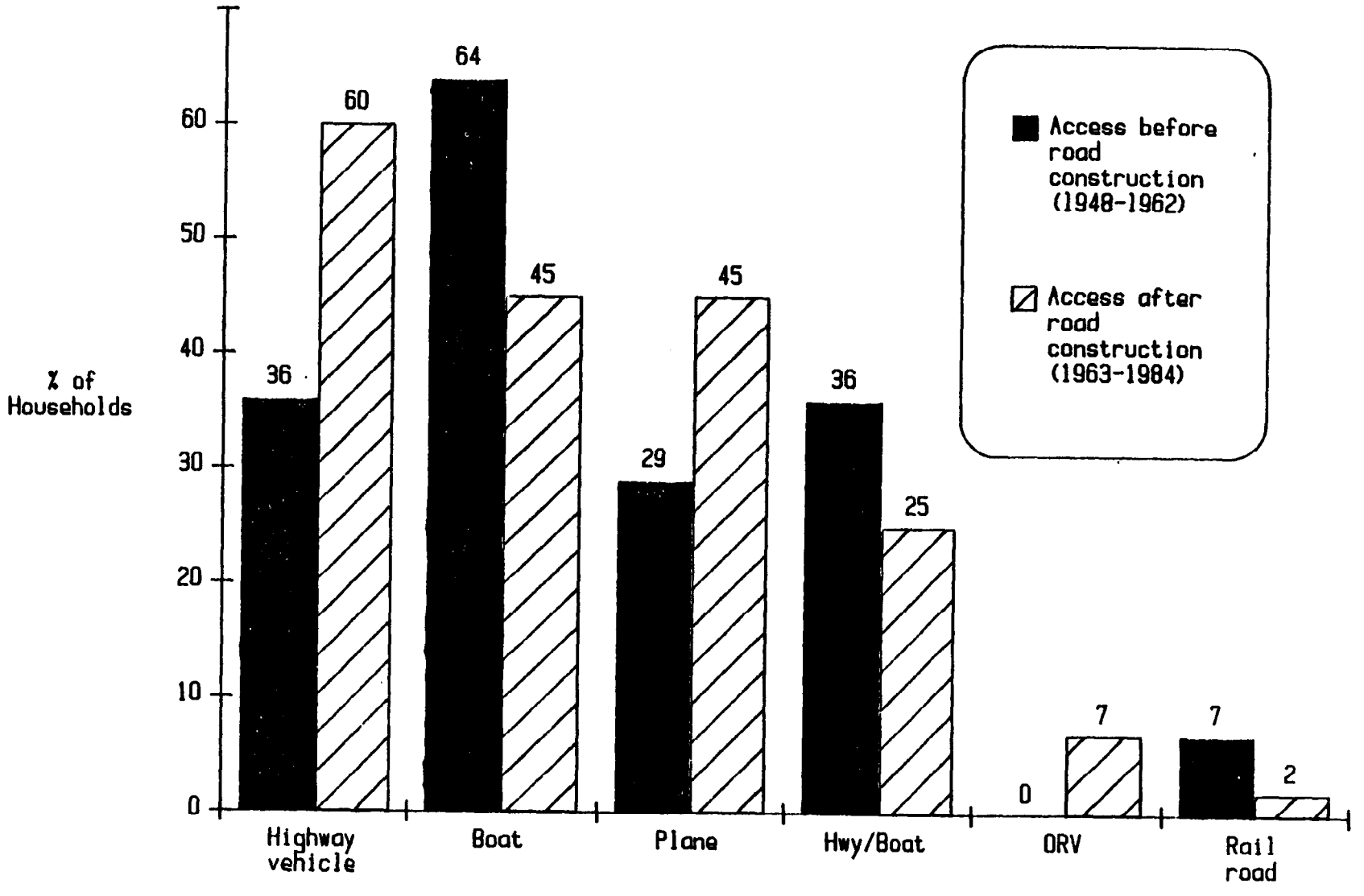



Fig. 40. Percentage of Yakutat households using transportation mode for hunting in the Yakutat area before 1962 and after 1963 (random sample, 1984, n=50 households).

Figure 40, the percent of households using highway vehicles to hunt moose increased from 36 percent before 1962 to 60 percent after 1963. Use of airplanes increased from 29 percent to 45 percent. In conrast, use of boats to hunt moose decreased from 64 percent to 45 percent. These figures represent the percent of households reporting use of this transportation mode on any single year during the two time spans.

Prior to the onset of construction of Forest Highway #10 in 1963, residents did use highway vehicles to hunt for moose primarily around the airport area, representing the 36 percent of households using highway vehicles before 1962. However, the portion using this mode of transportation has nearly doubled since that time as shown in Figure 40. At the same time the percentage using boats or a combination of highway vehicles and boats decreased. This decrease may be attributed to some households shifting over to road hunting. It may also be attributed to new people moving into the area and bringing with them highway vehicles which they may have used for hunting at their previous residence. Since moose arrived in the area, airplanes have been used for accessing moose hunting areas on the Yakutat Forelands. Because of the broad, hard-packed sandy beach along most of the shoreline and the numerous gravel bars on many of the rivers, there are numerous possible landing areas. In the early 1960s several gravel air strips were constructed, making the airplane an effective means of access to a number moose hunting areas. In recent years, various types of off-road vehicles have been brought to Yakutat, and these are used for many resource gathering activities including moose hunting. Off-road vehicles are often used in combination with road vehicles during the fall and winter months and in place of highway vehicles when the roads are closed because of snowfall.

# CHAPTER 6

# TIMBER HARVESTING AND USE OF WILDLIFE AND FISH

## HISTORY OF TIMBER HARVESTING IN THE YAKUTAT AREA

Timber harvesting in the Yakutat area dates back to the late 1800s when the Swedish Free Mission built a small sawmill in the community. Wood products were used locally for building construction, docks, and eventually railroad ties which provided over-land access from the Situk River to the Yakutat cannery. Small scale selective logging occurred along the shoreline in the immediate area of Yakutat as wood was needed for local construction through the first half of the 20th century.

It was not until the mid 1950s that clearcut harvesting and export of timber began near Yakutat. The first clearcuts occurred just north of Yakutat near Broken Oar Cove east of what is presently known as Sawmill Cove (Fig. 41). Between 1952 and 1976 a total of 117 million board feet of timber was clearcut from United States Forest Service (U.S.F.S.), lands within a five mile radius of Yakutat (City of Yakutat 1983). Since the land is relatively flat in the area, timber was removed in rectangular blocks. An additional 30 million board feet of timber was also removed from State lands immediately outside the village area of Yakutat during the 1970s.

More recently timber harvesting has occurred between 1983 and 1985 on U.S.F.S. lands at two locations 9 and 12 miles northeast of Yakutat off of Forest Highway #10. Additional cuts are planned in these same areas in the immediate future. The U.S.F.S. is presently developing

numerous alternatives that propose various levels of timber harvesting for the Yakutat Forelands. Some of the proposals involve roading and timber harvesting along the entire 50 mile distance of the Forelands from Yakutat to Dry Bay. Timber harvesting has also begun on Yakutat village corporation land just north of Broken Oar Cove and is planned north along the shoreline to Redfield Cove and as far as Humpback Creek (Fig. 41).

Clearcut logging has also occurred on State land thirty miles northwest of Yakutat between Icy Bay and Cape Yakataga. Logging camps were established in the area in the mid 1960s and cuts have occurred through the 1970s and 1980s moving north up the coast from Icy Bay toward Cape Yakataga. Timber harvesting has occurred on the one to two mile strip of forest that is found between the steep cliffs of the Robinson Mountains and the Gulf of Alaska.

Until 1983 most of the timber harvesting in the Yakutat area occurred within a six mile radius of the community center (with the exception of the Icy Bay operation). Since 1983 the cutting has spread to a distance of 12 miles. Considerable portions of land have been clearcut in these areas of close proximity to Yakutat, however, the entire Yakutat Forelands has not to date experienced extensive logging activities as have other communities in southeast Alaska such as Klawock on Prince of Wales Island or Kake on Kupreanof Island. It is therefore important to note that the types and the scale of relationships described in the following section is relative to the scale of harvesting that has occurred to date. Comparisons of these relationships with communities that have experienced different levels of cutting would provide additional information on the significance of these findings and

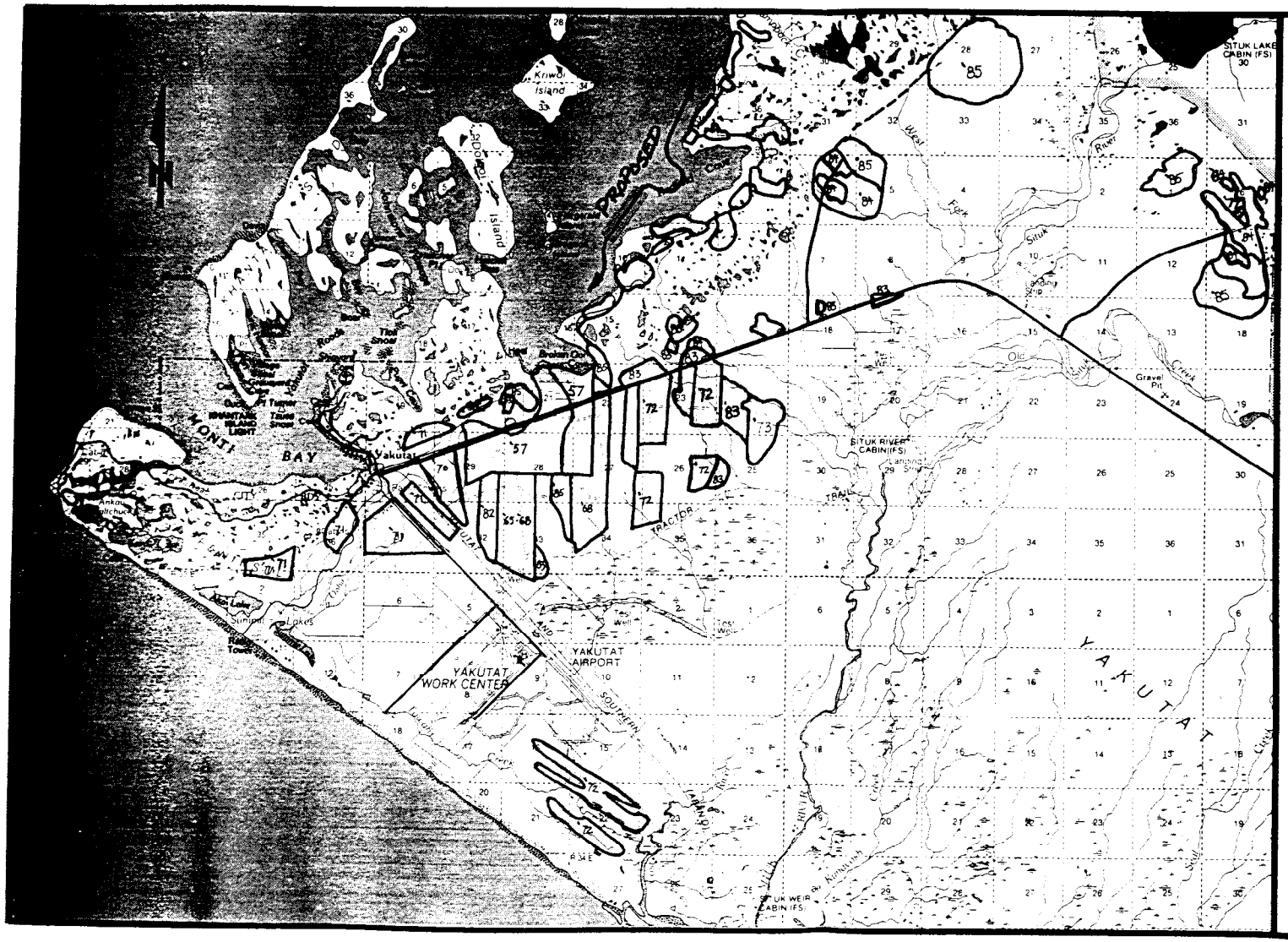



FIG. 41 HISTORY OF TIMBER HARVESTING IN THE YAKUTAT AREA.

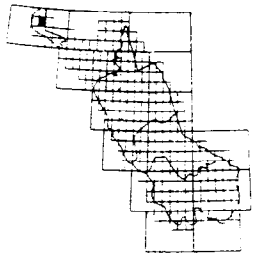
57 AREA CLEAR CUT AND DATE OF CUTTING

INFORMATION COLLECTED FROM STATE OF ALASKA, DEPARTMENT OF NATURAL RESOURCES, DIVISION OF FORESTRY.

SEE "FISH AND WILDLIFE USE IN YAKUTAT ALASKA: CONTEMPORARY PATTERNS AND CHANGES", BY DAVID D. MILLS AND ANNE S. FIRMAN, DIVISION OF SUBSISTENCE TECHNICAL PAPER NO. 131. FOR FURTHER EXPLANATION.

BASE MAP ADAPTED FROM USGS YAKUTAT (C-4) 1:63,360.

0 1 2 3 4 miles



TONGASS NATIONAL FOREST

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF SUBSISTENCE
1985

an insight into cumulative effects of clearcut logging on uses of fish and wildlife.

## CLEARCUT LOGGING AND IMPACTS ON WILDLIFE AND USES

While there remains a continuing need for more data on biological impacts of clearcut logging on wildlife and fisheries of southeast Alaska, a considerable amount of information is available for consideration in land use decisions (Sigman 1985). The scope of this report does not allow a detailed discussion of the biological impacts of clearcut logging on particular fish and wildlife species, however brief summaries are provided in the discussion below. Each of these summaries is followed by information gathered from these sampled households concerning relationships for particular resources between clearcut logging and harvesting activities for particular resources in the Yakutat area. The effects of road construction, while mentioned here, have been covered in the previous section.

### Deer

Considerable information is available on the relationship of old-growth forests and winter survival of deer (Leopold and Barrett 1972, Bloom 1978, Barrett 1979, Schoen and Wallmo 1979, Wallmo and Schoen 1980, Schoen et al. 1981, Alaback 1982, Rose 1982, Kessler 1982 Kirchhoff et al. 1983, Hanley et al. 1983, Schoen et al. 1984). Most of this research was conducted in the northern limits of the deer's natural range, the island areas of southeastern Alaska. Deer are not native to

the Yakutat area but were transplanted to the Yakutat Forelands during 1937. Deer populations increased slowly near Yakutat until the harsh winters of the early 1970s reduced their numbers and in 1981 deer hunting was closed in the area. The few deer that remain are located near Yakutat Bay concentrated primarily near Eleanor Cove and on offshore islands during winter months, where a few survive the deep winter snow in the forested beach fringe. As documented in Chapter 4, deer do not contribute substantially to the pattern of subsistence harvests of Yakutat residents.

## Mountain Goat

Population and habitat use studies of mountain goat have been conducted in southeast Alaska near Juneau (Schoen 1978, Fox 1979, 1982, Schoen et al. 1980, Schoen and Kirchhoff 1982), Haines (Hundertmark et al. 1983) and Ketchikan (Smith 1982, 1983, 1985). This research determined that contrary to the common perception that mountain goats spend most of their lives above treeline, in fact, forested habitats are used by goats throughout the year. Mountain goats use the forest occasionally in summer months for protection from wet, windy weather or for relief from heat and insects. In areas of heavy wet snows, goats were found to winter almost exclusively on forested slopes which typically were comprised of commercial volume timber. Forested lower elevations or southerly exposures are considered particularly critical wintering sites (Smith 1985).

Vehicle traffic and noise have been documented as being disturbing to goat behavior and potentially interfering with reproductive behavior

by separating nannies and kids and increasing susceptibility to predation, in studies in the Rocky Mountains. Abandonment of summer range and increased mortality have been documented as impacts attributable to camps and roading within 2 km of goat habitat (Foster and Rahs 1983).

Road access has the potential of causing over harvest of goat populations. Female goats are particularly tied to a home range. Elimination of females from a high value range can result in no goats inhabiting an area for many years (Chadwick 1973). Roads can also bisect goat movement and restrict traditional habitat use. Research has shown that goat populations decline as a result of over exploitation of mountain goats herds, in association with increased road access into formerly unroaded areas (Foster 1977).

In the Yakutat community subsistence use areas (see Chapter 4), timber harvesting near Icy Bay has removed known timbered wintering sites for the local mountain goat population (Smith and Reynolds 1977). Yakutat key respondents have reported that they no longer hunt mountain goats near Icy Bay as they did 10-15 years ago. Until the 1970s in the late summer and fall, groups of Yakutat hunters travelled by boat or occasionally by airplane 30 miles northwest up the coast to Icy Bay. They hunted for goats along the cliffs and mountains that surround the bay (Fig. 22). Because of the length of the trip and the time and energy expended to reach the areas where goats are found, the groups of hunters harvested more than one goat each. The meat was brought back to Yakutat and used for food and the hide was processed by local women and made into blankets and clothing.

When logging began in the Icy Bay area in the late 1960s and early 1970s, camps were established and roads were built near the areas where

hunting had taken place by Yakutat residents. Key respondents reported that they stopped hunting in the area because of the increased activity and number of people, and the destruction of their hunting camps. Roads were constructed and timber was removed up the sides of the mountains creating easier access to land based motor vehicles to the cliffs where goats were hunted. Because of the increased pressure on goat populations by the newly established logging camps and the increased access, the bag limit was lowered from two to one goat per hunter by the Alaska Department of Fish and Game (ADF&G). The Yakutat hunters who had continued to hunt the Icy Bay area despite the increased activity and competition in the area soon discontinued using the area because of the reduced bag limits, according to key respondents. "It's just not worth the time and expense to hunt for goats in Icy Bay when you're only allowed to take one", one key respondent commented. The last time he had hunted in the Icy Bay areas was in the early 1970s.

Closer to Yakutat, road building associated with timber harvesting activity has affected mountain goat hunting in the Brabazon Mountains. Mountain goat hunting during late summer by local residents occurred upland from the Yakutat Forelands during the 1920s to the 1940s, according to respondents. Yakutat residents fishing on the river systems of the Yakutat Forelands took periodic breaks from fish camp and traveled several days upstream to the Brabazon Mountains on foot or by canoe to hunt goats along mountain ridges. The meat, hides, and other useable parts were packed off the mountain and floated down river to fish camp and later brought to the community.

Airstrips built on the Yakutat Forelands in the 1950s made access to the mountainous areas more convenient, but did not cause a large

increase in hunter pressure or a decrease in the goat population according to key respondents. By the mid-1970s Forest Highway #10 was constructed from Yakutat to Harlequin Lake which is adjacent to the Brabazon Mountains (Fig. 21). Since that time, local resident, State resident and out of State hunters, drive approximately 31 miles of road to Harlequin Lake, take a skiff across the lake, and have access to the cliffs and ridges where goats are found. This increase of access has contributed to increased hunter pressure on local goat populations. During 1984, it became necessary to close the area to goat hunting six weeks early because of high hunting success.

## Moose

Studies by Doerr (1983, 1985), Huntermark et al. (1983), and Craighead et al. (1984) have indicated that certain coniferous forest stands are an essential component of moose winter range in southeast Alaska. Forests are used for calving areas, shade from the sun, feeding sites, and migratory corridors when deep snow accumulates in open areas.

Moose browse is generally found along large river systems or in areas of early plant succession where suitable forage such as willow is present. Research indicates that if high quality browse is limited in an area, young clearcuts with high understory production may provide additional foraging areas for moose during spring, fall, and winter periods with low snow fall. In areas studied, clearcuts up to 30 years of age were used for foraging. However, during deep snow conditions browse in clearcuts was unavailable and moose selected spruce river terrace forests, riparian shrub stands, and old-growth forests (Doerr

1983). In Yakutat during late winters with high snow accumulations, moose tracks indicate high use of old-growth timber stands for browsing or resting and avoidance of open areas (B. Dinneford, pers. comm.). Clearcuts with usable browse are generally short lived since conifer seedlings are quick to establish as even aged stands in the openings and eventually shade out usable forage.

Studies to date strongly indicate forested winter range is essential to moose during heavy snow falls (Hundertmark et al. 1983, Doerr 1985). Loss of certain forest habitats could be detrimental, especially to moose populations that have limited available winter range. Even on the Yakutat Forelands where limited timber harvesting has occurred, moose populations declined drastically during the early 1970s when severe winters brought heavy snows (Fig. 29).

A concern for the area-wide health of the moose population was common among residents interviewed. Some residents reported that clearcuts to date have not directly impacted their moose hunting since many of the areas they have traditionally used have not been physically altered by any type of development. Proposals for additional timber harvesting, however, frequently brought out concerns over impacts to habitat and measures that might be necessary to maintain or rebuild the perceived fragile moose population.

Most hunters used natural openings in the forest to hunt for moose. These included river corridors, muskegs, and beach flats where the hunter could observe an area from a considerable distance and have an unobstructed shot should a moose travel through the area. The large clearings created from recent logging were not used for moose hunting very frequently. Residents did mention that they would drive through a

clearcut occasionally to see if a moose was around but they seldom spent much time in these areas waiting. This was primarily due to the reported infrequent occurrence of a moose walking through a clearcut. Hunters felt that moose had a difficult time traveling through the brush and slash contained in the cuts. The brush and slash also discouraged hunters looking for areas that were easy and quiet to travel in and contained good sight distance for a "clean shot".

Areas that were clearcut in the late 1950s were not used for moose hunting because the 25-30 year second growth forest grew back densely and was difficult to see or travel through. Examples of these areas include areas clearcut during the 1950s between Sawmill Cove and Yakutat (Fig. 41).

Moose population dynamics and local hunting patterns in Yakutat have been detailed previously in Chapter 4. Key respondents interviewed in Yakutat felt the moose population on the Yakutat Forelands was fragile. They had witnessed the steady population growth of moose through the 1950s to the 1960s and then a rapid decline in the early 1970s which brought a closure of hunting for four years (see Chapter 4). This closure was difficult for Yakutat residents who had incorporated moose hunting into the community's seasonal cycle of subsistence activities over that 20-year period. Due to the local closure, residents did without moose or traveled greater distances by boat up the coast to hunt. As mentioned previously, the open ocean conditions north and south of Yakutat are considered particularly difficult for small skiff travel. While the Yakutat Forelands are now again open to moose hunting, currently hunting success is significantly greater in non-roaded areas more distant from the community, as detailed above.

Many long term residents have seen large changes in the populations of moose in the area during the past 20 years, although it is difficult for them to point to one factor as being responsible. Factors which were mentioned as directly or indirectly contributing to the decline of moose include: the management of the moose population, weather (such as heavy snow falls), changes in the land and moose habitat, road building, and logging activities. Many hunters did agree that the moose population was now tenuous and that adverse effects on the population should be minimized.

## Brown and Black Bear

Research in British Columbia has indicated that intensive forestry practices and other human factors may be contributing to a decline in brown bear populations in coastal British Columbia (Russell 1974; Smith 1978). Brown bears use forested stands along rivers during salmon runs as cover and for harvesting other foods including salmonberries, devils club berries, and currants. Many den sites are constructed in timber stands by excavating under large diameter trees. Clearcuts are used by brown bears but not as frequently as timbered areas (Schoen and Beier 1983).

The removal of timber has been found to remove hiding cover for bears (Black et al. 1976) and to inhibit growth of some berry producing shrubs (Mealey et al. 1977). As an area is developed for timber harvesting, road access may initially increase hunter success, and also increase bear mortality from illegal hunting and "problem bears" near accumulations of human garbage.

Both brown and black bear populations can be threatened by these factors. However, a study conducted on Mitkof Island observed a preference for young clearcuts by black bears. The growth of forbs and shrubs increases food supplies especially in south facing clearcuts during the spring when green plants are available and late summer when berries are available. This preference occurs in the early stages of the regrowth cycle. Canopy closure commonly occurs after 15 to 25 years, and the resultant even-growth stand that replaces the clearcut significantly reduces food supplies (Erickson et al. 1982).

Black bears often den in large hollow logs, especially if soil conditions are shallow, wet and not suitable for excavating dens. Clearcut logging often leaves large hollow logs suitable for den sites. However, after these eventually decay, hollow logs are not available in a second-growth stand for several hundred years (Erickson et al. 1982, Hanson 1982, Hanson and Doerr 1982).

In Yakutat, residents interviewed in this study generally had not observed significant changes in opportunities to harvest bears during the past 30 years, the period when timber harvesting has grown in scale. Human-bear conflicts have increased with development, primarily due to garbage, which is often available at construction sites. Bears are killed to protect property or ensure public safety. A few key respondents felt brown bear populations were higher than desired levels and should be controlled by increasing the bag limit above the present limit of one bear every four years.

## Furbearers

Little information is available describing the response of furbearer populations to habitat alterations or disturbances that result from clearcut logging. Logging is known to reduce prey species available for furbearers because of reduced diversity and food production in regrowth stands, impeded travel of furbearers because of slash, and increased mortality through increased trapper access by roads (Woolington 1984).

Research in eastern Canada and Minnesota has found that alteration of forests through clearing by logging or fire has resulted in declines of marten, a furbearer that primarily inhabits mature forests (Marshall 1951, de Vos 1952, Mech and Rogers 1977). Marten populations have been found to be less abundant in second growth stands than in mature forests (de Vos 1952). Researchers have documented reductions in redbacked vole populations, a main food source for marten, in clearcut areas and second growth stands (Clark and Campbell 1977).

Beaver ponds are important habitat for other furbearers such as muskrat, mink, otter, and wolves, and provide rearing habitat for coho salmon, cutthroat, Dolly Varden char, and steelhead. The construction of roads can cause sedimentation in beaver ponds and alter this important habitat (Bryant 1984).

In recent studies in southeast Alaska, land otters were found to avoid clearcuts for travel routes, burrows and natal dens. The conversion of mature forests into second-growth forest is thought to remove important breeding and burrowing habitat. Loss of this habitat, especially along river and ocean shorelines, is thought to have an

adverse impact on reproduction of otter populations (Larson 1983, Woolington 1984).

In the Yakutat community resource use area, trapping has occurred in forested areas primarily along river systems, ocean beaches and road corridors for mink, martin, land otter and wolf (see Chapter 4). None of the trappers contacted presently use areas which had been clearcut. Trappers avoided clearcuts and areas near construction or logging activities. They felt these areas would be less likely to have furbearers traveling through than a more remote forested area. Prior to roads being built in the area, trappers used ocean shorelines and river banks to set traps. Trappers in 1984 used roads built for logging to access forested areas when setting traplines. One trapper who used the road system was concerned about "wiping out" some areas if more people started trapping again and concentrated along the convenient road corridor. Because of fur prices the participation in trapping in the Yakutat area is presently low.

## CLEARCUT LOGGING AND IMPACTS ON FISHERIES

### Biological and Physical Changes on Fisheries

Recent scientific investigations conducted in southeastern Alaska and the Pacific Northwest on the effects of logging on fish have documented a number of physical changes to stream habitat which can occur as a result of specific logging practices. These changes can alter the survival rate of salmonid populations. Little research has been conducted specific to the Yakutat area investigating clearcut

logging and fisheries, so impacts mentioned are potential effects and are generalized from research throughout the region. Both negative and positive effects on fisheries by nearby clearcut logging have been documented. Some of the changes that have occurred within streams associated with logging activities include changes in: stream flow, sedimentation, water temperature, water quality size of rearing habitat, growth rates of fish, egg and fry survival and adult survival rates. For a detailed discussion of these potential changes refer to "The Impacts of Clearcut Logging on the Fisheries Resources of Southeast Alaska" by Schwan, Elliott and Edgington of Alaska Department of Fish and Game, edited by Sigman in 1985.

## Changes Observed by Local Residents

Many of the residents interviewed pointed to Ophir Creek as an example of fisheries degradation which they felt can result from timber harvesting, road building, and other development activities. These impacts of development were not totally understood before projects began, and might have been avoided. Ophir Creek was a productive salmon stream that was used extensively by Yakutat residents at least since the early 1900s. Because of its easy walking distance from the village site and abundance of sockeye and coho salmon, it was an ideal subsistence fishing area.

The headwaters of Ophir Creek originate southeast of Sawmill Cove in an area that was logged in the late 1950s. South of this area the watershed begins to combine into small tributaries. Eventually these waterways become a small creek, which flows through land that was logged

in the mid-1960s, and then runs adjacent to a trailer camp and lodge constructed during the mid-1970s. Beyond this, the creek flows through a culvert underneath the airport road and between two areas cut in the early 1970s. The creek continues through flat forested terrain for two miles and empties into a pond system called Summit Lakes before draining into ocean waters (Fig. 41). The distance of the creek system is about five miles.

Since the 1920s key respondents reported fishing the creek through the summer months and late into the fall for a variety of salmon. Sockeye salmon were taken during early summer months. During the fall, a late run of sockeye salmon was available along with coho salmon. These late run fish, called "red fish", were highly desired because of their special flavor. Because Ophir Creek is clear, slow moving, and shallow, selective harvesting with spears was possible. Fishers were proficient at selecting and spearing salmon with a minimal amount of damage to the edible flesh. This was the fishing pattern on the river system through the 1960s.

During the summer of 1968 it was noted that portions of the creek dried up, and during winter water levels remained very low. Periodic low water conditions have prevailed since that time. Consequently, salmon populations have declined in the creek due to loss of spawning habitat and winter rearing areas. In 1984 people continued to fish Ophir Creek, especially for "red fish", however, the creek no longer provided the number of salmon that Yakutat residents had previously depended upon. In 1984, most of the salmon used in Yakutat households came from the Situk or Lost River systems or Yakutat Bay.

The cause or the causes of the change in water level and resulting loss of salmon is not well understood or agreed upon among various observers. Bishop (1970) concluded that the bedrock in the entire area was in the process of uplifting as a result of post glacial rebound. The uplift lowered the water table and decreased streamflow. In addition, the uplift cut off certain streams connecting Ophir Creek to the Ankau Lagoon system leading to the ocean, blocking the passage of some salmon to the creek and restricting the use of the lake area for rearing salmon. George Plafker of the U.S. Geological Survey reported the only way to measure gradual uplift in the Ophir Creek area, is from a tide gage located near Yakutat. Measurements from this guage over a 36 year period (1940-1976) indicated a lowering of sea level 0.8 ft, for an average of 0.022 feet per year. He indicated that this change was probably a minor factor in modification of the coastal area. However, he speculated that sudden tectnonic uplift accompanying major earthquakes such as the 1899 event, may have a major impact on river gradients (Plafker 1983).

Local residents attribute reduced stream flow to changes in the patterns of snowmelt in the watershed of Ophir Creek due to logging. The Yakutat Forelands can receive up to 300 inches of snow during heavy snow winters (averaging 209 inches). Some of the snow that falls in forested areas is intercepted by tree canopies, but much of the heavy wet snow accumulates on the forest floor. Spring and summer sunlight and warming temperatures begin melting these large quantities of stored water. Local residents have observed that unforested areas are the first to be totally void of snow as the summer progresses. Under the shade of forests, the melt period is extended late into the summer

months. These observers believe that delayed melting and run off are critical for providing adequate water levels during salmon migrations in late summer months when streams are typically drier. Much of the upper watershed of Ophir Creek was clearcut during the 1950s and 1960s. Local observers report that snow melt is running off earlier than it would under forested conditions, and that the necessary water levels are not possible later in the summer when the salmon are attempting to spawn.

Other activities in the Ophir Creek watershed also may be contributing to the lower stream flow, according to local observers. The airport road crosses Ophir Creek approximately two miles upstream from Summit Lakes. The culvert under the road surface, because it is higher than the creek bed, dries up during low water situations and blocks fish movement. This has led to problems, primarily during the early spring, when water levels remain low and juvenile salmon are attempting to migrate downstream to rear in the lake or the ocean. During the 1970s, ADF&G personnel physically carried juvenile fish from one side of the road to the other because of this drainage problem. Blockage of the watershed is also attributed to Forest Highway #10, constructed during 1963, on the northwestern fringes of the Ophir Creek watershed. Key informants questioned the ability of the numerous culverts placed under this road to carry the water load, which is substantial in the area. In the area, water appears to be flowing so diffusely that no major tributaries are visible. However, large areas seem to be transporting surface water. Residents felt that roads built through an area of diffuse water flow, will retain or divert water even with numerous culverts.

In addition to road building, recreational and housing development along the creek may have reduced stream flow, according to local observers. In the early 1970s, a lodge and trailer camp were built adjacent to the creek. Wells were drilled, upstream creek bed gravel removed, and pits dug to extract fill material. Concurrently, a gravel operation was established nearby which drew ground water to wash rock. These activities possibly diverted some of the Ophir Creek headwaters, contributing to the low water problem.

The quality of water in the Ophir Creek watershed has diminished as well according to local observers. The lodge and trailer camp adjacent to the creek have had difficulty properly treating sewage and monitoring agencies have reported sewage entering the stream. A sorting yard for timber operations was constructed on one of the original clearcut areas near Sawmill Cove. Water from this area, in the upper watershed of Ophir Creek, drains into Ophir Creek. Leachates from freshly cut debris can be toxic to salmonids. The city landfill is also located in the upper watershed area.

Local observers concur that naturally changing land forms from glacial rebound are modifying water drainage in the Yakutat area. Local residents also have observed man-made changes which cumulatively could be a detriment to the fish habitat of Ophir Creek. These include timber harvesting (clearcut logging), log storage, road building, well drilling, gravel extraction, waste disposal and housing construction. They consider these developments to be accelerating and exagerating natural changes occurring in the watershed. Ophir Creek has become an example for residents of resource declines apparently associated with clearcut logging and other developments. Many residents are hesitant to

allow similar activities to occur elsewhere on the Yakutat Forelands until the situation at Ophir Creek is fully understood and corrected.

Other changes in fishing patterns have occurred near Yakutat in specific areas in association with logging and road construction according to respondents. Logging along the shoreline has removed wind barriers from coves, exposing them to storms and reducing the value of the cove for an anchorage. Key respondents who used ocean waters for commercial fishing reported that this has occurred around Broken Oar and Sawmill Cove.

Fishers have reported that changes in fishery resources have occurred at Sawmill Cove in association with logging. Two types of changes have been reported. First, because of shipping activity and logs in the water, the cove is physically more occupied and not as available for fishing activities. Second, some residents reported having decreased fishing success in the area. Other residents reported no changes in patterns of fishing before and after the transfer site began operation. Some fishers report that shrimp, herring, and salmon are no longer harvested at levels from Sawmill Cove as they were prior to the establishment of the transfer facility. Some trollers who previously fished the Sawmill Cove area reported first observing a decline in the amount of herring and other "feed fish" visible in the water; subsequently, a decline was observed in their catch of salmon. Herring spawn on kelp in Sawmill Cove area as well as the entire island area is also reported to have decreased in recent years.

# CHAPTER 7

## SUMMARY AND CONCLUSIONS

For generations residents of the Yakutat area have lived from the surrounding land, harvesting fish, wildlife, and plants. The area supported numerous different villages and many people. As documented in this report, modern day residents, while fewer in number, continue to live close to the land and depend upon the abundant fish and wildlife resources they have inherited from their ancestors. To a person not familiar with Yakutat and its people, much of the land of the area may appear as wilderness, uninhabited and unutilized by human beings. As shown by the maps of this report this is far from true. From Dry Bay to Cape Suckling, along the coast and inland, the land is used for its wealth of fish and wildlife. For the most part, the habitat remains unaltered with the ability to perpetuate a sustained harvest of renewable resources. Residents of the area have developed economic strategies that utilize many of these resources, allowing for involvement in both market activities and subsistence activities. The result is a mixed subsistence-cash economy that is based on the harvest of readily renewable fish and wildlife both for cash and for home use.

Non-commercial harvests of local fish and wildlife in Yakutat are substantial, an average of 369 pounds per capita in 1984 the highest recorded to date in the southeast region. But hunting and fishing are more than just economic pursuits for residents of Yakutat. The Alaska Native residents have developed a culture that is spiritually tied to the land and the resources that it provides. In many ways these ties

are integral to the continuance of their culture. Non-Native people have moved to the area, many seeking a life that also allows them to become connected with natural processes and the surrounding land, suggesting that similar needs exist for these people as well.

The following general conclusions can be made from research results presented in this report:

- The harvesting of local fish and wildlife resources continues to be a stable and primary focus of the Yakutat economy. The economy is based on a combination of commercial and subsistence harvesting of fish and wildlife.
- Yakutat residents harvest a wide breadth of different fish and wildlife resources from the waters and the uplands between the Deception Hills near Dry Bay, north to Cape Suckling.
- The average household harvested 1,105 pounds of fish and wildlife during 1984 or 368 pounds per household member.
- The 50 households randomly sampled were composed of a total of 150 residents ranging from infants to 80 year olds. Over two-thirds of surveyed sample had fished and over one-third had hunted during 1984.
- Over one-half of the surveyed households in Yakutat, harvested 10-37 different wild resources during 1984. Over seventy different types of fish and wildlife resources were harvested by residents during 1984, representing over 150 different species.

- On the average fish represented 57 percent of the total harvest, land mammals 14 percent (moose was 78 percent of the land mammal weight), shellfish 12 percent, and the remaining 17 percent was divided between marine plants, marine mammals, berries and plants, and birds.
- Fish and wildlife resources were shared and distributed widely throughout the community. For example dungeness crab was harvested by 40 percent of Yakutat households but used by 90 percent, shrimp was harvested by 18 percent and used by 86 percent, and moose was harvested by 22 percent and used by seventy percent of Yakutat's households.
- Use of local wild resources by Yakutat residents was common throughout the community. Over 90 percent of the households used shellfish, salmon, other fish, and berries and plants. Over fifty percent used land mammals, birds and eggs, and marine mammals.
- Households interviewed had used areas during their lifetimes ranging 200 miles along the coast of the Gulf of Alaska from the Deception Hills near Dry Bay, northwest to Cape Suckling, and inland to the St. Elias Mountains. After dividing this large use area into 30 sub-units it was determined that; 5 subunits were used by more than 60 percent of the Yakutat households, 8 sub-units were used by 31-60 percent of the households, and 17 sub-units were used by 30 percent or less of the households, for hunting, fishing or gathering.
- The construction of Forest Highway #10 in 1963 provided increased access to larger portions of the Yakutat Forelands. Since its construction, a large percentage of residents have used the road

system for hunting and fishing, in some cases abandoning more traditional areas.

- The road system, and areas it leads to, also has been used heavily by non-local hunters and fishers. Use of areas that were transected by roads or near the end of a road were said by local residents to have received significantly increased hunting and fishing use in recent years. Use of a few of these areas has become so competitive that some Yakutat residents have abandoned them.
- Since the construction of Forest Highway #10, hunting transportation types have changed in Yakutat. Highway vehicles are now used for moose hunting by more then twice as many Yakutat households as before the construction of the road. The proportion of households using boats for hunting has declined during this same time period.
- Areas of the Yakutat Forelands that were roaded or easily accessible by roads have significantly lower rates of moose hunter success compared to non-roaded areas. In 1984 non-roaded areas had six times the hunter success rate for moose compared to roaded areas, produced more moose per square mile, and accounted for most of the community's moose supply despite receiving much less hunter pressure.
- Use of a highway vehicle for moose hunting, while the most common means of transportation for Yakutat residents, was the least productive means of transportation. Fifty-four percent of all Yakutat moose hunters used a highway vehicle as their primary means

of transportation in 1984, but only three percent successfully harvested a moose by this means of transportation.

- Road construction and timber development are partially responsible for the increase in population in the area in the past twenty years and the change in ethnic composition of the community. These two changes have influenced hunting and fishing patterns, leading to use of new forms of access, reports of increased competition for resources, shifts in areas used, lower success rates, and more restrictive regulations.
- The construction of roads and the new and convenient access they provide also create additional demands for wildlife. One long term residents recalled that when Forest Highway #10 was constructed, "people that never use to hunt moose started to when the road went in". Hunters and fishers not living in Yakutat also were attracted to the improved access possibilities in the area. New users and uses of the area have had conflicts with existing uses. These conflicts have included competition for resources, or disruption of one group's activities by another group using a new form of transportation technology.
- Clearcut areas logged near Yakutat are now used infrequently for hunting or trapping. This appears true for recent clearcut areas as well as areas that were logged 30 years ago, and which now contain young second growth stands of conifers.
- The combination of naturally changing land forms and man-made disturbances in decreasing available salmon habitat on Ophir Creek is still uncertain. This loss of habitat has decreased the number and quality of salmon available in Ophir Creek for subsistence use.

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APPENDIX A

# HOUSEHOLD SURVEY: TIMBER MANAGEMENT AND FISH AND WILDLIFE UTILIZATION IN SELECTED SOUTHEAST ALASKAN COMMUNITIES

Yakutat Version

Community _____

Household ID# _____

Interviewer _____

| | Date | time |
|---|---|---|
| 1st visit | | |
| 2nd visit | | |
| 3rd visit | | |

replaced by Household # _____

length of interview _____

## 1. HOUSEHOLD INFORMATION

A. Please complete the following information for each person in your household:

(* = respondent)

| ID# | M/F | RELATION TO HOUSEHOLD HEAD | BIRTH DATE | RESIDENCE OF MOTHER WHEN YOU WERE BORN | # YRS RESIDED IN THIS COMMUNITY | PREVIOUS RESIDENCE (PLACE) | Native/ non-Native ETHNICITY |
|---|---|---|---|---|---|---|---|
| 1 | | household head | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |
| 7 | | | | | | | |
| 8 | | | | | | | |
| 9 | | | | | | | |
| 10 | | | | | | | |
| 11 | | | | | | | |
| 12 | | | | | | | |
| 13 | | | | | | | |
| 14 | | | | | | | |
| 15 | | | | | | | |

B. Using Person ID#'s from the table above, please indicate which household members participated in harvesting activities during 1984:

hunting _____ fishing _____

C. Do you have parents or children in other Southeast Alaska communities? If so, please list communities below:

_____ _____

_____ _____

D. Did you own or use any of the following equipment in 1984?

| TYPE OF EQUIPMENT | NUMBER OWNED OR USED | DO YOU USE FOR HUNTING/FISHING? yes | no |
|---|---|---|---|
| Automobile | | | |
| Truck | | | |
| Skiff (open boat) | | | |
| Enclosed Boat | | | |
| Snowmachine | | | |
| ATV | | | |
| Airplane | | | |
| Other | | | |

For each Boat owned, please indicate length, type, and motor size:

Boat #1: _____

Boat #2: _____

2. EMPLOYMENT INFORMATION

Please complete the following information for all jobs (cash employment) held by household members during 1984:

| ID# FROM TABLE IN #1 | JOB TITLE | # OF MONTHS WORKED PER YEAR | # OF HOURS WORKED PER WEEK |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

3. FISH

Did your household try to harvest or did you give or receive any type of fish, shellfish, or beach food in 1984? yes ____ no ____

If yes, please complete the following tables:

A. Use of Salmon From Commercial Catch

| SPECIES | COMM. Harvest | | Home Use | | NUMBER REMOVED FROM COMMERCIAL CATCH FOR HOME USE | | | |
|---|---|---|---|---|---|---|---|---|
| | yes | no | yes | no | seine | power troll | hand troll | gill net |
| King (chinook) | | | | | | | | |
| Chum (dog) | | | | | | | | |
| Pink (humpies) | | | | | | | | |
| Red (sockeye) | | | | | | | | |
| Silver (coho) | | | | | | | | |
| Other or Unknown | | | | | | | | |

Used salmon from a commercial catch?
harvest commercially?

B. Use of Salmon From Non-Commercial Catch

| SPECIES | USED* | | TRIED TO HARVEST** | | # HARVESTED NON-COMMERCIALLY BY GEAR TYPE | | | | | | | RECVD | | GAVE | | # OF SALMON DSIRED |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | yes | no | yes | no | seine *** P | seine *** B | troll **** | rod & reel | gill net | spear/ gaff | other | yes | no | yes | no | |
| King (chinook) | | | | | | | | | | | | | | | | |
| Chum (dog) | | | | | | | | | | | | | | | | |
| Kokanee | | | | | | | | | | | | | | | | |
| Pink (humpies) | | | | | | | | | | | | | | | | |
| Red (sockeye) | | | | | | | | | | | | | | | | |
| Silver (coho) | | | | | | | | | | | | | | | | |
| Other or Unknown | | | | | | | | | | | | | | | | |

* Used salmon from a non-commercial catch?
** Tried to harvest non-commercially?
*** Specify purse seine or beach seine.
**** Dragging a line & hook from a moving boat, rod & reel means everything else.

"If there were no limitations set by regulation, about how many salmon would your household have harvested last year?" _____

## C. Fresh Water Fish

| | SPECIES | USED yes | USED no | TRIED TO HARVEST yes | TRIED TO HARVEST no | NUMBER HARVESTED | RECVD yes | RECVD no | GAVE yes | GAVE no |
|---|---|---|---|---|---|---|---|---|---|---|
| Trout | Cutthroat | | | | | | | | | |
| | Dolly Varden | | | | | | | | | |
| | Rainbow | | | | | | | | | |
| | Steelhead | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Other Freshwater Fish | Grayling | | | | | | | | | |
| | Northern Pike | | | | | | | | | |
| | Whitefish | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |

## D. Marine Fish

| | SPECIES | USED yes | USED no | TRIED TO HARVEST yes | TRIED TO HARVEST no | AMOUNT HARVESTED (units) | RECVD yes | RECVD no | GAVE yes | GAVE no |
|---|---|---|---|---|---|---|---|---|---|---|
| Smelt | Candle Fish (Capelin) | | | | | ( ) | | | | |
| | Hooligan (Eulachon) | | | | | ( ) | | | | |
| | Surf Smelt (Silver Smelt) | | | | | ( ) | | | | |
| | Other or Unknown | | | | | ( ) | | | | |
| Herring | Pacific Herring | | | | | ( ) | | | | |
| | Herring Eggs | | | | | ( ) | | | | |
| | Herring Eggs On Kelp* | | | | | ( ) | | | | |
| | Other or Unknown | | | | | ( ) | | | | |
| | | | | | | NUMBER HARVESTED | | | | |
| Sturgeon | Green | | | | | | | | | |
| | White | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Eels | Blenny (Prickle Back) | | | | | | | | | |
| | Pacific Lamprey | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |

* or other substrate

Marine Fish Cont.

| | SPECIES | USED yes | USED no | TRIED TO HARVEST yes | TRIED TO HARVEST no | NUMBER HARVESTED | RECVD yes | RECVD no | GAVE yes | GAVE no |
|---|---|---|---|---|---|---|---|---|---|---|
| Flounders | Flounder | | | | | | | | | |
| | Sole | | | | | | | | | |
| Halibut | Halibut | | | | | ($) (lbs) | | | | |
| Cod | Ling Cod | | | | | | | | | |
| | Pacific Cod (Gray Cod) | | | | | | | | | |
| | Rock Greenling | | | | | | | | | |
| | Tom Cod | | | | | | | | | |
| | Whiting (SlmJm or WllEydPlck) | | | | | | | | | |
| | Sablefish (Black Cod) | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Rock Fish | Blue Rockfish | | | | | | | | | |
| | Red Snapper | | | | | | | | | |
| | Sea Bass (Black Bass) | | | | | | | | | |
| | Sea Perch | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Skates | Skate | | | | | | | | | |
| Sharks | Dog Fish | | | | | | | | | |
| | Salmon Shark | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Tuna and Mackerel | Blue Fin | | | | | | | | | |
| | Mackerel | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Sculpin (bullhead) | Buffalo Sculpin | | | | | | | | | |
| | Irish Lord | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Other Marine Fish | | | | | | | | | | |
| | | | | | | | | | | |

## E. Marine Invertebrates

| | SPECIES | USED yes | USED no | TRIED TO HARVEST yes | TRIED TO HARVEST no | 5 GALLON BUCKETS HARVESTED | RECVD yes | RECVD no | GAVE yes | GAVE no |
|---|---|---|---|---|---|---|---|---|---|---|
| Clams and Cockles | Basket Cockle | | | | | | | | | |
| | Heart Cockle | | | | | | | | | |
| | Butter Clam | | | | | | | | | |
| | Blue Mussel | | | | | | | | | |
| | Geoduck | | | | | | | | | |
| | Horse Clam | | | | | | | | | |
| | Razor Clam | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| | | | | | | NUMBER HARVESTED | | | | |
| Crab | Box Crab | | | | | | | | | |
| | Dungeness Crab | | | | | | | | | |
| | King Crab | | | | | | | | | |
| | Tanner Crab | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| | | | | | | 5 GALLON BUCKETS HARVESTED | | | | |
| Other Shellfish | Abalone | | | | | | | | | |
| | Black Gumboot (Black Chiton) | | | | | | | | | |
| | Red Gumboot (Red Ldy Slpr) | | | | | | | | | |
| | Limpet | | | | | | | | | |
| | Neets (Sea Urchin) | | | | | | | | | |
| | Rock Oyster (Rock Scallop) | | | | | | | | | |
| | Whelks (snails) | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |

Marine Invertebrates Cont.

| | SPECIES | USED yes | USED no | TRIED TO HARVEST yes | TRIED TO HARVEST no | AMOUNT HARVESTED (units) | RECVD yes | RECVD no | GAVE yes | GAVE no |
|---|---|---|---|---|---|---|---|---|---|---|
| Other Invertebrates | Octopus (Devil Fish) | | | | | ( # ) | | | | |
| | Sea Cucumber (Yen) | | | | | (5 gal bckt) | | | | |
| | Sea Scallops | | | | | ( ) | | | | |
| | Shrimp | | | | | ( ) | | | | |
| | Squid | | | | | ( # ) | | | | |
| | Other or Unknown | | | | | ( ) | | | | |

F. Marine Plants

| | SPECIES | USED yes | USED no | TRIED TO HARVEST yes | TRIED TO HARVEST no | AMOUNT HARVESTED (units) | RECVD yes | RECVD no | GAVE yes | GAVE no |
|---|---|---|---|---|---|---|---|---|---|---|
| Seaweed | Black Seaweed | | | | | ( ) | | | | |
| | Sea Ribbons | | | | | ( ) | | | | |
| | Other Seaweed | | | | | ( ) | | | | |
| Kelp | Bull Kelp | | | | | ( ) | | | | |
| | Other or Unknown | | | | | ( ) | | | | |

Did your household try to harvest,give or recieve any mammal wildlife in 1984?

Yes ____ No____

C. Land Mammals

| SPECIES | USED | | TRIED TO HARVEST | | NUMBER HARVESTED | NUMBER USED FOR | | RECVD | | GAVE | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | yes | no | yes | no | | FURS | FOOD | yes | no | yes | no |
| Moose | | | | | | | | | | | |
| Black Bear | | | | | | | | | | | |
| Brown Bear | | | | | | | | | | | |
| Deer | | | | | | | | | | | |
| Mountain Goat | | | | | | | | | | | |
| Wolf | | | | | | | | | | | |
| Coyote | | | | | | | | | | | |
| Red Fox | | | | | | | | | | | |
| Lynx | | | | | | | | | | | |
| Wolverine | | | | | | | | | | | |
| Land Otter | | | | | | | | | | | |
| Beaver | | | | | | | | | | | |
| Porcupine | | | | | | | | | | | |
| Muskrat | | | | | | | | | | | |
| Marmot | | | | | | | | | | | |
| Weasel | | | | | | | | | | | |
| Mink | | | | | | | | | | | |
| Marten | | | | | | | | | | | |
| Hare (Rabbit) | | | | | | | | | | | |
| Squirrel | | | | | | | | | | | |
| Other | | | | | | | | | | | |

B. Marine Mammals

| SPECIES | USED | | TRIED TO HARVEST | | NUMBER HARVESTED | NUMBER USED FOR | | RECVD | | GAVE | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | yes | no | yes | no | | FURS | FOOD | yes | no | yes | no |
| Belukha | | | | | | | | | | | |
| Fur Seal | | | | | | | | | | | |
| Harbor Seal | | | | | | | | | | | |
| Sealion | | | | | | | | | | | |
| Sea Otter | | | | | 203 | | | | | | |
| Other | | | | | | | | | | | |

5. **BIRDS/EGGS**

Did your household try to harvest or did you give or receive birds or bird eggs during 1984? yes ____ no ____

If yes, please complete the following table:

| | SPECIES | USED | | TRIED TO HARVEST | | NUMBER HARVESTED | RECVD | | GAVE | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | yes | no | yes | no | | yes | no | yes | no |
| Upland Birds | Ptarmigan | | | | | | | | | |
| | Grouse | | | | | | | | | |
| | Eggs | | | | | | | | | |
| | Other | | | | | | | | | |
| Geese | Black Brant | | | | | | | | | |
| | Canada | | | | | | | | | |
| | Emperor | | | | | | | | | |
| | Snow | | | | | | | | | |
| | White Fronted | | | | | | | | | |
| | Eggs | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Swans | Whistling Swan | | | | | | | | | |
| | Trumpeter Swan | | | | | | | | | |
| | Eggs | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Cranes/ Herons | Great Blue Heron | | | | | | | | | |
| | Sandhill Crane | | | | | | | | | |
| | Eggs | | | | | | | | | |
| | Other or Unknown | | | | | | | | | |
| Ducks/ Sea Ducks | Ducks | | | | | | | | | |
| | Eggs | | | | | | | | | |

BIRDS/EGGS Cont.

| | SPECIES | USED | | TRIED TO HARVEST | | NUMBER HARVESTED | RECVD | | GAVE | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | yes | no | yes | no | | yes | no | yes | no |
| Seabirds | Gulls | | | | | | | | | |
| | Terns | | | | | | | | | |
| | Cormorants | | | | | | | | | |
| | Grebes | | | | | | | | | |
| | Loons | | | | | | | | | |
| | Puffins | | | | | | | | | |
| | Eggs | | | | | | | | | |
| | Other | | | | | | | | | |

6. PLANTS

A. Did members of your household harvest or give or receive berries in 1984?

yes ____ no ____

If yes, how many quarts did you harvest? ____ give? ____ receive? ____

B. Did members of your household harvest or give or receive plants in 1984?

yes ____ no ____

If yes, how much did you harvest? _____ give? _____ receive? _____

C. Did members of your household gather wood during 1984?

yes ____ no ____

If yes, how much did you gather?

firewood _____ (cords)

house logs _____ (number of logs) (or board feet)

other (specify) _____ _____ (cords)

## 7. MISCELLANEOUS QUESTIONS

A. Please circle the range below which best represents your household's annual gross income:

| | |
|---|---|
| a. $ 0 | l. $ 50,000 - 54,999 |
| b. $ 1 - 4,999 | m. $ 55,000 - 59,999 |
| c. $ 5,000 - 9,999 | n. $ 60,000 - 64,999 |
| d. $ 10,000 - 14,999 | o. $ 65,000 - 69,999 |
| e. $ 15,000 - 19,999 | p. $ 70,000 - 74,999 |
| f. $ 20,000 - 24,999 | q. $ 75,000 - 79,999 |
| g. $ 25,000 - 29,999 | r. $ 80,000 - 84,999 |
| h. $ 30,000 - 34,999 | s. $ 85,000 - 89,999 |
| i. $ 35,000 - 39,999 | t. $ 90,000 - 94,999 |
| j. $ 40,000 - 44,999 | u. $ 95,000 - 99,999 |
| k. $ 45,000 - 49,999 | v. $100,000 or over |

B. Approximately what percent of your total household income in 1984 came from each of the following categories: (should total 100%)

| | % | | % |
|---|---|---|---|
| commercial fishing | ____ | retail business | ____ |
| logging | ____ | construction | ____ |
| longshoring | ____ | transfer payments | ____ |
| government services | ____ | other (list) | ____ |

(with the use of area map ask these questions)

1. When did you first start hunting moose in the Yakutat Area?
2. What areas did you use?
3. How did you access these areas?
4. Continue by recording areas used and access through their lifetime up to present.
5. Note any changes in use areas, access and years and when moose were no longer hunted and reasons.

Years
1910 - 1984

| Sub-Area | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | Reason for no longer using or access change |
|---|---|---|---|---|---|---|---|---|---|
| 1. Alsek River | | | | | | | | | |
| 2. Dry Bay (east) | | | | | | | | | |
| 3. Tanis River | | | | | | | | | |
| 4. Brabazon Range | | | | | | | | | |
| 5. Akwe River | | | | | | | | | |
| 6. Italio River | | | | | | | | | |
| 7. Dangerous River | | | | | | | | | |
| 8. Ahrnklin River | | | | | | | | | |
| 9. Situk River | | | | | | | | | |
| 10. Yakutat Area | | | | | | | | | |
| 11. Redfield Lakes | | | | | | | | | |
| 12. Yak. Bay Islands | | | | | | | | | |
| 13. Situk Lake | | | | | | | | | |
| 14. Nunatak Fiord | | | | | | | | | |
| 15. Russell Fiord | | | | | | | | | |

1910-1984

| Sub-Area | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | Reason for no longer using or access chan |
|---|---|---|---|---|---|---|---|---|---|
| 16. Slate Peak | | | | | | | | | |
| 17. Disenchant. Bay | | | | | | | | | |
| 18. Turner Glacier | | | | | | | | | |
| 19. Mandby Shore | | | | | | | | | |
| 20. Malaspina Forelds | | | | | | | | | |
| 21. Yahtse River | | | | | | | | | |
| 22. Chaix Hills | | | | | | | | | |
| 23. Icy Bay/Cape | | | | | | | | | |
| 24. C. Yakataga | | | | | | | | | |
| 25.Tsiu/Kaliakh R. | | | | | | | | | |
| 26. Cape Suckling | | | | | | | | | |
| 27. Ophir Creek | | | | | | | | | |
| 28. F.H. Yak.-Mile 9 | | | | | | | | | |
| 29. F.H. Mile 9-Harl. | | | | | | | | | |
| 30. Lost R./Airport | | | | | | | | | |

(with the use of area map ask these questions)

1. When did you first start salmon fishing in the Yakutat Area?
2. What areas did you use?
3. How did you access these areas?
4. Continue by recording areas used and access through their lifetime up to present.
5. Note any changes in use areas, access and years and when salmon were no longer fished and reasons.

| Sub-Area | Years 1910 - 1984 | | | | | | | | Reason for no longer using or access change |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | |
| 1. Alsek River | | | | | | | | | |
| 2. Dry Bay (east) | | | | | | | | | |
| 3. Tanis River | | | | | | | | | |
| 4. Brabazon Range | | | | | | | | | |
| 5. Akwe River | | | | | | | | | |
| 6. Italio River | | | | | | | | | |
| 7. Dangerous River | | | | | | | | | |
| 8. Ahrnklin River | | | | | | | | | |
| 9. Situk River | | | | | | | | | |
| 10. Yakutat Area | | | | | | | | | |
| 11. Redfield Lakes | | | | | | | | | |
| 12. Yak. Bay Islands | | | | | | | | | |
| 13. Situk Lake | | | | | | | | | |
| 14. Nunatak Fiord | | | | | | | | | |
| 15. Russell Fiord | | | | | | | | | |

Years 1910-1984

| Sub-Area | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | Reason for no longer using or access chang |
|---|---|---|---|---|---|---|---|---|---|
| 16. Slate Peak | | | | | | | | | |
| 17. Disenchant. Bay | | | | | | | | | |
| 18. Turner Glacier | | | | | | | | | |
| 19. Mandby Shore | | | | | | | | | |
| 20. Malaspina Forelds | | | | | | | | | |
| 21. Yahtse River | | | | | | | | | |
| 22. Chaix Hills | | | | | | | | | |
| 23. Icy Bay/Cape | | | | | | | | | |
| 24. C. Yakataga | | | | | | | | | |
| 25.Tsiu/Kaliakh R. | | | | | | | | | |
| 26. Cape Suckling | | | | | | | | | |
| 27. Ophir Creek | | | | | | | | | |
| 28. F.H. Yak.-Mile 9 | | | | | | | | | |
| 29. F.H. Mile 9-Harl. | | | | | | | | | |
| 30. Lost R./Airport | | | | | | | | | |

YAKUTAT SUPPLEMENT - OTHER _____
page 1 of 2

(with the use of area map ask these questions)

1. When did you first start _____ in the Yakutat Area?
2. What areas did you use?
3. How did you access these areas?
4. Continue by recording areas used and access through their lifetime up to present.
5. Note any changes in use areas, access and years and when _____ were no longer hunted and reasons.

| Sub-Area | Years 1910 - 1984 | | | | | | | | Reason for no longer using or access change |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | |
| 1. Alsek River | | | | | | | | | |
| 2. Dry Bay (east) | | | | | | | | | |
| 3. Tanis River | | | | | | | | | |
| 4. Brabazon Range | | | | | | | | | |
| 5. Akwe River | | | | | | | | | |
| 6. Italio River | | | | | | | | | |
| 7. Dangerous River | | | | | | | | | |
| 8. Ahrnklin River | | | | | | | | | |
| 9. Situk River | | | | | | | | | |
| 10. Yakutat Area | | | | | | | | | |
| 11. Redfield Lakes | | | | | | | | | |
| 12. Yak. Bay Islands | | | | | | | | | |
| 13. Situk Lake | | | | | | | | | |
| 14. Nunatak Fiord | | | | | | | | | |
| 15. Russell Fiord | | | | | | | | | |

Yakutat Supplement - OTHER _____

page 2 of 2

Years 1910-1984

| Sub-Area | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | Reason for no longer using or access chang |
|---|---|---|---|---|---|---|---|---|---|
| 16. Slate Peak | | | | | | | | | |
| 17. Disenchant. Bay | | | | | | | | | |
| 18. Turner Glacier | | | | | | | | | |
| 19. Mandby Shore | | | | | | | | | |
| 20. Malaspina Forelds | | | | | | | | | |
| 21. Yahtse River | | | | | | | | | |
| 22. Chaix Hills | | | | | | | | | |
| 23. Icy Bay/Cape | | | | | | | | | |
| 24. C. Yakataga | | | | | | | | | |
| 25.Tsiu/Kaliakh R. | | | | | | | | | |
| 26. Cape Suckling | | | | | | | | | |
| 27. Ophir Creek | | | | | | | | | |
| 28. F.H. Yak.-Mile 9 | | | | | | | | | |
| 29. F.H. Mile 9-Harl. | | | | | | | | | |
| 30. Lost R./Airport | | | | | | | | | |

LIST ALL AREAS WHICH HAVE BEEN USED FOR ANY HUNTING,FISHING OR GATHERING DURING THE LIFE TIME OF THE RESONDENT

| Sub-Area | Area Used | |
|---|---|---|
| | YES | NO |
| 1. Alsek River | | |
| 2. Dry Bay (east) | | |
| 3. Tanis River | | |
| 4. Brabazon Range | | |
| 5. Akwe River | | |
| 6. Italio River | | |
| 7. Dangerous River | | |
| 8. Ahrnklin River | | |
| 9. Situk River | | |
| 10. Yakutat Area | | |
| 11. Redfield Lakes | | |
| 12. Yak. Bay Islands | | |
| 13. Situk Lake | | |
| 14. Nunatak Fiord | | |
| 15. Russell Fiord | | |

| Sub-Area | Area Used | |
|---|---|---|
| | YES | NO |
| 16. Slate Peak | | |
| 17. Disenchant. Bay | | |
| 18. Turner Glacier | | |
| 19. Mandby Shore | | |
| 20. Malaspina Forelds | | |
| 21. Yahtse River | | |
| 22. Chaix Hills | | |
| 23. Icy Bay/Cape | | |
| 24. C. Yakataga | | |
| 25.Tsiu/Kaliakh R. | | |
| 26. Cape Suckling | | |
| 27. Ophir Creek | | |
| 28. F.H. Yak.-Mile 9 | | |
| 29. F.H. Mile 9-Harl. | | |
| 30. Lost R./Airport | | |

COMMUNITY OPINIONS - Yakutat

1. How would you describe impacts on your hunting, fishing, and gathering activities by timber harvests, associated camps, and roading activities?

Overall Impacts: (CIRCLE ONE)

a. very positive b. positive c. no impact d. negative
d. very negative

| Impacts of Timber Harvesting | Impacts of Associated Camps | Impacts of Roading |
|---|---|---|
| a. very positive | a. very positive | a. very positive |
| b. positive | b. positive | b. positive |
| c. no impact | c. no impact | c. no impact |
| d. negative | d. negative | d. negative |
| e. very negative | e. very negative | e. very negative |

2. How would you describe impacts of the following possible developments on your hunting, fishing, and gathering activities?

| Impacts of additional timber Harvesting on the Yakutat Forelands | Impacts of a road built from Harlequin Lake to Dry Bay |
|---|---|
| a. very positive | a. very positive |
| b. positive | b. positive |
| c. no impact | c. no impact |
| d. negative | d. negative |
| e. very negative | e. very negative |

3. Can you explain some of the ways timber harvesting and associated activities have affected your hunting, fishing, and gathering activities? (use the back of page if needed)

4. Have any areas around Yakutat changed in terms of competition for fish or wildlife?

| | YES | NO | DON'T KNOW | WHICH AREAS? |
|---|---|---|---|---|
| 1. Increased alot | | | | |
| 2. Increased some | | | | |
| 3. Remained the same | | | | |
| 4. Decreased some | | | | |
| 5. Decreased alot | | | | |

Overall, do you think competition for hunting, and fishing in the Yakutat area has: 1. Increased alot 2. Increased some 3. Remained the same 4. Decreased some 5. Decreased alot. (Circle One)

5. Is there any other information that you feel is important for us to know? (use the back page if needed)

# APPENDIX B

# CASE STUDIES ON CHANGES IN RESOURCE USE

## SITUK RIVER CASE STUDY

### Introduction

Improved access to the Situk River has caused changes in harvest strategies and an increase in competition for the resources in the Situk drainage. Construction of roads and railroads exposed the river to commercial and recreational development and altered hunting and fishing patterns. The following sections discuss the development of access to the Situk and the resulting impacts on resource use.

### Background Information

Situk is believed to be an Eyak name. The meaning is unknown, but the river is said to have been named for an Athabascan man from the interior (de Laguna 1972:78).

The Situk River belongs to the Bear House of the Teqwedi. There used to be a village called Situk on the eastern bank of the lower Situk River that was established by the Teqwedi who moved from Lost River. The settlement was used as a fish camp after it stopped being a permanent residence (de Laguna 1972:78).

The Situk is located about seven miles southeast of Yakutat, between the Lost and Ahrnklin Rivers. It can be reached by road from

Forest Service Highway #10 at 9-mile, and from the Lost River road which leads to the mouth of the river. There is a landing strip located along the middle portion of the river; access to the headwaters of the river is by floatplane to Situk Lake.

## Physical Description

The headwaters of the Situk River originate at the foot of the Saint Elias mountains above Situk Lake in the Russell Fiord wilderness. The river winds a distance of 19 miles across the Yakutat Forelands and empties into the Gulf of Alaska.

The Yakutat Forelands are broad, gently sloping, glacial outwash plains located between the Saint Elias Mountains and the Gulf of Alaska. The Forelands are a remains of the glacier activity that covered the surrounding landscape creating steep rugged mountains, low valleys, inlet fiords and gently sloping forelands. As the glaciers retreated they deposited a layer of cobbles, pebbles and gravel covering much of the lowlands (U.S. Forest Service 1982:7).

The Situk River is highly braided, containing many tributaries and cross channels, which are characteristic of streams weaving across glacier outwash deposits (U.S. Forest Service 1982:7).

The course of the Situk has changed over the past century. In the early 1800s the Hubbard Glacier closed off the northern end of Russell Fiord in Disenchantment Bay creating a large lake whose outflow was carried by what is now called old Situk Creek. As the glacier retreated and the level of the lake dropped the flow through old Situk Creek was drastically reduced and the main course of the river became more like it

is today. Geologists believe that sometime this century the Glacier may again advance across the mouth of Russell Fiord, creating an ice dam, so that Old Situk Creek would again be the major drainage of that area of the Forelands (U.S. Forest Service 1982:8).

The Situk River is free flowing from Situk Lake to the Gulf of Alaska. Run-off from snowmelt and rainfall provide streamflow in the upper portion of the basin. In the lower river area, stream flow is dependent on precipitation, ground water flow and outflow from Situk Lake. The river is generally of low gradient with a fine gravel substrate (U.S. Forest Service 1982:14).

A variety of forest types exist in the Situk drainage. Younger stands of western hemlock are found from the area near Situk Lake to almost five miles south of the lake. Older stands of mixed western hemlock and Sitka spruce are present from the lake and four miles southwest. Both of these areas have continuous stands of even-aged trees interspersed with a few muskegs, creeks and small ponds.

Sitka alder, devils club, salmonberry and various grasses make up the understory vegetation on the wetter sites. The understory vegetation on the better drained sites is composed of devils club, blueberry, salmonberry, five leaf bramble, bunchberry and heather mosses (U.S. Forest Service 1982:10).

The remainder of the area that the Situk flows through has scattered forest land. Young to middle aged timber stands (less than 100 years old) grow immediately adjacent to the large stream courses. Large areas of muskeg are present, consisting of sedges, deer cabbage, heather and willow (U.S. Forest Service 1982:10).

## History of Resource Use

Historically, the upper portion of the Situk was used for hunting and trapping with camps located along the river and Situk Lake. Black bear and mountain goat were hunted upriver and mink, river otter, and weasel were trapped on the many streams draining the upper Situk. People also harvested "red fish" (late sockeye or coho) in the upper regions of the Situk River. Brown bear were hunted up and down the river. The lower portion of the Situk was important for fishing and berry gathering. Sockeye and coho were caught at the mouth of the river by gill net and sold to fish buyers and the cannery in Yakutat. Eulachon and some salmon were kept for home use.

## Current Resource Use

Coho and sockeye salmon are fished commercially on the Situk River. Commercial set netting takes place at the mouth of the Situk from June through September as previously described in the chapter on the seasonal round of resource use.

Steelhead are harvested with rod and reel up and down the river in the spring and fall, and coho salmon are harvested in August and September. Local residents harvest subsistence king salmon with nets in the spring. This subsistence salmon fishery continues throughout the summer in between commercial openings. Yakutat residents also fish the Situk mouth for Eulachon in February and March.

Waterfowl and cranes are harvested in the wetlands/tidal flats areas around the mouth of the Situk from the Lost River to the Middle Slough behind Blacksand Island, the area that is know as Situk Flats. Moose are hunted up and down the length of the Situk River and along the mouth of the Situk from Lost River up into the drainages that feed into the mouth of the Ahrnklin River. Ptarmigan are hunted on the upper Situk from the 9-mile bridge north. Berries are harvested near the mouth of the Situk.

## Development History of the Area and Changes in Resource Use

The development history of the Situk River reflects the development of Yakutat itself. As commercial fishing, military bases, logging operations, oil and gas exploration, and tourism have appeared in Yakutat, each has impacted the Situk River. The following section discusses the development history of the Situk.

### Commercial Fishing

In the early 1900s the commercial fishing industry began to grow in Yakutat. A cannery was built near town and in 1903 a railroad from the cannery to the mouth of the Situk River, a primary fishing area, was constructed by the cannery owners. The railroad hauled fish from the river to the cannery, and carried people, gear, and occasionally boats back and forth from town to the river. The railroad operated during the fishing season and everyone rode for free. The railroad schedule was coordinated with the time of high tides at the Situk River mouth, so

that skiffs could be used to access the fish camps on opposite shores. Many people remained at their cabins throughout the summer returning to Yakutat, only once or twice during the fishing season.

In the early 1950s the fish hauling railroad stopped running. A car converted to fit the tracks was operated by the Federal Aviation Agency until the late 1960s for recreational use, carrying hunters and fishers to and from the Situk, and occasionally hauling out harvested moose.

Fish camps have been located on the Situk since Native people first lived in Yakutat. Since the early 1900s fish camps and cabins were established on the Situk flats, Blacksand Island and Blacksand spit at the mouth of the Situk for subsistence and commercial fishing purposes. Cabins are still used today, many having been rebuilt or moved from their original site.

A fish weir was placed on the Situk River in the late 1920s by the U.S. Fish and Wildlife Service. The weir was removed during 1933 and 1972-75. It was not in place for portions in 1935, 1937, 1938, 1943, and 1980 (ADF&G 1985). The Alaska Department of Fish and Game took over operation of the weir at statehood. Placement of the weir has been an issue in past years; local people felt that the weir blocked fish passage and disrupted spawning activities. In 1985 the weir was moved further downstream.

## Military

During World War II, a military base was established in Yakutat and many roads were constructed throughout the area to accomodate military

operations. Construction of the road that would eventually extend to the Situk River was begun during this time. It was first built from the airport to the Lost River. In 1968-69 the section from Lost River to the Situk was completed. The Lost River road was improved in 1972 by the Forest Service and the State of Alaska in preparation for the Tawah Creek timber sale.

## Oil and Gas Exploration

A landing strip located on the middle Situk was built in the early 1960s by the Colorado Oil and Gas Company to facilitate oil and gas exploration. The strip is still in use and is maintained by the Forest Service and the Alaska Department of Fish and Game.

## Tourism

In recent years, the Yakutat area has had a major increase in tourism and recreational use due mainly to the abundance of fish and wildlife resources found along the Situk River. Recreational use of the Situk includes sport fishing and floating the river. Sport fishing is the major attraction from early April through late November.

Motorized boats, both prop and jet driven, and non motorized boats are used on the Situk, mainly in the lower portion from the Forest Highway #10 bridge downstream. To float the upper river it is necessary to portage over or navigate around log jams. Log jams on the lower river periodically are cleared. Beach combing, hiking, and viewing scenery and wildlife are additional recreational activities that people participate in at the mouth of the Situk.

Hunting and fishing guides have operated out of Yakutat since the 1940s. Previously, the only access to the Situk for these guiding outfits had been by plane or boat. Construction of the roads in the mid and late 1960s brought an increase in guided and non-guided recreational use of the Situk. Three cabins were constructed by the Forest Service in the early 1960s. Cabin use increased throughout the 1960s and then stabilized at maximum capacity in 1970. The increase in recreational use of the area is attributable to increases in day trips and tent camping. (U.S. Forest Service 1982:17)

Non-local use of the Situk increases in the spring and fall when the steelhead and coho runs are at their peak. Two commercial jet flights per day to Yakutat bring recreationists from nearly every state and several countries.

In the past 15 years, the Situk River has become a major recreation resource. Excellent sport fishing, hiking trails and cabins, wildlife viewing and ease of access have made it so. Commercial lodge operations developed in the late 1960s also contributed to the growth of the recreation use of the Situk.

Many local residents view the increase in recreational use as being in direct competition with their commercial and traditional use of the river. In fact, increased recreational use of the river has caused some local residents to no longer use the Situk. They mention increased numbers of people, lack of solitude, and siltation and erosion from the jet boats and outboard motors as reasons for seeking other areas. Some have said that certain resources, steelhead in particular, once harvested by local people are no longer used because the steelhead fishery is managed as a sports fishery.

## Changes in Resource Use

The following section discusses changes in harvest strategies and resource use over time for salmon, moose, cranes, hooligan, ptarmigan, mink and land otter. Man-made changes in access to the Situk have created the greatest impacts on harvest strategies and resource use. Harvesting activities and access at the mouth of the Situk will be presented first, followed by discussion of harvest strategies used on the middle and Upper Situk.

### Harvest Strategies and Access - Mouth of the Situk

Salmon are usually harvested by set gill net at the mouth of the Situk. The fishing area extends from the Situk River beyond Blacksand Island and Middle Slough up into the area where the Ahrnklin merges with Situk. The Ahrnklin and the Situk Rivers are managed as one fishery.

Sockeye and coho are the main species taken for both commercial and subsistence use. During commercial season, subsistence fishing can take place up to 48 hours before or 48 hours after commercial net openings. A few salmon from a commercial catch are brought back for home use. Resources other than fish are harvested while people are fishing at the mouth of the Situk. Berries are picked, tern eggs are gathered from Blacksand spit, and waterfowl and moose are hunted along the creeks on Situk and Ahrnklin flats. Eulachon are also harvested near the mouth of the Situk.

Before the turn of the century, access to the Situk was by an inland water route running from the Ankau lagoon system to Dry Bay. At

high tide this paddle and portage route was navigable by canoe or other small boats. People paddled the route, poled up the Situk, and floated down, fishing and hunting as they drifted. Geologic forces and tidal action have altered the course of this waterway and today it is impassable except at high tides with small boats.

The previously discussed railroad built in 1903 to carry salmon and fishers back and forth from the cannery in town, was for many years the main route used to access the mouth of the Situk. The railroad fell idle in 1968-69 when the Lost River road was extended to the Situk River.

Today, the main access to the lower end of the Situk River is by the Lost River road which runs from the Yakutat airport to the mouth of the Situk. Once the Lost River road was extended and improved by the Forest Service and the State of Alaska, in conjunction with the 1972 Tawah Creek timber sale, easy access was provided to the Situk River allowing fishers to return to Yakutat as often as they wanted rather than spending days or the whole season living at the Situk. One key respondent said that he was able to hold a full time job and still commercial fish after work in the evenings, or before work in the morning. The road allows fishers to trailer their boats and gear to and from the Situk rather than brave the severe coastal weather. The people fishing on the Situk are also able to tow their cabins up from the mouth of the Situk River to a safer winter storage area further inland. The cabins are towed back to the mouth of the Situk in the spring.

The same advantages that the commercial fishers have in utilizing the Lost River Road are shared by moose hunters, sports fishers, and waterfowl hunters. Boats and equipment are driven to the Situk and back

in a short time, eliminating overnight camping or stashing equipment at the river for the season. Road access allows moose hunters to drive to the river, get out, and hike through open meadows. Hunters also take motorized skiffs past the mouth of the Situk, through Middle Slough and up into the smaller creeks that drain into the Situk/Ahrnklin mouth, where they spend from one to several days investigating meadows and open areas, camping overnight as they go. The time they hunt is determined by the tides and the time of day.

Sport fishers drive to the Situk with motorized river boats (john boats, flatbottomed boats). Out of town sports fishers are usually shuttled to the mouth of the Situk River where guides with motorized boats take them up river.

The harvest methods for Eulachon have changed little over the years. Key respondents say that in February and March they take their skiffs about one mile up river from the mouth of the Situk and dipnet for the fish. The method of accessing the mouth of the Situk is probably the major strategy that has changed through time.

### Harvest Strategies and Access - Middle and Upper Situk

Moose hunters, sports fishers, and ptarmigan hunters utilize the middle to upper areas of the Situk. Prior to 1968, hunters and fishers arrived at the upper/middle Situk by airplane, landing at the middle airstrip. After 1967 access to the upper Situk was provided by Forest Highway #10 at the 9-mile bridge. Moose hunters and fishers now drive to 9-mile bridge across the Situk, launch rafts, canoes and river boats, and float the Situk to the mouth. Along the route, hunters beach their

boats, climb trees to spot moose and hunt grassy meadows, edges of clearings and open areas. Sports fishers fish from their boats or land their boats and fish from shore. Occasionally moose hunters take boats up river from the 9-mile bridge into the smaller drainages of the Situk and old Situk or hike down river to clearings.

One respondent mentioned that he had trapped the upper Situk around Situk Lake for mink in 1972 but it was not worth returning because the furbearer population had been reduced due to previous trapping. How he accessed the Situk Lake area is unknown. In earlier years, he used a canoe to get from Yakutat to Chicago Harbor where he had a camp and paddled the creeks northwest of Situk Lake setting traplines. Another respondent said that he had trapped the upper Situk from 1970-72 for mink and otter, but that he stopped because of lack of time and lack of profit.

## Summary

Over the years, improved access to the Situk has caused changes in harvest strategies and an increase in competition for the resources in and adjacent to the river. For years the only access was by boat - rowing, paddling, then motorized. When the railroad was built there was an increase in commercial fishers and further development of the commercial fishing industry. The Lost River road and Forest Highway #10 brought an increase in sports fishers and the development of guiding and tourism, causing many local people to avoid the Situk River, or to no longer harvest the resources (steelhead and salmon) that they once did. Regulations limiting stealhead fishing to rod and reel, hook and line

methods have contributed to this decline in use. Stealhead were considered by local residents as a winter subsistence food. They provided fresh fish during months when slamon were not as abundant and were also preserved much like salmon. These stealhead were caught in the Situk River by means of gillnets. While they were not harvested in the quantities that salmon were during the summer months they were considered an important part of subsistence activities by many of interviewed residents. When the Forest Highway #10 was completed to 9-mile, hunters were able to drive to the bridge and hike up and down river, drive their boats to the Situk and float down river from the 9-mile bridge in riverboats, skiffs and canoes or (motor) paddle up river through the Old Situk drainage. As illustrated, the building of roads and the resulting changes have had a significant effect on the types of hunting and fishing patterns along the Situk.

# AHRNKLIN RIVER CASE STUDY

## Introduction

A reduction in resource use over time is the major change that has taken place on the Ahrnklin River. This change can be attributed to road building in other areas of the Yakutat Forelands which has tended to disperse Ahrnklin River users to the roaded areas. Declining fur prices and vegetative succession are secondary causes that have resulted in reduced use of the Ahrnklin River drainage.

## Background Information

Ahrnklin or Antlen means "big town (or country) of the animals" (de Laguna 1982:80) and was the name given to a village located two miles above the mouth and between the two main branches of the river. The Ahrnklin River was once the heart of the Drum House (Teqwedi) territory. Reportedly, the inhabitants of the Ahrnklin were devastated by smallpox and the town abandoned (de Laguna 1982:80).

## Physical Description

The Ahrnklin River is located about 10 miles southeast of Yakutat between the Situk and Dangerous Rivers. Like the Situk, the Ahrnklin River originates in the Saint Elias mountains, winds across the Yakutat Forelands, and empties into the Gulf of Alaska. Characteristic of

glacial outwash rivers, the Ahrnklin is fed by many tributaries. The upper Ahrnklin can be reached by road from Forest Service Highway #10 at about 29 mile, while access to the mouth of the Ahrnklin is by boat launched from the Situk landing.

## History of Resource Use

Mountain goat were hunted on the mountain slopes at the head of the Ahrnklin. People fished for coho and sockeye salmon up and down the river. Otter, wolf, coyote, fox, mink and ermine were trapped for fur within the river drainage, along the banks of the river. Camps were established along the length of the river to the base of the mountains and families moved from camp to camp fishing and trapping. One key informant of the Teqwedi clan said her family moved seasonally from Yakutat up through Russell Fiord in the summer and returned back down the Ahrnklin River usually in the fall and winter for trapping.

Three key respondents trapped and fished along the Ahrnklin with their fathers, fathers' cousins, husbands and brothers from the 1920s to 1950s. According to the key respondents, people set traps along the Ahrnklin from the mountains to the mouth. Starting at an up river cabin, they drifted down from cabin to cabin, spending two or three nights fishing with gill nets at each cabin site. Once the cabin at the mouth was reached, they returned up river, trapping and fishing their way back to the mountains.

The first moose were sighted along the Ahrnklin drainage in the late 1930s. People were careful to let the population increase before

they began hunting them in the 1950s. One key respondent said that moose were easy to hunt along the Ahrnklin in the 1950s.

## Current Resource Use

Moose currently are hunted by boat along the mouth of the Ahrnklin and up smaller adjacent drainages. Whereas, moose were hunted in the 1950s as people moved from cabin to cabin trapping and fishing, from the 1960s to the present moose have been hunted by skiff. People drive to the Situk River, put in a boat, and travel up to the Ahrnklin. Some travel by skiff from their fishing camps at the mouth of the Situk up to the Ahrnklin and adjacent smaller drainages. Hunters look for cleared areas or climb trees to spot moose.

The Forest Service Highway #10, since the early 1970s has provided direct access to the upper portion of the Ahrnklin River. Road hunters drive Forest Service Highway #10 and stop and look for moose where the highway crosses the Ahrnklin.

Moose hunters

drive the road and occasionally get out and hike a short distance up or down the Ahrnklin River on either side of the road. In addition to moose hunting, waterfowl and some ptarmigan are hunted at the mouth of the Ahrnklin along Ahrnklin flats, accessed by skiff from the Situk.

The Situk and Ahrnklin Rivers are managed as one fishery by the Alaska Department of Fish and Game since the mouths of the two rivers merge into one large estuary. The mouth of the Ahrnklin River is commercially fished with gill nets. Gill nets are no longer used up river.

## Development History and Changes in Resource Use

Unlike the Situk, the immediate area surrounding the Ahrnklin River has been left relatively untouched by timber and recreational development. However, hunting, fishing and trapping patterns in the Ahrnklin area have been effected by economics, man-made developments in other areas, or by natural processes which over time, have altered the Ahrnklin River drainage.

Trapping and fishing cabins and camps established or built up river before the turn of the century through the early 1950s are no longer used. Fur prices fell and trapping on the entire Yakutat Forelands dropped off. Once fur trapping, a major source of income subsided, the use of cabins for fishing and hunting also declined. People established new camps and began fishing instead at the mouth of the Ahrnklin River.

When Forest Highway #10 was completed across the Ahrnklin River in the early 1970s, an easy access to the upper portion of the Ahrnklin was provided for moose hunting. This caused a change in hunting technique from hunting with boats to road hunting. One key respondent noted that if a moose is shot it is easier to get it home by truck than by skiff and there is less waste of meat. Most hunters who drive Forest Highway #10 to the Ahrnklin hike only a short distance up or down the river.

Successional changes in the Ahrnklin area have altered vegetation and disrupted hunting strategies, according to respondents. Streams once open in the Ahrnklin drainage are now clogged with vegetation and are unnavigable. Second growth in clearings and meadows also have made hunting more difficult.

APPENDIX C

CONVERSION FACTORS FOR DETERMINING USABLE
WEIGHTS OF RESOURCES USED IN YAKUTAT DURING 1984

| Common Name | (Local Name if Different from Common Name) | Scientific Name | Usable Weight | Source |
|---|---|---|---|---|
| SALMON | | | | |
| Chinook | (King) | Oncorhynchus tshawytscha | 16.5 lbs. | ADF&G Comm. Fish. Div.[1] |
| Chum | (Dog) | Oncorhynchus keta | 7.7 lbs. | ADF&G Comm. Fish. Div.[1] |
| Pink | (Humpback) | Oncorhynchus gorbuscha | 3.5 lbs. | ADF&G Comm. Fish. Div.[1] |
| Red | (Sockeye) | Oncorhynchus nerka | 5.6 lbs. | ADF&G Comm. Fish. Div.[1] |
| Silver | (Coho) | Oncorhynchus kisutch | 8.7 lbs. | ADF&G Comm. Fish. Div.[1] |
| OTHER FISH | | | | |
| Cutthroat Trout | | Salmo clarki | 1.5 lbs. | Researcher Estimate |
| Dolly Varden | | Salvelinus malma | 1.4 lbs. | Researcher Estimate |
| Rainbow Trout | | Salmo gairdneri | 2.0 lbs. | Researcher Estimate |
| Steelhead | | Salmo gairdneri | 6.0 lbs. | Researcher Estimate |
| Capelin | (Candle fish) | Mallotus villosus | 20 lbs. per 5 gal. bucket | Researcher Estimate |
| Eulachon | (Hooligan) | Thagichthys pacificus | Recorded in lbs. | - |
| Pacific Herring | | Clupea pallasii | Recorded in lbs. | - |
| Herring Eggs on Kelp/Other Substrate | | - | Recorded in lbs. | - |
| White Sturgeon | | Acipenser transmontanus | 40 lbs. | Reseacher Estimate |
| Unknown Eel | | - | 8 lbs. | Reseacher Estimate |
| Starry Flounder | | Palatichthys stellatus | 4.0 lbs. | Morrow 1980 |
| Sole | | Pleuronectidae | 2.0 lbs. | Researcher Estimate |
| Halibut | | Hippoglossus stenolepis | Recorded in lbs. | - |
| Ling Cod | (Greenling) | Ophiodon elongatus | 5.0 lbs. | Researcher Estimate |
| Pacific Cod | | Gadus macrocephalus | 4.0 lbs. | Researcher Estimate |
| Tom Cod | | Family Gadidae | 2.0 lbs. | Researcher Estimate |
| Sablefish | (Blackcod) | Anoplopoma fimbria | 6.0 lbs. | Researcher Estimate |
| Unknown Cod | | Family Gadidae | 2.0 | Researcher Estimate |
| Blue Rockfish | | Sebastes mystinus | 2.0 | Researcher Estimate |

[1] Yakutat Annual Report

APPENDIX C (continued)

CONVERSION FACTORS FOR DETERMINING USABLE
WEIGHTS OF RESOURCES USED IN YAKUTAT DURING 1984

| Common Name | (Local Name if Different from Common Name) | Scientific Name | Usable Weight | Source |
|---|---|---|---|---|
| Red Snapper | | Sebastodes rub errimus | 3.0 lbs. | Researcher Estimate |
| Sea Bass | | Cynoscion nobilis | 2.0 lbs. | Researcher Estimate |
| Sea Perch | | - | 2.0 lbs. | Researcher Estimate |
| Unknown Rockfish | | - | 2.0 lbs. | Researcher Estimate |
| Skates | | - | 5.0 lbs. | Researcher Estimate |
| Dogfish | (Spiny) | Squalus acanthias | 4.0 lbs. | Researcher Estimate |
| Buffalo Sculpin | | Enophrys bison | 1.0 lbs. | Technical Paper #95[1] |
| Irish Lords | (Uglies) | Hemilepidotus hemilepidotus | 1.0 lbs. | Technical Paper #95[1] |
| Basket Cockles | | - | 2.0 lbs. (per 5 gal. bucket) | Technical Paper #95[1] |
| Butter Clams | | Saxidomus giganteus | 2.0 lbs. (per 5 gal. bucket) | Technical Paper #95[1] |
| Razor Clams | | Siliqua patula | 2.0 lbs. (per 5 gal. bucket) | Technical Paper #95[1] |
| Dungeness Crab | | Cancer magister | 2.5 lbs | Koeneman, ADF&G, per. comm. |
| King Crab | | Paralithodes camtschatica | 7.0 lbs. | Koeneman, ADF&G, per. comm. |
| Tanner Crab | | Chionoecetes bairdi | 2.2 lbs. | Koeneman, ADF&G, per. comm. |
| Abalone | | Haliotis kamtschatkana | 20.0 lbs. (per 5 gal. bucket) | Researcher Estimate |
| Black Gumboots | | - | 20.0 lbs. (per 5 gal. bucket) | Researcher Estimate |
| Sea Urchin | (Neets) | - | 5.0 lbs. (per 5 gal. bucket) | Researcher Estimate |
| Octopus | (Devil Fish) | - | 10.0 lbs. | K.A.N.A. (1983)[2] |
| Sea Scallops | | Patinopecten cauirnus | Recorded in lbs. | - |
| Shrimp | | Panadalid | Recorded in lbs. | - |
| Black Seaweed | | - | 20.0 lbs. (per 5 gal. bucket) | Researcher Estimate |
| Sea Ribbons | | - | 20.0 lbs. (per 5 gal. bucket) | Researcher Estimate |
| Bull Kelp | | - | 20.0 lbs. (per 5 gal. bucket) | Researcher Estimate |
| MARINE MAMMALS | | | | |
| Harbor Seal | | Phoca vitulina | 180.0 lbs | ADF&G[3] |

[1] Wildlife Notebook Series
[2] Kodiak Area Native Association
[3] ADF&G Subsistence Division

APPENDIX C (continued)

CONVERSION FACTORS FOR DETERMINING USABLE
WEIGHTS OF RESOURCES USED IN YAKUTAT DURING 1984

| Common Name | (Local Name if Different from Common Name) | Scientific Name | Usable Weight | Source |
|---|---|---|---|---|
| LAND MAMMALS | | | | |
| Deer | | Odocoileus hemionus sitkensis | 80.0 lbs. | L. Johnson, ADF&G, pers. comm. |
| Moose | | Alces alces | 550.0 lbs | Researcher Estimate |
| Black Bear | | Ursus americanus | 150.0 lbs | Researcher Estimate |
| Brown Bear | | Ursus arctos | 50.0 lbs | Researcher Estimate |
| Mountain Goat | | Oreamnos americanus | 120.0 lbs | ADF&G[1] |
| Lynx | | Lynx canadensis | 20.0 lbs | Researcher Estimate |
| Beaver | | Castor canadensis | 15.0 lbs | Technical Paper #95[2] |
| Hare | | Lepus americanus | 1.5 lbs | Technical Paper #95[2] |
| BIRDS AND EGGS | | | | |
| Ptarmigan | | Lagopus lagopus | .7 lbs. | Technical Paper #95[2] |
| Canada Geese | | Branta canadensis | 5.0 lbs. | Technical Paper #95[2] |
| Whistling Swan | | Olor columbianus | 8.0 lbs. | Technical Paper #95[2] |
| Sandhill Crane | | Grus canadensis | 8.0 lbs. | Technical Paper #95[2] |
| Ducks | | - | 1.5 lbs. | Technical Paper #95[2] |
| Seabird Eggs (Pigeon eggs) | | - | .20 lbs. | Researcher Estimate |
| PLANTS AND BERRIES | | | | |
| Berries | | - | 1.0 lb. per quart | Researcher Estimate |
| Plants | | - | 1.0 lb. per quart | Researcher Estimate |

[1] Wildlife Notebook Series
[2] ADF&G Subsistence Division

APPENDIX D

PROFILE OF HOUSEHOLD HARVEST AND USE OF FISH AND WILDLIFE RESOURCES BY YAKUTAT RESIDENTS DURING 1984
(RANDOM SALMPLE, n = 50)

| esource | Percent of Households Using | Percent of Households Attempting to Harvest | Percent of Households Harvesting | Mean Harvest Quantities (All HH n = 50) | Range Quantities | Mean lbs. Harvested Per Active HH | Mean lbs. Harvested Per HH (All HH n = 50) | Percent Households Receiving | Percent Households Giving |
|---|---|---|---|---|---|---|---|---|---|
| OMMERCIALLY CAUGHT SALMON USED AT HOME | | | | | | | | | |
| ALMON (42% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| ing | 32 | 38 | 38 | 2.6 | 0-20 | 208 | 44 | | |
| num | 4 | 6 | 6 | .9 | 5-40 | 173 | 7 | Not | Not |
| ink | 10 | 20 | 20 | 1.2 | 3-25 | 69 | 4 | Available | Available |
| ockeye | 22 | 32 | 32 | 5.5 | 5-80 | 119 | 31 | | |
| oho | 32 | 32 | 32 | 4.8 | 0-30 | 223 | 43 | | |
| ON-COMMERCIAL SALMON | | | | | | | | | |
| 92% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| ing | 84 | 60 | - | 4.8 | 0-24 | 317 | 80 | 46 | 40 |
| num | 12 | 8 | - | .2 | 0-5 | 28 | 2 | 8 | 8 |
| umpback | 30 | 20 | - | 1.2 | 0-10 | 57 | 4 | 16 | 18 |
| ockeye | 82 | 44 | - | 15.8 | 0-150 | 336 | 90 | 38 | 28 |
| oho | 72 | 54 | 4 | 10.0 | 0-100 | 462 | 88 | 32 | 32 |
| THER FISH (98% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| utthroat Trout | 18 | 16 | 16 | 2.1 | 0-30 | 20 | 3 | 2 | 8 |
| olly Varden | 34 | 28 | 28 | 3.2 | 0-30 | 16 | 5 | 4 | 14 |
| ainbow Trout | 12 | 10 | 10 | 1.6 | 0-35 | 32 | 3 | 2 | 6 |
| teelhead | 60 | 42 | 38 | 1.3 | 0-12 | 18 | 8 | 28 | 24 |
| andlefish | 34 | 22 | 22 | lbs. | 0-500 | 83 | 18 | 16 | 10 |
| ooligan | 64 | 28 | 28 | lbs. | 0-500 | 103 | 29 | 36 | 22 |
| erring | 28 | 20 | 20 | lbs. | 0-200 | 93 | 19 | 8 | 6 |
| erring Eggs | 30 | 14 | 14 | lbs. | 0-75 | 34 | 5 | 16 | 10 |
| hite Sturgeon | 2 | 2 | 2 | .1 | 0-1 | 2 | 0[1] | 2 | 0 |
| nknown Eel | 20 | 20 | 20 | lbs. | 0-12 | 47 | 9 | 2 | 2 |
| tarry Flounder | 22 | 20 | 12 | 2.3 | 0-50 | 46 | 9 | 12 | 2 |
| ole | 10 | 2 | 2 | .4 | 0-20 | 40 | 1 | 8 | 2 |
| alibut | 92 | 58 | 58 | lbs. | 0-1000 | 175 | 104 | 58 | 40 |
| ing Cod | 20 | 12 | 12 | 2.5 | 0-75 | 103 | 13 | 8 | 6 |
| acific Cod | 8 | 6 | 6 | .9 | 0-20 | 61 | 4 | 2 | 2 |

[1] less than .5 pounds
[2] 5 gallon buckets
[3] quarts
HH = households
* households that attempted to harvest the resource during 1984.

APPENDIX D (continued)

PROFILE OF HOUSEHOLD HARVEST AND USE OF FISH AND WILDLIFE RESOURCES BY YAKUTAT RESIDENTS DURING 1984
(RANDOM SAMPLE, n = 50)

| Resource | Percent of Households Using | Percent of Households Attempting to Harvest | Percent of Households Harvesting | Mean Harvest Quantities (All HH n = 50) | Range Quantities | Mean lbs. Harvested Per Active HH | Mean lbs. Harvested Per HH (All HH n = 50) | Percent Households Receiving | Percent Households Giving |
|---|---|---|---|---|---|---|---|---|---|
| Tom Cod | 6 | 4 | 4 | 1.2 | 0-50 | 58 | 2 | 0 | 0 |
| Sablefish | 12 | 6 | 6 | .4 | 0-20 | 44 | 3 | 6 | 2 |
| Unknown Cod | 4 | 4 | 4 | .1 | 0-2 | 4 | 0[1] | 2 | 2 |
| Blue Rockfish | 4 | 2 | 2 | .1 | 0-2 | 4 | 0[1] | 2 | 2 |
| Red Snapper | 18 | 10 | 10 | 2.9 | 0-100 | 86 | 9 | 10 | 4 |
| Sea Bass | 6 | 4 | 4 | .2 | 0-10 | 12 | 0 | 2 | 2 |
| Sea Perch | 2 | 2 | 2 | .3 | 0-15 | 30 | 1 | 0 | 0 |
| Unknown Rockfish | 2 | 2 | 2 | .5 | 0-25 | 50 | 1 | 0 | 2 |
| Skates | 2 | 2 | 2 | .4 | 0-20 | 100 | 2 | 2 | 2 |
| Dogfish | 2 | 2 | 2 | .2 | 0-10 | 40 | 1 | 2 | 2 |
| Sculpin | 2 | 2 | 2 | 1.0 | 0-50 | 50 | 1 | 0 | 0 |
| Irish Lords | 2 | 2 | 2 | 1.0 | 0-50 | 50 | 1 | 0 | 0 |
| SHELLFISH (100% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| Basket Cockles | 66 | 46 | 46 | 1.5[2] | 0-20 | 7 | 3 | 36 | 30 |
| Butter Clams | 86 | 58 | 58 | 2.8[2] | 0-20 | 10 | 6 | 44 | 36 |
| Razor Clams | 10 | 4 | 4 | .1[2] | 0-5 | 7 | 0[1] | 6 | 2 |
| Dungeness Crab | 98 | 40 | 40 | 32.4 | 0-500 | 203 | 83 | 66 | 34 |
| King Crab | 50 | 8 | 8 | 1.3 | 0-25 | 112 | 9 | 50 | 10 |
| Tanner Crab | 60 | 10 | 10 | 4.1 | 0-100 | 91 | 9 | 54 | 10 |
| Abalone | 2 | 2 | 2 | .1[2] | 0-4 | 48 | 1 | 0 | 2 |
| Black Gumboots | 36 | 18 | 18 | .3[2] | 0-3 | 22 | 4 | 20 | 20 |
| Sea Urchin | 24 | 12 | 12 | .2[2] | 0-5 | 10 | 1 | 16 | 10 |
| Octopus | 4 | 20 | 20 | lbs. | 0-60 | 32 | 6 | 24 | 6 |
| Sea Scallops | 74 | 4 | 4 | lbs. | 0-40 | 28 | 1 | 74 | 0 |
| Shrimp | 86 | 18 | 18 | lbs. | 0-200 | 86 | 16 | 72 | 12 |
| MARINE PLANTS (44% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| Black Seaweed | 40 | 26 | 26 | .8[2] | 0-10 | 62 | 17 | 20 | 16 |
| Sea Ribbons | 32 | 20 | 20 | 1.5 | 0-40 | 155 | 32 | 14 | 14 |
| Bull Kelp | 4 | 4 | 4 | lbs. | 0-3 | 31 | 1 | 0 | 0 |
| MARINE MAMMAL (50% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| Harbor Seal | 50 | 20 | 20 | .4 | 0-4 | 360 | 72 | 34 | 18 |

[1] less than .5 pounds
[2] 5 gallon buckets
[3] quarts
HH = households
* households that attempted to harvest the resource during 1984.

APPENDIX D (continued)

PROFILE OF HOUSEHOLD HARVEST AND USE OF FISH AND WILDLIFE RESOURCES BY YAKUTAT RESIDENTS DURING 1984
(RANDOM SAMPLE, n = 50)

| Resource | Percent of Households Using | Percent of Households Attempting to Harvest | Percent of Households Harvesting | Mean Harvest Quantities (All HH n = 50) | Range Quantities | Mean lbs. Harvested Per Active HH | Mean lbs. Harvested Per HH (All HH n = 50) | Percent Households Receiving | Percent Households Giving |
|---|---|---|---|---|---|---|---|---|---|
| LAND MAMMAL (72% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| Moose | 70 | 62 | 22 | .2 | 0-1 | 195 | 121 | 62 | 22 |
| Deer | 22 | 6 | 6 | .1 | 0-2 | 133 | 8 | 16 | 8 |
| Black Bear | 8 | 8 | 4 | .1 | 0-3 | 188 | 15 | 8 | 4 |
| Brown Bear | 8 | 10 | 6 | .1 | 0-2 | 25 | 2 | 8 | 4 |
| Mt. Goat | 12 | 8 | 6 | .1 | 0-1 | 90 | 7 | 8 | 6 |
| Lynx | 2 | 2 | 2 | .1 | 0-2 | 40 | 1 | 0 | 0 |
| Beaver | 2 | 2 | 2 | .1 | 0-5 | 75 | 2 | - | - |
| Wolf | 10 | 10 | 10 | .4 | 0-10 | - | - | 0 | 2 |
| Coyote | 4 | 2 | 2 | .1 | 0-1 | - | - | 0 | 2 |
| Wolverine | 4 | 4 | 4 | .2 | 0-10 | - | - | 0 | 2 |
| Land Otter | 2 | 2 | 2 | .1 | 0-3 | - | - | 0 | 2 |
| Mink | 6 | 6 | 6 | .3 | 0-10 | - | - | 0 | 0 |
| Martin | 6 | 6 | - | .4 | 0-10 | - | - | 0 | 2 |
| Squirrel | 2 | 2 | 2 | .1 | 0-2 | - | - | 0 | 0 |
| Weasel | 2 | 2 | 2 | .1 | 0-3 | - | - | 0 | 2 |
| Hare | 8 | 8 | 8 | .1 | 0-2 | 3 | 0[1] | 2 | 0 |
| BIRDS AND EGGS (66% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| Ptarmigan | 8 | 12 | 6 | .9 | 0-30 | 5 | 1 | 2 | 6 |
| Canada Geese | 30 | 22 | 22 | .9 | 0-15 | 20 | 4 | 12 | 14 |
| Whistling Swan | 2 | 2 | 2 | .1 | 0-1 | 8 | 0[1] | 0 | 0 |
| Sandhill Crane | 6 | 6 | 6 | .1 | 0-3 | 19 | 1 | 0 | 2 |
| Ducks | 50 | 38 | 38 | 14.8 | 0-200 | 59 | 22 | 20 | 28 |
| Seabird Eggs | 32 | 12 | 12 | 4.3 | 0-140 | 7 | 1 | 20 | 10 |
| PLANTS AND BERRIES (94% OF ALL HOUSEHOLDS PARTICIPATED)* | | | | | | | | | |
| Berries | 94 | 88 | 88 | 25.9[3] | 0-120 | 29 | 26 | 50 | 40 |
| Plants | 32 | 24 | 24 | 3.8[3] | 0-130 | 16 | 4 | 10 | 8 |
| Firewood | 52 | 50 | 50 | 5.2 (cords) | | - | - | - | - |

[1] less than .5 pounds
[2] 5 gallon buckets
[3] quarts
HH = households

APPENDIX E

AVERAGE NUMBER OF SALMON HARVESTED AND USED AT HOME BY GEAR TYPE FOR ALL KLAWOCK HOUSEHOLDS SURVEYED AND ACTIVE HOUSEHOLDS ONLY (1984)

ALL HOUSEHOLDS (n = 36)

| | King | Sockeye | Silver | Chum | Pink |
|---|---|---|---|---|---|
| Commercial Fishing | | | | | |
| Purse Seine | 0.2 | 0.2 | 0.1[1] | 0.0 | 0.0 |
| Troll | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gillnet | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL | 0.2 | 0.2 | 0.1[1] | 0.0 | 0.0 |
| Non-Commercial | | | | | |
| Beach Seine | 0.0 | 9.3 | 0.0 | 0.0 | 1.7 |
| Troll | 0.8 | 0.0 | 1.4 | 1.3 | 1.5 |
| Rod and Reel | 1.1 | 2.6 | 7.7 | 3.0 | 4.5 |
| Purse Seine | 0.0 | 1.7 | 0.0 | 0.0 | 0.0 |
| TOTAL | 1.9 | 13.6 | 9.1 | 4.3 | 7.7 |
| GRAND TOTAL | 2.1 | 13.8 | 9.1 | 4.3 | 7.7 |

ACTIVE HOUSEHOLDS ONLY

| | King | Sockeye | Silver | Chum | Pink |
|---|---|---|---|---|---|
| Commercial Fishing | | | | | |
| Purse Seine | 1.8 | 3.0 | 1.0 | 0.0 | 0.0 |
| Troll | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Gillnet | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| TOTAL | 1.8 | 3.0 | 1.0 | 0.0 | 0.0 |
| Non-Commercial | | | | | |
| Beach Seine | 0.0 | 37.2 | 0.0 | 0.0 | 20.3 |
| Troll | 6.8 | 0.0 | 25.0 | 22.5 | 27.5 |
| Rod and Reel | 8.2 | 13.4 | 16.4 | 15.4 | 23.0 |
| Purse Seine | 0.0 | 30.0 | 0.0 | 0.0 | 0.0 |
| TOTAL | 15.0 | 80.6 | 41.4 | 37.9 | 70.8 |
| GRAND TOTAL | 16.8 | 83.6 | 42.4 | 37.9 | 70.8 |

[1] Less than .1