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SALMON USE BY THE RESIDENTS OF THE CHILKAT AND CHILKOOT RIVER DRAINAGES 1983

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ABSTRACT

This report documents uses of salmon by residents of the Chilkat and Chilkoot River valleys during 1982-1983 in the context of other non-fish resource harvest activities and socioeconomic characteristics. Information was collected during the fall of 1983 by interviewing 180 randomly selected households in Haines, along the Haines Highway, and in Klukwan. The report also provides a brief overview of socioeconomic information, general patterns of resource use, and historic salmon fishing. Results demonstrate that all three samples -- Haines, Highway, and Klukwan -- harvested relatively large quantities of resources and a variety of resources. Mean household harvests of all fish and game resources during the study period were: Haines, 343 pounds; Highway, 467 pounds; and Klukwan, 663 pounds. The following are important conclusions of the study:

- The harvesting of salmon was found to play a key role in the overall patterns of local resource use in all three samples. Salmon comprised 32.5 percent of the total harvest in Haines; 51 percent in the Highway sample; and 67.2 percent in Klukwan. A high percentage of the sampled households participated in the harvest of salmon and other fish campared to other resource categories.
- Salmon was also found to be a widely shared resource and was an important part of the diet of non-harvesters.
- Sockeye salmon was the most commonly harvested salmon species and was generally taken in larger quantities because of its availability, taste, texture, and suitability for preserving.

- Household employment type appears to have an effect on harvest levels. Seasonal and part-time employed households had the greatest average harvests (640 pounds and 600 pounds, respectively), whereas full-time and unemployed households had the lowest harvests (260 pounds for both groups).
- Average harvest levels increased as the length of residency increased.
- Households that participated in commercial fishing harvested larger quantities of a variety of resources (682 pounds per household) compared to non-commercial fishing households (309 pounds per household).
- Subsistence fishing households were found to be more active harvesters than those who did not subsistence fish. Klukwan subsistence fishers harvested a greater amount of salmon (558 pounds per household) than subsistence fishers from the other two communities (330 pounds per household); however, the Haines and Highway samples harvested greater amounts from other resource categories.
- Environmental conditions which alter water levels on the Chilkat River make it extremely difficult to harvest salmon with subsistence gillnets when water levels are high.

By evaluating the periods during which sample households fished on the Chilkat River in 1983, it was found that a proposal to limit the subsistence fishing season to two two-week periods would have eliminated 50 percent of the fishing activity of residents during 1983. Since this proposal would not affect the area adjacent to Klukwan the result might increase fishing activities and competition for fishing sites in the vicinity of Klukwan.

ACKNOWLEDGMENTS

We would like to acknowledge the residents of Haines, Klukwan, and those along the Haines Highway for their cooperation in providing information that has made this report possible. Hopefully their time donated to this project will help provide a better understanding of the role of wild resources in the lives of residents of the area.

Special gratitude is extended to the City of Haines, and members of the Chilkat Indian Village I.R.A., the Upper Lynn Canal Fish and Game Advisory Committee, the Chilkoot Indian Association, and the Haines Alaska Native Brotherhood and Alaska Native Sisterhood for their support and assistance with this project.

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INTRODUCTION

The Chilkat/Chilkoot River drainage area, which includes the communities of Klukwan and Haines, and surrounding settlements, has been the focus of both land management planning efforts as well as proposals for changing fish and game management regulations. At the March 1983 meeting of the Alaska Board of Fisheries, the Upper Lynn Canal Fish and Game Advisory Committee submitted a proposal that would have affected the subsistence salmon fishing season on the Chilkat River. The Board deferred consideration of the proposal until more information was available on the harvesting activities by residents of the area.

At the request of the local fish and game advisory committee and the Board of Fisheries, the Division of Subsistence, Alaska Department of Fish and Game, responded to these needs for information by conducting research in 1983 on resource harvest and use activities in this area. The focus of this paper will be on salmon resource harvesting. A comprehensive report describing other characteristics of wild resource uses in the Chilkat/Chilkoot River drainage area will be completed in the near future. The results of this research will have relevance for a variety of purposes. The Boards of Fisheries and Game may use the data for allocative decisions. Also, land planning efforts by the State of Alaska and local communities may find the data useful.

The Study Area

This report describes resource use by the residents of the Chilkat/Chilkoot River drainage area. This area is located in the northwestern portion of Lynn Canal, the northern-most fiord of the inside waterways of Southeast Alaska. It is bounded by the United States-Canadian border to

the north and west, and the Takhinsha Mountains and the ice fields of Glacier Bay National Park to the south (Figure 1).

The Chilkat River and its tributaries originate from glacial melt along steep mountains, many of which reach 6,000 feet in height. The rivers then flow through broad flood plains, forming braided stream channels, gravel bars, and islands covered with dense stands of willow and cottonwood. Numerous lakes, streams, and side channels provide spawning and rearing habitat for sockeye, coho, king, pink, and chum salmon, as well as for trout and eulachon (hooligan).

The study area is transitional between two climatic zones: maritime and subarctic interior. The maritime climate, which is influenced by the ocean, becomes less apparent as one travels northward and enters the dry subarctic environment. This change is noted by differences in the amount of precipitation, length of seasons, and consequent floral and faunal differences.

Purpose of the Study

The purpose of the "Chilkat/Chilkoot Resource Use Study" was to describe contemporary uses of local resources in the vicinity of these two river valley drainages. The study was to provide a broad baseline overview of local hunting, fishing, and gathering activities and related socioeconomic characteristics of residents of the study area. The focus of the present report is salmon resource use in the context of other non-fish resource harvest activities and socioeconomic characteristics of sampled households.

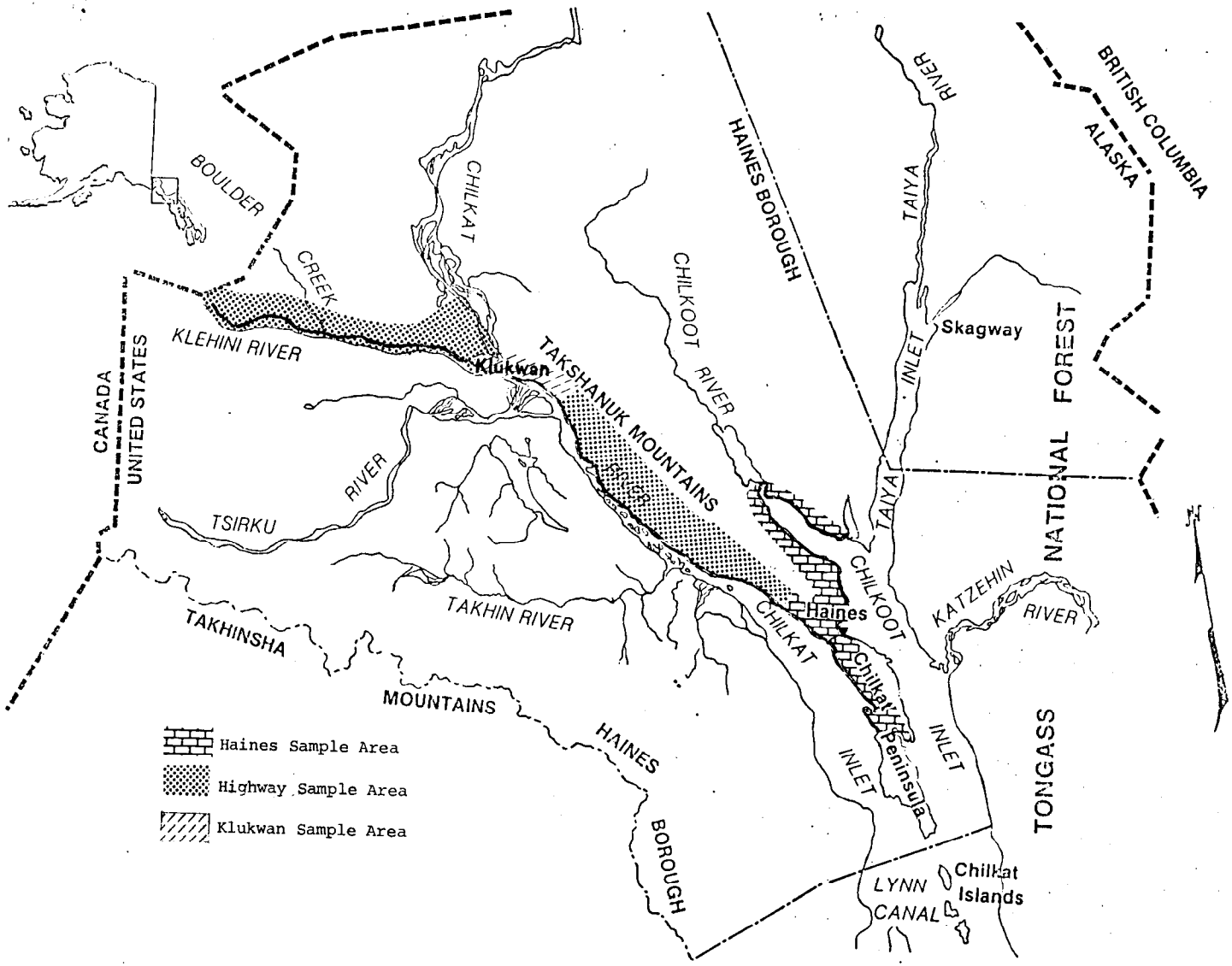

Figure 1: The Chilkat/Chilkoot resource use study area.

Methodology

The research project was conducted by two Resource Specialist IIs and two Fish and Game Technician IIIs of the Southeast Region, Division of Subsistence, Alaska Department of Fish and Game. The research design and survey instrument (Appendix A) were developed during the summer of 1983 and introduced to representatives of the communities of Haines and Klukwan during the second week of September. A literature search was conducted throughout the period of the study.

The population of the entire Haines/Klukwan area was divided into three groupings for purposes of sampling and data analysis: Haines, Highway, and the community of Klukwan. The Haines study area included the City of Haines as well as areas outside the established city limits such as Mud Bay, Small Tract, Lutak, and Piedad Roads (Figure 1). The Highway sample included households along the Haines Highway from mile four to the United States-Canadian border. Households within the village of Klukwan constituted the third area. The survey instrument was administered to a random sample of households within the Haines and Highway populations. The households of the study area were mapped and numbered. All numbers were transferred onto individual pieces of paper and placed in a container and then randomly selected. The survey goal for Klukwan was 100 percent of the identified households. Table 1 presents the total number of households determined to be in each sample area, the number and percentage targeted for surveying, and the actual number and percentage surveyed.

Information was obtained from the respondents on quantities of wild resources harvested, given away, and/or received from other households between September 1, 1982 through August 31, 1983. More detailed questions were asked about subsistence net fishing for salmon. Additional

TABLE 1. NUMBER OF HOUSEHOLDS IN EACH SAMPLE TARGETED AND SURVEYED.

	Number of Households	Number Targeted	(Percent)	Number Surveyed	(Percent)
Haines	599	120	(20.0)	117	(19.5)
Highway	61	30	(49.2)	30	(49.2)
Klukwan	41	41	(100.0)	33	(80.5)

information about the subsistence salmon net fishery was gathered in the field through informal interviews and observations along the Chilkat River during the first week in September. Another method of data gathering was 15 in-depth interviews with a subset of the random households. These interviews were designed to obtain additional information from households displaying specific socioeconomic features, such as involvement in commercial fishing or year-round wage employment. The completion of the in-depth interviews brought field research to an end during December 1983.

SOCIOECONOMIC OVERVIEW

Information from this chapter is based on secondary sources, such as the U.S. Bureau of the Census, as well as survey data obtained during the course of the study. Secondary source material provides general information on the study area, while survey data pertain only to the sample of the study area populations.

Demographic Characteristics

According to U.S. Bureau of the Census (1980) figures, the 1980 population of the Haines Borough including Klukwan (which is not part of the bor-

ough) was 1,815 persons. The Haines Borough covers a wider region than in the Chilkat/Chilkoot study area surveyed in this report: the borough includes the City of Haines and outlying areas such as the sparsely inhabited settlement of Excursion Inlet (Figure 1). The 1980 populations broken into smaller units were Klukwan (135), Haines City (993), and Haines Borough exclusive of Haines City (687). Population counts conducted in 1982 are somewhat higher with an estimated city population of 1,078 and borough population of 1,854 (Alaska Department of Labor 1983). Figures 2, 3, and 4 present 1980 population profiles by age and sex for Klukwan, Haines City, and Haines Borough, respectively (U.S. Bureau of the Census 1980).

Demographic information for the sample populations surveyed is presented below in Table 2. This table demonstrates some of the distinct differences between households in the Klukwan sample and those in the Haines and Highway samples. The Klukwan sample has the greatest percentage of households with an Alaska Native present, and the mean household size is also the largest of the three samples. The mean age of the oldest resident in each household was also slightly higher than in the Highway and Haines samples.

TABLE 2. DEMOGRAPHIC CHARACTERISTICS OF STUDY SAMPLES.

	HAINES	HIGHWAY	KLUKWAN
Mean household size	3.0	2.9	3.8
Mean age of oldest resident in each household	45.9	46.8	50.0
Percent of households with an Alaskan Native resident	17.9	10.0	97.0

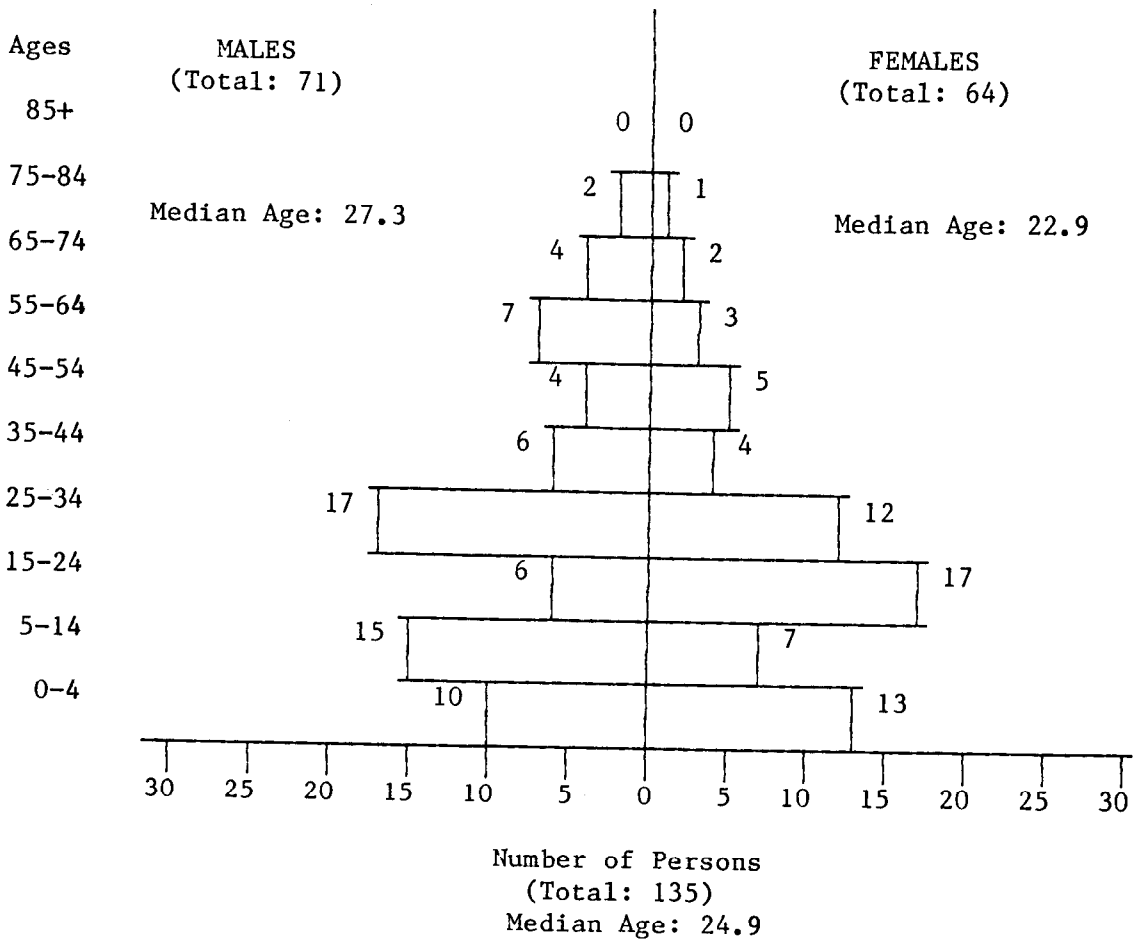

Figure 2. Klukwan population profile (1980).

Source: U.S. Bureau of the Census (1980)

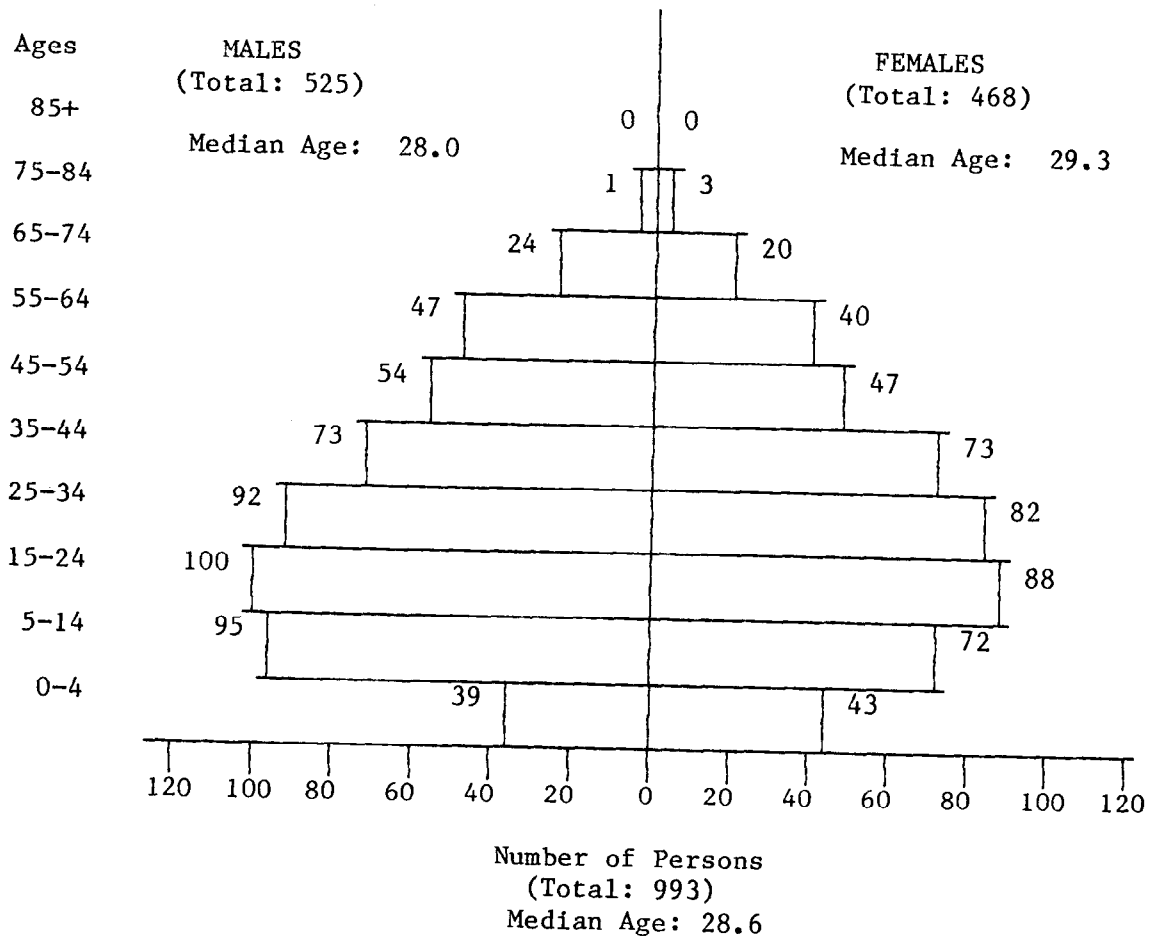

Figure 3. City of Haines population profile (1980).

Source: U.S. Bureau of the Census (1980)

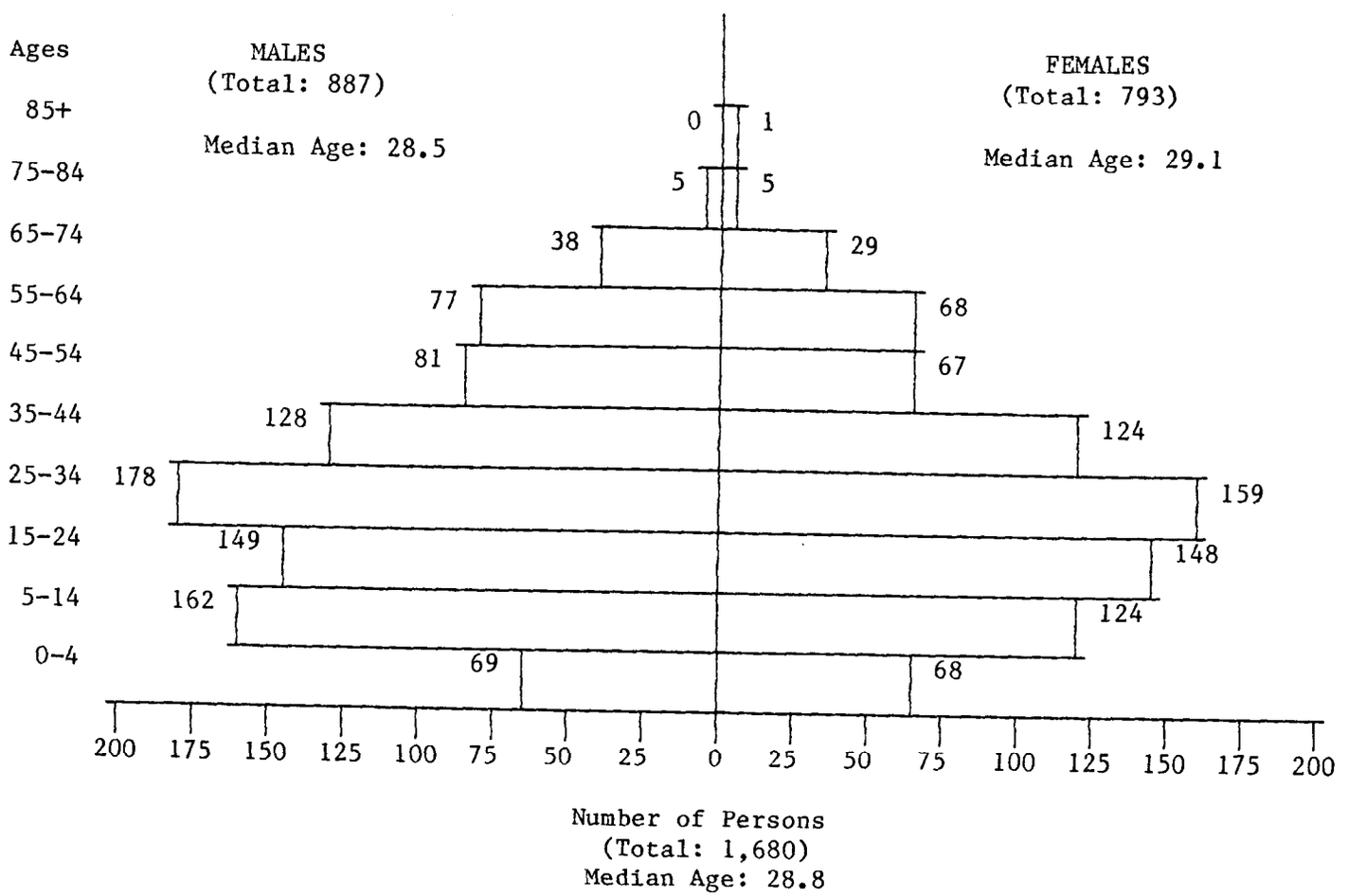

Figure 4. Haines Borough population profile (1980).

Source: U.S. Bureau of the Census (1980)

Figure 5 illustrates the length of residency of the longest-term household member in each sample. Again, Klukwan contrasts with the other two samples. The Highway sample had the greatest percentage of households (36.7 percent) in the 1 to 5 year range, while the Haines sample peaked at the 11 to 20 year range with 28.2 percent. Both of these samples begin to show a low percentage of households from the 31 to 40 year range, where interestingly, the Klukwan sample peaks with 24.2 percent. Klukwan households are also more evenly distributed across all ranges. The mean years of residency for the longest-term resident in each household was lowest in the Highway sample (15.7 years), closely followed by the Haines sample (17.3 years). The mean length of residency for Klukwan is 34.3 years, or twice that of the Haines sample.

Employment and Income

Figure 6 presents information on the type of employment for sample households in 1983. The Haines sample shows the highest percentage of households with full-time, year-round employment (53 percent), compared with the Highway sample (20 percent) and Klukwan sample (12 percent). The largest percentage of households in the Highway and Klukwan samples were employed seasonally (30 percent). This was the second highest category for the Haines sample (25 percent). Of the total sample, approximately 67 percent of all the sample households were employed in either full-time, year-round, or seasonal work.

The mean income ranges for each of the five employment types is also presented in Figure 6. Mean income ranges are highest for households employed full-time, year-round. The mean income decreases steadily for households with seasonal and part-time employment and is the lowest for retired and unemployed households.

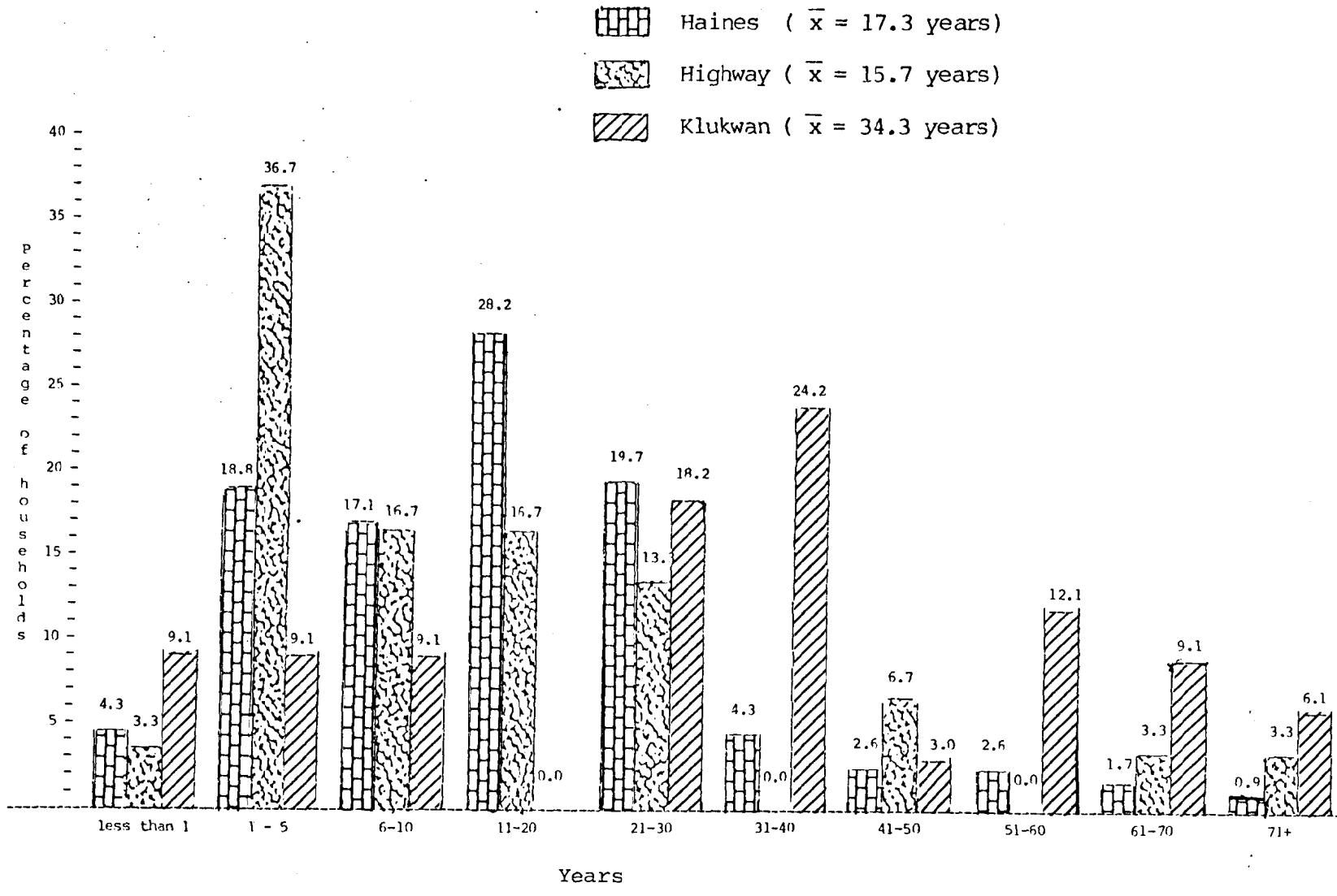

Figure 5. Length of residency of the longest-term household member, by sample.

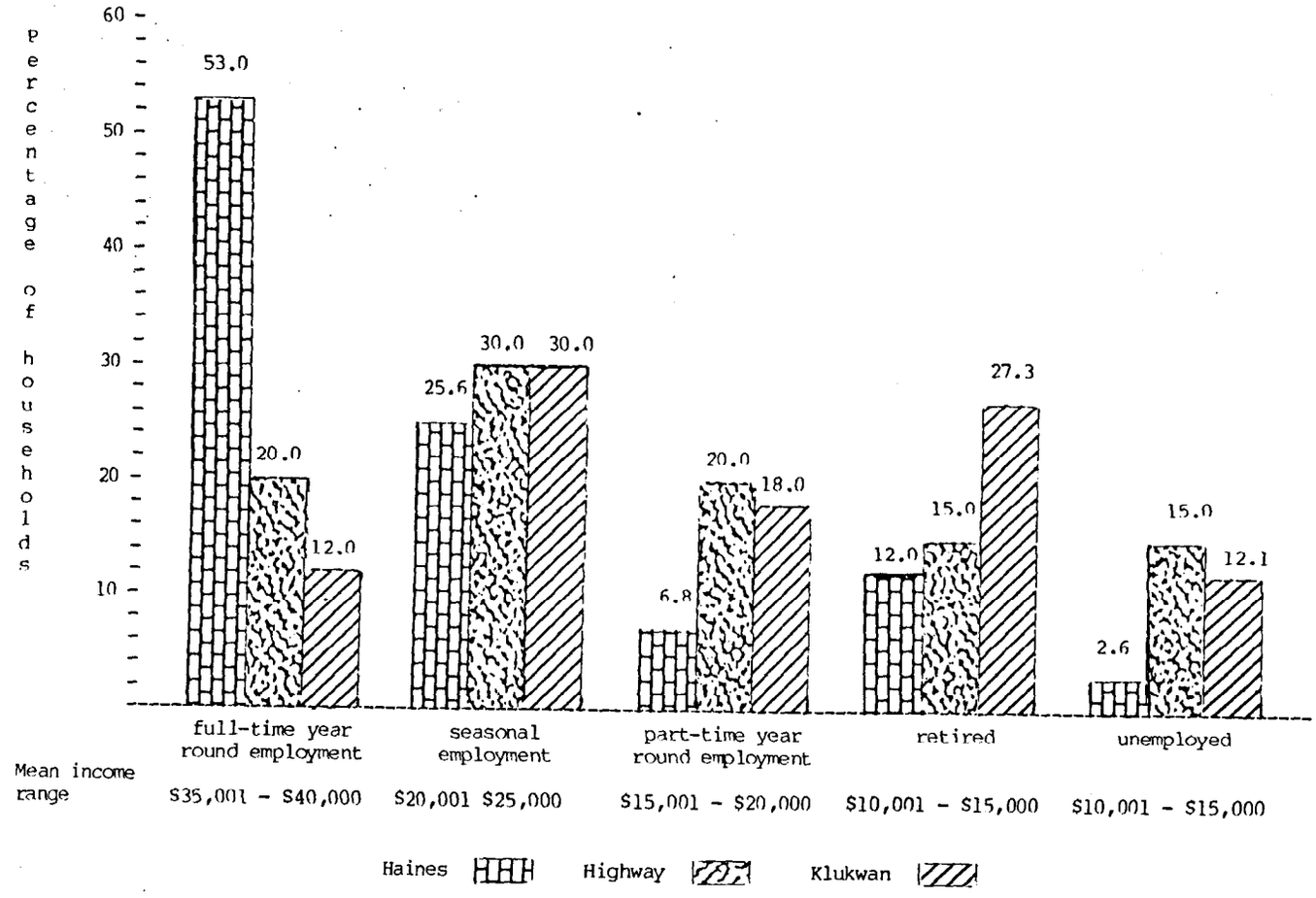

Figure 6. Household employment in 1983 by type and sample.

The mean household income range was $25,001 to $30,000 for the Haines sample and $15,001 to $20,000 for both the Highway and Klukwan samples. Figure 7 depicts the percentage of households from all sampled households by gross annual income range for 1982. This figure shows the largest percentage of households occurs in the $5,000 to $15,000 range, with the percentage of households decreasing in higher income ranges. Fourteen households, 7.8 percent of the entire sample, did not respond to this question.

PATTERNS OF RESOURCE USE

Seasonal Rounds

Figures 8, 9, and 10 depict seasons during which resources were reported harvested by the sample of households interviewed in-depth. The absence of resource harvest data in the seasonal rounds is not necessarily indicative of a lack of harvesting activity for that particular resource. Seasonal round information presented here may not be fully representative of the entire study area. These figures show that salmon is one resource among several that are taken within each community, including other varieties of fish (especially trout, halibut, and eulachon), crab, big game, small game, birds, plants, and furbearers. Certain similarities and differences occur in the timing and methods of harvest between communities. These will be described and discussed more fully in an upcoming comprehensive report on resource use in the Chilkat/Chilkoot area.

Participation in Harvesting and Harvest Quantities

Figure 11 illustrates the percentage of households in each sample participating in the harvest of specific resource categories. All three samples show substantial household participation rates in particular resource

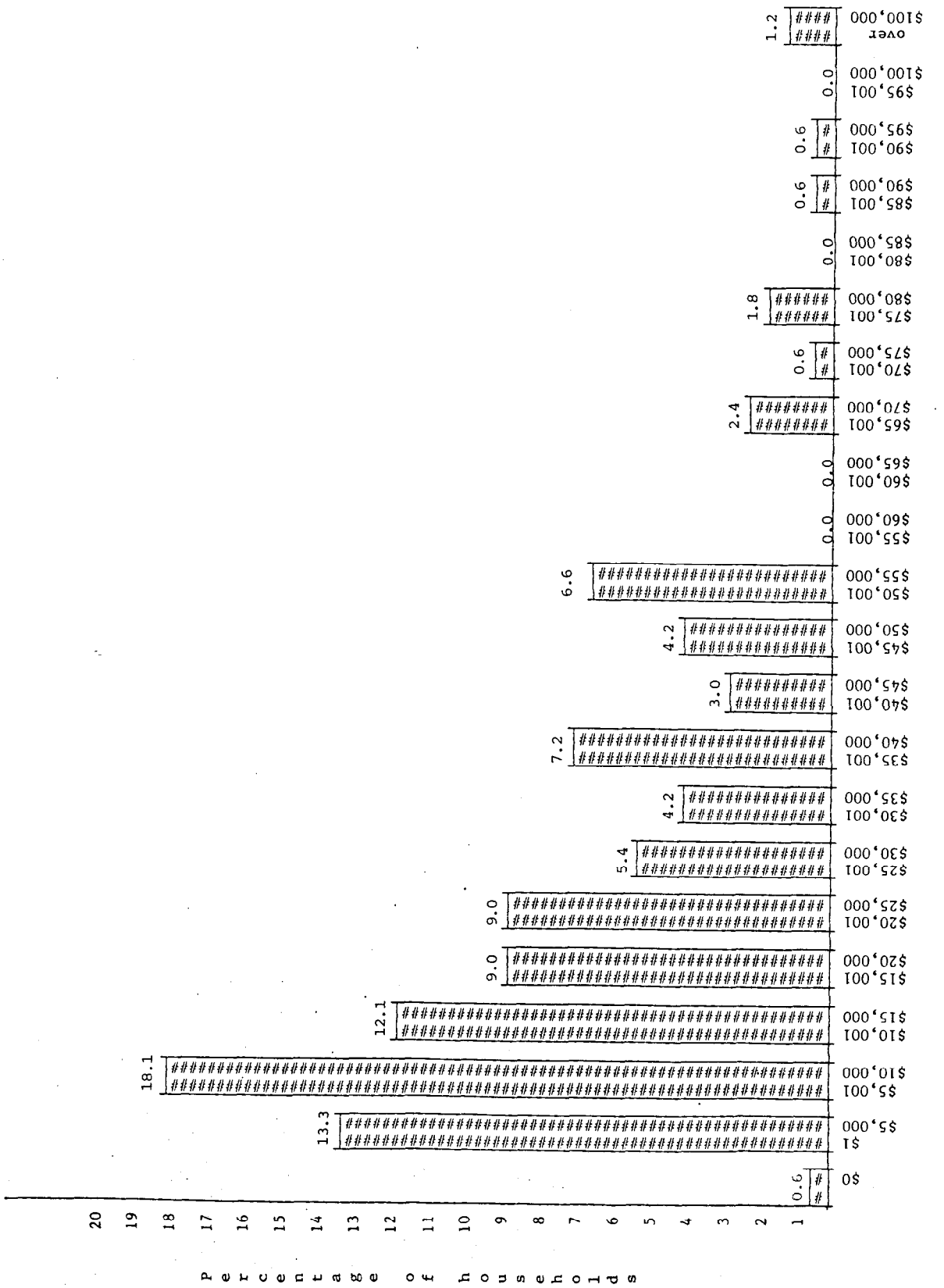

Figure 7. Mean annual household income of total Chilkat/Chilkoot sample, 1982.

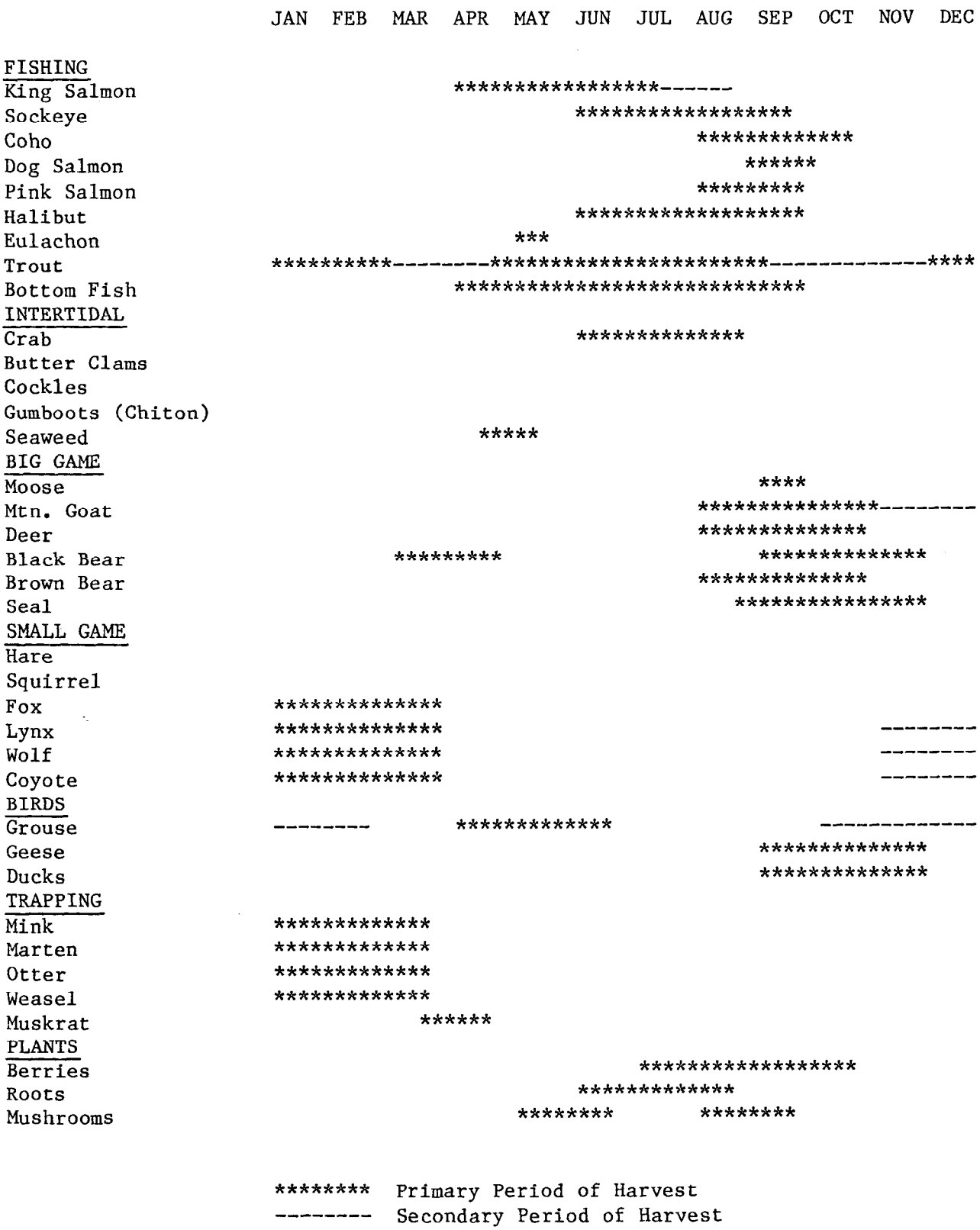

Figure 8. Seasonal round of resource harvest for Haines sample.

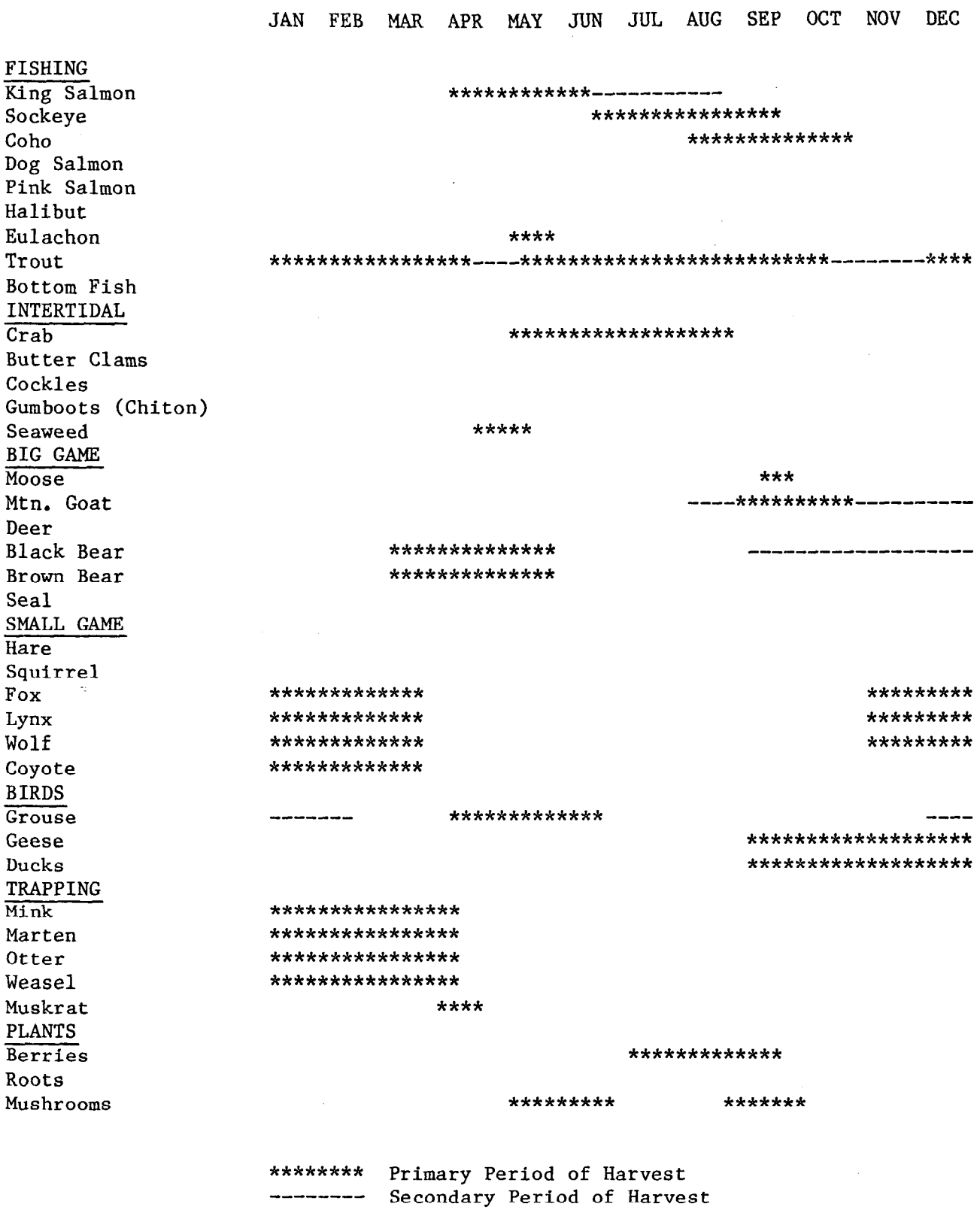

Figure 9. Seasonal round of resource harvest for Highway sample.

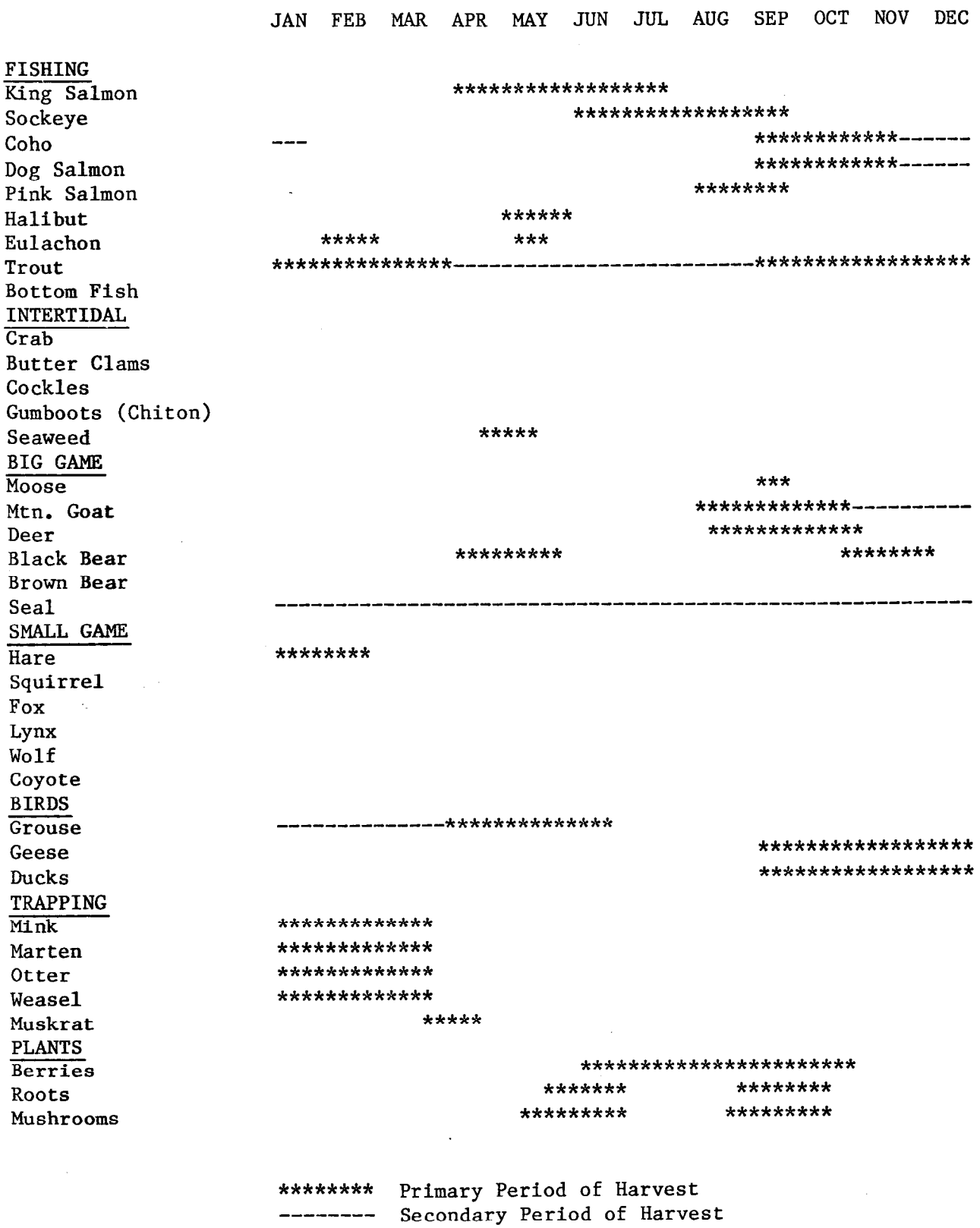

Figure 10. Seasonal round of resource harvest for Klukwan sample.

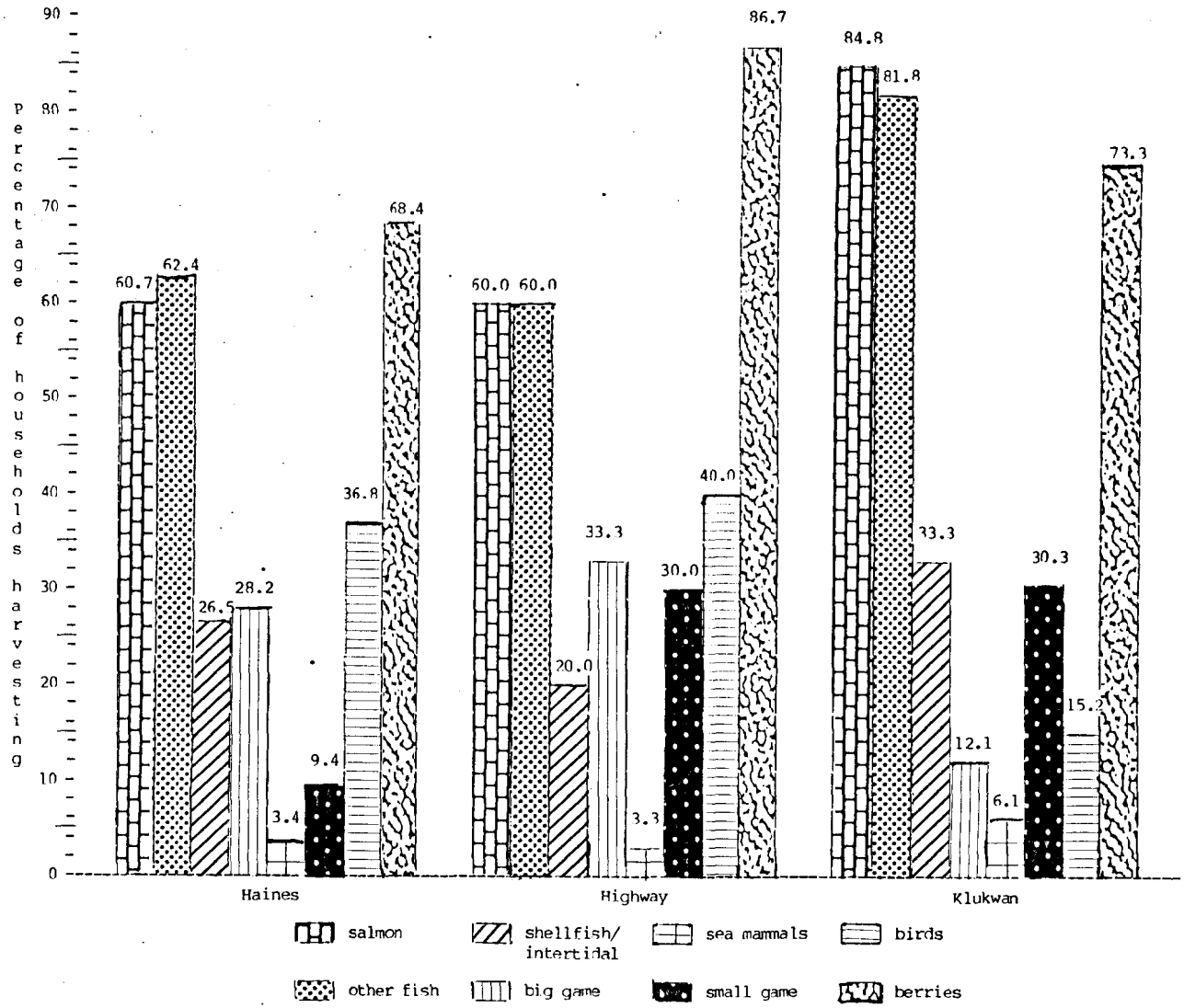

Figure 11. Household participation in harvest activities by resource category and sample.

harvest activities. Salmon fishing, harvesting fish other than salmon, and berry picking were the most common resource harvesting activities in each of the three samples. A greater percentage of Klukwan households (84.8 percent for salmon, 81.8 percent for other fish) participated in fishing in comparison with the Haines and Highway sample (about 60-62 percent). The number of households harvesting big game was highest in the Highway sample (33.3 percent) followed by Haines (28.2 percent) and Klukwan (12.1 percent). Small game hunting was undertaken by a larger proportion of the Highway and Klukwan samples (30.0 percent and 33.3 percent, respectively) than by the Haines sample (9.4 percent). Sea mammal hunting was participated in by the smallest number of households in each sample.

The mean number of pounds per household of selected resources harvested during September 1982 through August 1983 is presented in Figure 12 (see Appendix B for conversion weights). The darkened portion of each bar represents the mean harvest of all households within each sample. The entire bar depicts the mean harvest for only those households that participated in the harvest of that resource category. The mean household harvest for all resource categories for all sampled households was 342.9 pounds for the Haines sample, 465.4 pounds for the Highway sample and 662.5 for the Klukwan sample.

In each sample, the three resource categories providing the largest volume of food during 1983 were salmon, other fish, and big game, although the order and relative quantities differed among samples. The order for Haines households was salmon (111.6 pounds), other fish (103.2 pounds), and big game (87.2 pounds). For Highway households, the mean pounds of salmon harvested was highest (237.0 pounds), followed by big game (112.3 pounds), and other fish (69.2 pounds). The mean pounds of salmon harvested

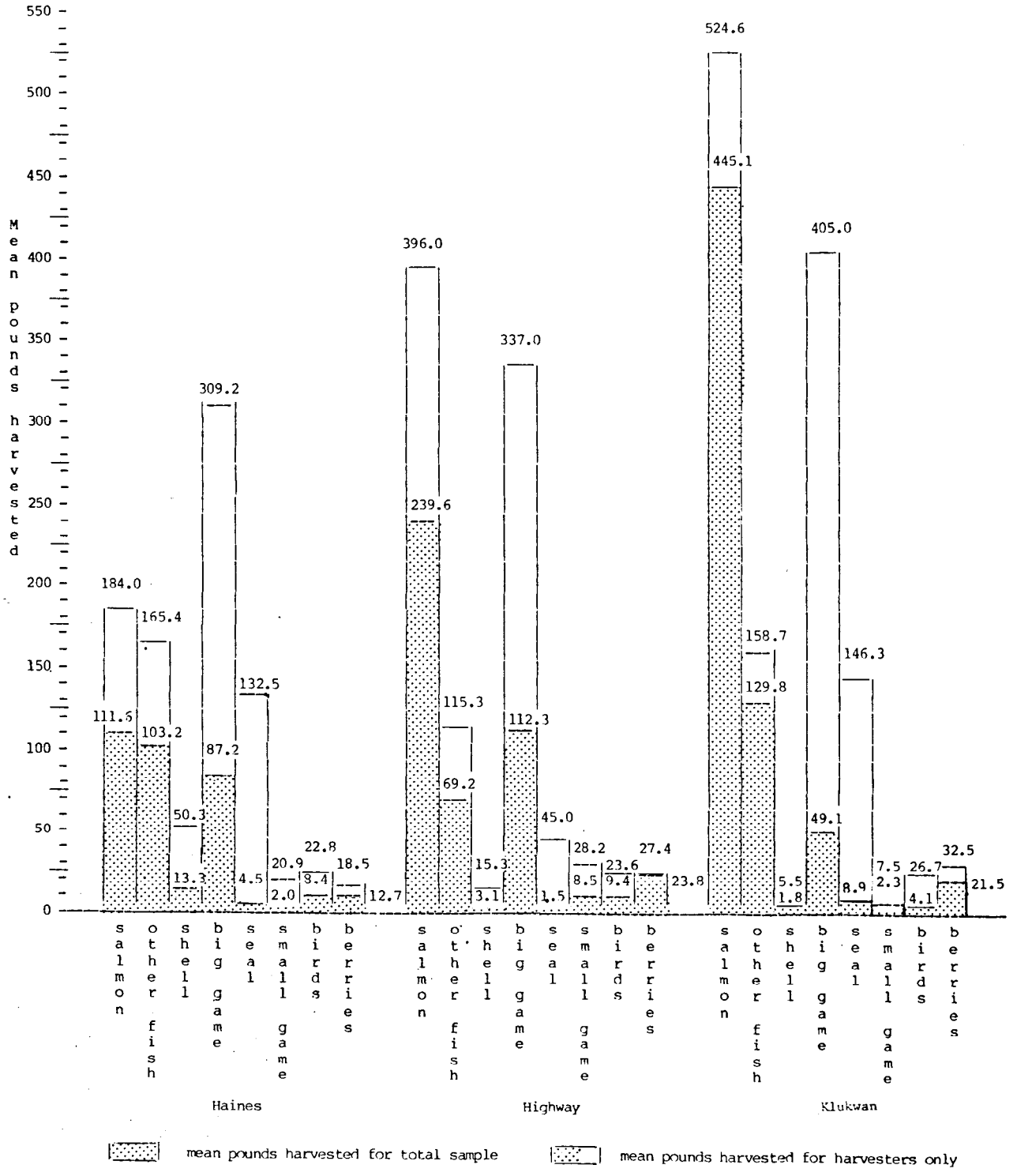

Figure 12. Mean household harvests of selected resources in pounds dressed weight, September 1982 through August 1983, by total sampled households and active households.

by Klukwan households was 445.1 pounds, followed by other fish (129.8 pounds), and big game (49.1 pounds).

HISTORIC SALMON HARVEST

Salmon harvests from the Chilkat and Chilkoot drainages have supported human settlements in the area for centuries. The aboriginal occupants of the area, the Tlingit Indians, may have arrived several centuries prior to the European discovery of the area by the Russians and Spanish in the 1700s (Woodcock 1977). Ethnographic information consistently points to a uniform northward migration of people by water along the coast and inland passages from northern British Columbia and Prince of Wales Island (Swanton 1900; Emmons 1916; Garfield 1947; de Laguna 1960). This coastal migration was augmented by people descending from the interior along river valleys to the sea. The Tlingit Indians who settled the valleys presently called the Chilkat and Chilkoot are known as the Chilkat Tlingit. The history of their migration northward may be traced to their clan names (L'uknax.'adi, Gaanaxteidi', Noow shaka.aayi, Kaagwaantaan, Dagisdinaa, and Dakl'aweidi), all of which are associated with geographic locations or events that influenced the clans when they were occupying areas to the south of the Chilkat territory (Sackett 1979).

The Chilkat territory was described in the 1940s (Goldschmidt and Haas 1946) as including the shores of Lynn Canal and its tributaries from the east shore of Lynn Canal just north of Berners Bay, to the west shore south of Sullivan Island, northward to and including Chilkat and Chilkoot Passes (Figure 1). The Chilkat people often subdivide their population into two groups: the Chilkat (Jilkaat) Natives of the Chilkat River drain-

age, with Klukwan being the major population center; and the Chilkoot (Jilkoot) Natives living in and near the Chilkoot River drainage. Haines is the present population center for the Chilkoot Tlingit.

Prior to the establishment of Haines, the Chilkoot Indians lived in four villages located near the present site of Haines, along Lutak Inlet and along the Chilkoot River. An important fishing settlement, Chilkoot Village, was located along the Chilkoot River midway between Chilkoot Lake and Lutak Inlet. The 1880 census reported a population of 127 with about eight houses in Chilkoot Village and numerous smokehouses lining both sides of the River (Petroff 1884). Three reasons are given for the abandonment of Chilkoot village: a mudslide buried the east shore structures near the end of the nineteenth century; smallpox and related diseases took many lives; and many residents sought wage labor which was beginning to develop in Haines. The last family moved from the area in the 1920s (Sackett 1979).

Fishing in the Chilkoot River was primarily conducted by gaffing or spearing salmon from fishing platforms as the fish made their way upstream to Chilkoot Lake. The platforms were often large boulders which were naturally scattered the entire length of the riverbed, or small wooden walkways which were built to bridge the boulders. During the winter when the River was low, rocks were moved in the stream bed to form weirs which, during the summer months, helped funnel traveling salmon to areas where they could easily be gaffed or speared. Farther up the Chilkoot River system near the outlet into Chilkoot Lake, small gill nets or beach seines were used to capture salmon that were in the lake or in small pools just upstream from the Lake. Each of these fishing locations provided the fishers with a salmon that had a distinct flavor and texture when processed. Different

fishing locations often produced salmon which were best processed in a specific manner, such as smoking, drying, or boiling.

Of the four types of salmon found in the Chilkoot River (sockeye, pink, chum, coho), the sockeye was the most plentiful and most desired because of its exceptionally large size and suitability for smoking, drying, or canning for later use. Since the mid-1960s, subsistence fishing for salmon by use of net or gaff hook has not been permitted in the Chilkoot River. Presently the only legal method of harvesting salmon in the Chilkoot River is by means of rod and reel.

Since the turn of the century, salmon have also been harvested by Chilkoot people from the waters of Lutak and Chilkoot inlets by means of drift gill nets from boats and set gill nets from the shore for both subsistence and commercial purposes. In addition to the Chilkoot River and ocean, the Chilkoot area people have also used the lower portions of the Chilkat River for harvesting salmon, especially the late runs of chum and coho salmon. King salmon, one of the first species to arrive in the Chilkat River after the eulachon run, were eagerly sought as the year's first fresh salmon.

Commercial fishing for salmon in the upper Lynn Canal area began during the early 1900s by means of fish traps and gill nets in the saltwater and at the mouths of streams. Those residents who harvested fish by these means retained portions of their commercial catch for domestic use, as is the practice of some present-day commercial fishermen in the area.

During the mid-1800s, the Chilkat Indians inhabited four different village sites, all along the Chilkat River. Klukwan, located 22 miles upstream from the mouth of the Chilkat River (Figure 1), was the largest of these villages and is the only one that remains today (Sackett 1979).

The village of Klukwan is ideally located for salmon fishing on a confined portion of the Chilkat River, adjacent to the Tsirku River, an important tributary for spawning salmon. A unique upwelling of warm water nearby provides a freshwater habitat inhabited by salmon almost year-round. Numerous small, braided channels at the mouth of the Tsirku River provide shallow sloughs where historically salmon have been obtained from the shoreline by means of a gaff hook attached to a wooden pole 10 to 15 feet long. Working from the shoreline or standing in a canoe, the fisher drew the gaff hook along the bottom and quickly jerked the hook upward when he felt a fish brushing against the hook or saw a salmon near the hook.

Interviews conducted with long-term residents provided insight on historic fishing by residents of Klukwan. Set gill nets had limited use for salmon fishing in the Chilkat River near Klukwan. Until recently, nets were neither strong nor durable and required frequent maintenance and replacement. This was an expense which many could not afford, especially if they were not associated with commercial fishing and had no access to such equipment. Set gill nets required special river conditions and required constant maintenance in order to function properly. Changes in water level, debris in the water, and ice conditions made net fishing less desirable. In addition, the gaff hook provided a means to selectively harvest fish of different species and quality when the waters were clear.

Fishing for salmon took place at many settlements and camps along the north shore of the Chilkat River where fish were concentrated for efficient harvesting and where facilities for processing were located. Fishing sites were also located on tributaries to the Chilkat River at Chilkat Lake and Big Boulder Creek (Figure 1).

All five species of salmon were harvested from the Chilkat River.

Each was taken at a different time of the year and prepared or preserved in a manner specific to the type of fish. King salmon were the first available in the spring, appearing shortly after the end of the eulachon run. These salmon were used fresh and some were dried in strips. The sockeye salmon were next to arrive as early as mid-May and were available throughout the summer and into early fall. These fish were harvested in large quantities and were considered highly desirable because their firm texture made them suitable for smoking, drying, and canning. Pink salmon were often used as "boiled fish," although not in the quantities of other types of salmon since they generally spawn in small tributaries close to the ocean and are not found in great numbers upstream. Chum salmon were available in large numbers in the fall and were usually preserved by drying for human use and as food for dog teams. Coho salmon were taken in the fall and early winter for immediate consumption as fresh boiled fish. Cohos which were not eaten fresh were packed in snow outside the house until warm spring weather began to thaw the fish. The fish were then lightly smoked and were said to have a flavor distinct from other preserved salmon.

In 1908 a road was built from Haines following the Chilkat and Klehini rivers to an area upriver from Klukwan near the Canadian border. Homesteads and small settlements of Native and non-Native people developed along the banks of these rivers. These people used the river adjacent to their homes for the harvesting of salmon for use in their homes.

Subsistence Regulation and Policy Guidelines for the Chilkat River

In 1960 regulations were adopted by the Alaska Board of Fisheries that created a new fishery, the "Subsistence Fishery on the Chilkat River." Prior to this time, regulations governing the harvest of salmon for non-com-

mercial and non-sport fishing were referred to as a "Personal Use Fishery." The new subsistence fishing regulations required that a person obtain a permit to harvest salmon from areas not open to commercial fishing. In 1961 regulations were passed requiring a permit for subsistence salmon fishing in all areas of southeastern Alaska during all seasons. In the mid-1960s policies and regulations were established to prohibit the issuance of subsistence permits for harvesting salmon in certain areas of southeast. Upper Lynn Canal (District 15) was closed to saltwater subsistence fishing in 1969 during periods closed to the commercial net fishery (5 AAC 33.990(4)).

In 1969 regulations were established prohibiting the issuance of subsistence permits for the harvesting of king and coho salmon in southeastern Alaska (5 AAC 33.990(5)). This was largely the result of concern over steadily decreasing success in the commercial harvesting of these two species. The subsistence harvest of coho salmon was permitted again in 1972 under subsistence regulations, but only in the area of the Chilkat River adjacent to Klukwan (5 AAC 33.990(5)). Regulations were adopted in 1975 closing subsistence set gill net fishing in all southeastern Alaska (5 AAC 01.720(2)). The following year these regulations were amended to allow set gill netting only in the mainstream of the Chilkat River north of the latitude of Zimovia Point (5 AAC 990(5)).

In 1979 regulations were adopted requiring subsistence net fishers to mark their catch by removing the dorsal fin (5 AAC 01.740). In 1981 a policy was adopted allowing a subsistence drift gill net fishery in all of District 15 with the stipulation that this fishery be concurrent with commercial fishing period openings. In 1982 the subsistence taking of king salmon was legalized in the area of the Chilkat River adjacent to Klukwan (5 AAC 01.730). Table 3 summarizes the regulatory and policy history for the Chilkat River subsistence fishery.

TABLE 3. HISTORY OF SALMON REGULATIONS AND POLICIES FOR THE CHILKAT RIVER SUBSISTENCE FISHERY.

1955-1959	Personal use fishery
1960	Title of regulation changed from "personal use fishery" to "subsistence fishery"
	First permit for subsistence fishing required
1961	Subsistence permit required in all areas
Mid-1960s	By policy, subsistence permits for the Chilkoot River drainages no longer issued
1969	Permits for taking king salmon and coho for subsistence purposes no longer issued
	Subsistence salmon fishing in saltwater in District 15A prohibited during the closed periods of commercial net fishery (5 AAC 33.990(4))
1972	Permits for taking coho salmon for subsistence purposes issued for the Chilkat River adjacent to the Klukwan Reservation (5 AAC 33.990(5))
1975	Subsistence set gill net fishing closed in all of southeastern Alaska (5 AAC 01.720(2))
1976	The use of set gill net gear allowed in the mainstream of the Chilkat River north of the latitude of Zimovia Point (5 AAC 990(5))
1979	Marking of subsistence salmon required; subsistence fishermen must remove the dorsal fin from subsistence caught salmon when taken (5 AAC 01.740)
1981	Subsistence drift gill netting in all of District 15A allowed by policy during commercial openings
1982	Subsistence fishing for king salmon permitted in the area adjacent to Klukwan on the Chilkat River (5 AAC 01.730(b))

CONTEMPORARY FISHING

Today fishers in the study area harvest salmon for local use, with four different types of gear: Subsistence set gill nets, rod and reel, subsistence and commercial drift gill nets, and other commercial gear. When fishing with a set gill net, the salmon are harvested from the Chilkat River from Zimovia Point to one mile above Wells Bridge. The areas fished when using a rod and reel include nearly all the waters of the area. The harvesting of salmon by drift gill net with a subsistence permit occurs in Lynn Canal during the regular commercial gill net openings. The salmon taken from commercial catches are harvested primarily from the waters of Lynn Canal.

Seasons

The fishing seasons vary with the different methods of harvest. By permit set gill net fishing started the second week in June and continued until the second week in October. Rod and reel fishermen fish throughout the year in the saltwater, rivers, streams, and lakes. Drift gill nets are used during the regular commercial gill net openings in Lynn Canal. The retention for local use of salmon caught with commercial gear occurs throughout the year during commercial gill net, troll, and seine openings.

The following section describes the specific methods, seasons, harvest activities, and the sharing and receiving of salmon for the three sampled areas -- Haines, Highway, and Klukwan.

Haines

In 1983, residents of Haines took salmon for local use with gill nets set along the Chilkat River from Zimovia Point to the vicinity of Wells

Bridge (see Figure 14). The sites for set gill nets were predetermined by the physical characteristics of the River. Gill nets were generally placed where back eddies occur, off points on the bank or in bends in the riverbed (Figure 13).

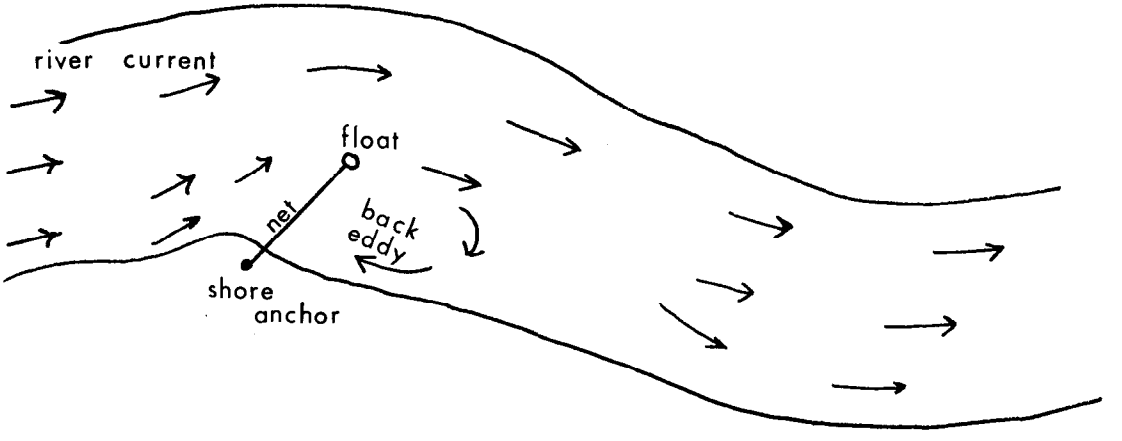

Figure 13. Illustration of a set net site in a stream.

Sites along the Chilkat were used on a first-come-first-use basis, with many sites used at different times by numerous people throughout the season. The Haines fishers tended to favor upriver sites, with a majority of the respondents using sites starting at 13 mile along the highway up to the vicinity of Wells Bridge (see Figure 14). In 1983 the Haines fishers started their season the second week in June, with the effort increasing slowly until July (Figure 15). During July, the fishing effort escalated rapidly to a peak during the last week of the month, possibly due to the increasing number of salmon reported in the Chilkat River at this time. The fishing effort decreased until the second week in August, when many fishers reported fishing again. Fishing effort decreased rapidly through the second week in September, with a few reporting fishing until the second

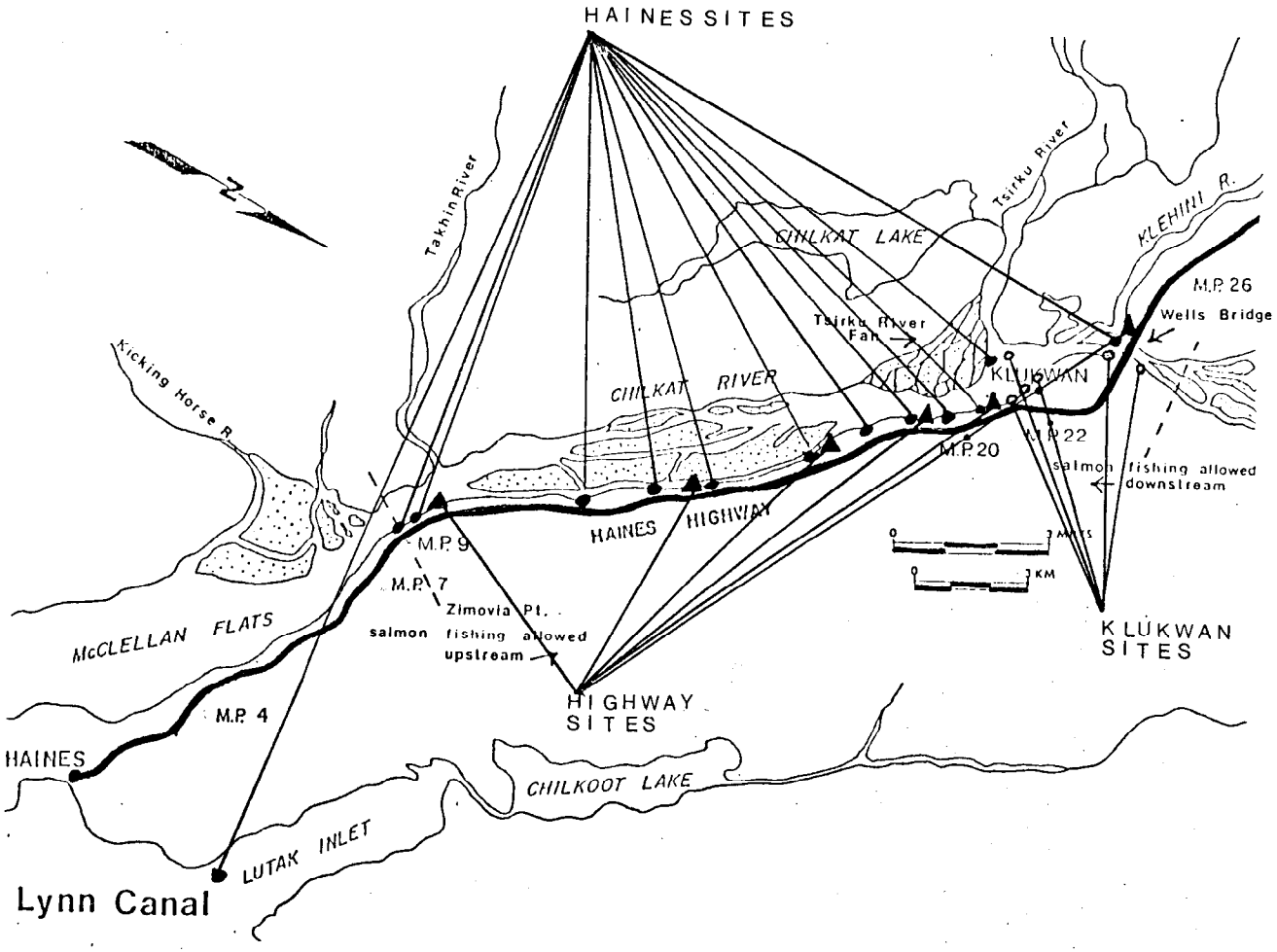

Figure 14. Subsistence net fishing sites for Haines, Highway, and Klukwan samples, 1983.

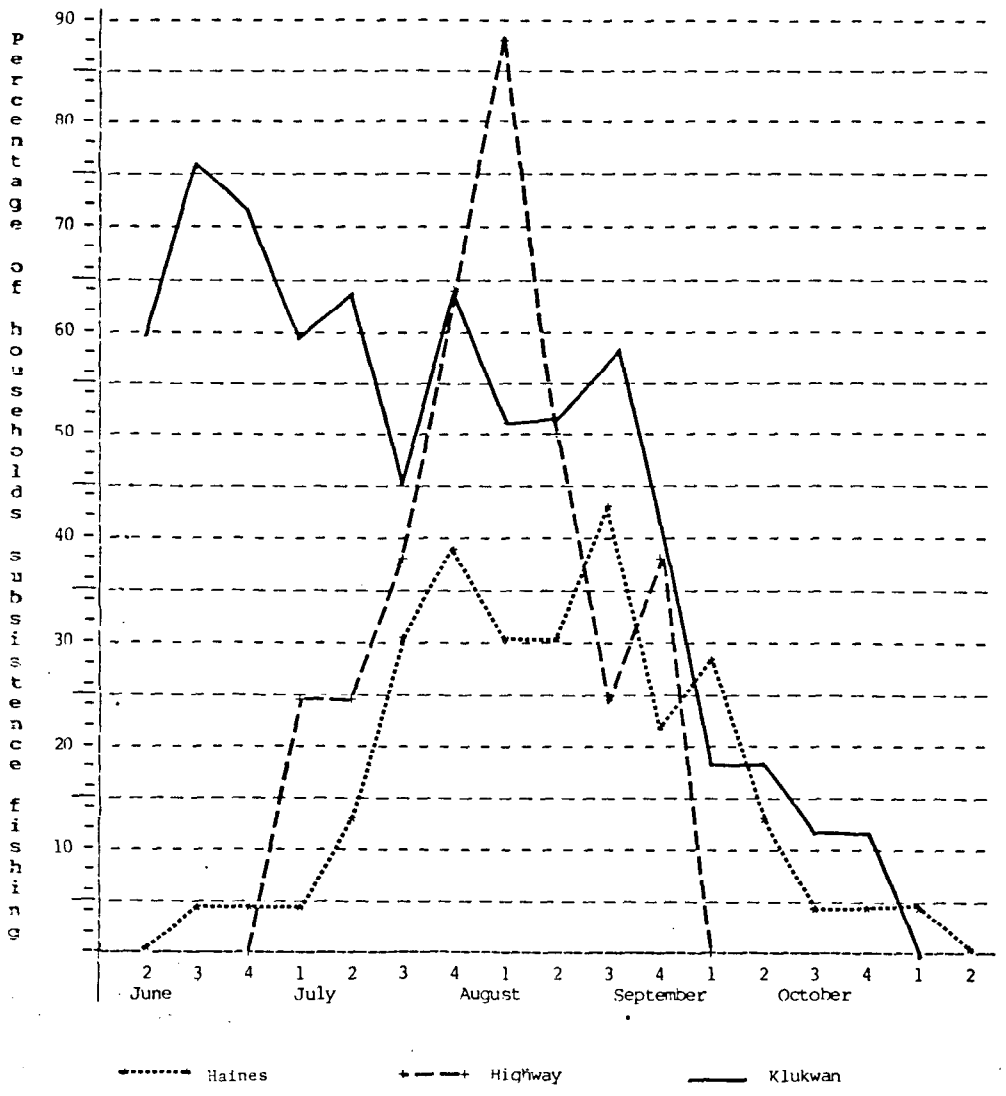

Figure 15. Participation by sampled households in the 1983 Chilkat River subsistence salmon net fishery.

week in October (Figure 15).

In 1983 the drift gill net fishing for salmon occurred in Lutak Inlet during the commercial drift gill net openings. The retention of salmon for household use from commercial catches occurred during the commercial openings for each gear type. The third method of obtaining salmon for home use was by use of rod and reel, which occurred throughout the year in both fresh and salt waters of the area.

During the study period, the sampled residents from Haines spent a total of 1,563 days fishing for all species of fish, a mean of 13.4 days per household. About 22.2 percent of the households spent a total of 140 days fishing for salmon with a subsistence set net between September 1, 1982 and August 31, 1983 (Table 4).

Table 5 presents the mean household harvest for all five species of salmon by sample. The respondents from Haines reported harvesting 365 king salmon with a mean of 3.1 kings per household (Figure 16). Most of the king salmon (53.4 percent) were harvested with commercial gear, 42.2 percent were taken with rod and reel, while the rest (4.4 percent) were not attributed to any specific gear type. About eighteen percent of the sampled households reported sharing king salmon, and 27.4 percent reported receiving king salmon (Figure 17).

The total number of sockeye harvested by the fishers of Haines was 783 with a mean of 6.7 sockeye per household. Subsistence fishers harvested 62.7 percent, commercial gear accounted for 22.3 percent, rod and reel 9.8 percent, and 5.1 percent was unaccounted for by gear type. Almost 13 percent of the sampled households shared their sockeyes and 35.9 percent reported receiving sockeye salmon.

The coho catch totalled 253 salmon with a mean of 2.2 coho per house-

TABLE 4. FISHING DAYS IN 1983 BY HAINES, HIGHWAY, AND KLUKWAN SAMPLES.

	Haines	Highway	Klukwan
Total Sample	n=117 (100.0%)	n=30 (100.0%)	n=33 (100.0%)
Total days fishing, all gear types	1,563	432	955
Mean days fishing, all gear types	13.4	21.6	28.9
Total days fishing, subsistence nets	140	113	436
Mean days fishing, subsistence nets	1.2	3.8	13.2
Subsistence Fishers	n=26 (22.2%)	n=10 (33.3%)	n=22 (66.7%)
Total days fishing, all gear types	433	262	845
Mean days fishing all gear types	16.7	26.2	38.4
Total days fishing, subsistence nets	140	113	436
Mean days fishing, subsistence nets	5.4	11.3	19.8

TABLE 5. MEAN HOUSEHOLD HARVEST OF SALMON (NUMBERS OF FISH), 1983, BY SAMPLE

	Haines	Highway	Klukwan
Total Sample	n=117	n=30	n=33
King	3.1	1.6	2.9
Sockeye	6.7	11.2	43.4
Coho	2.2	1.3	13.8
Pink	2.7	1.0	3.2
Chum	1.4	13.6	4.3

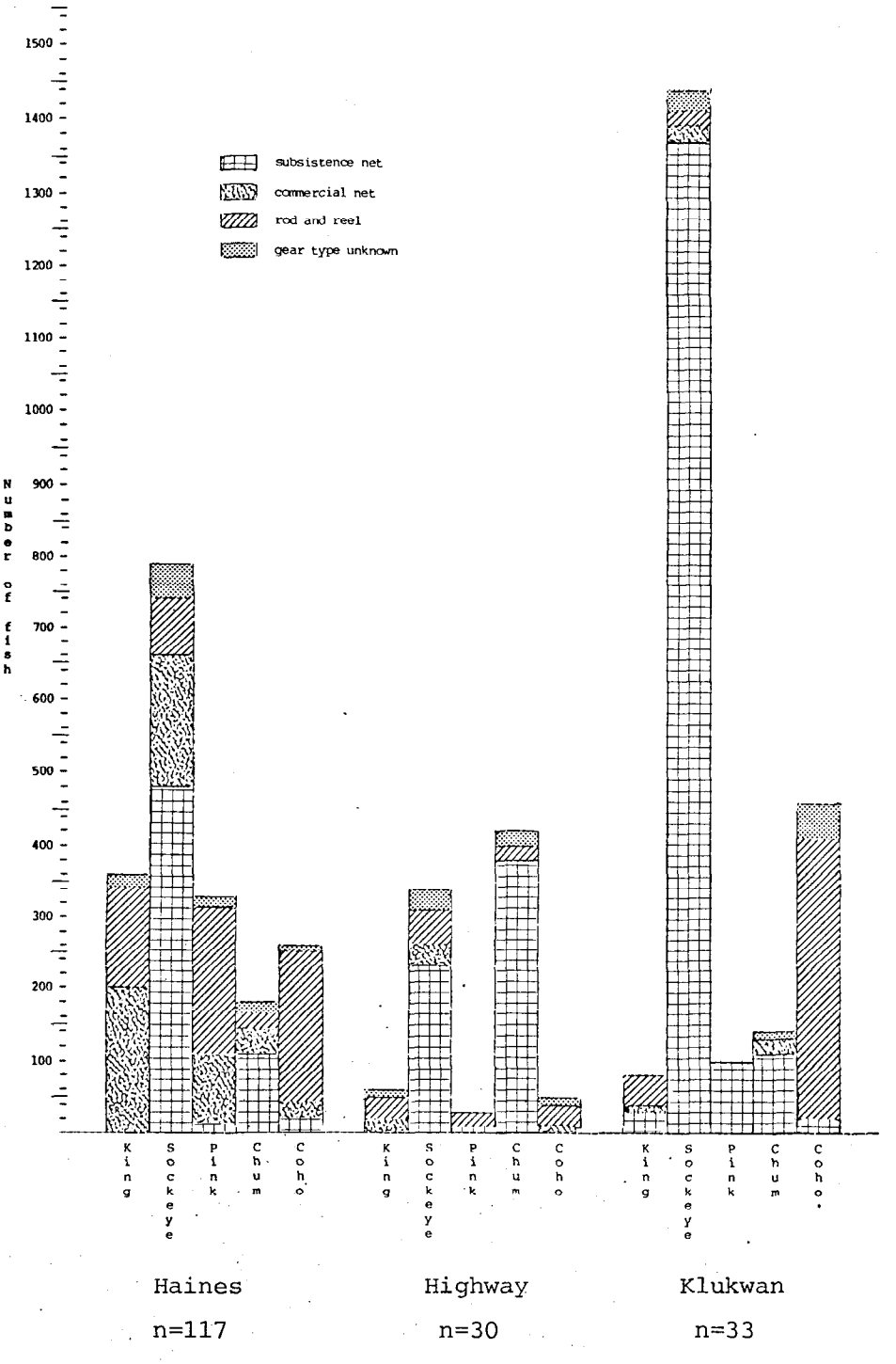

Figure 16. Number of salmon harvested by species and gear type in 1983, by sample.

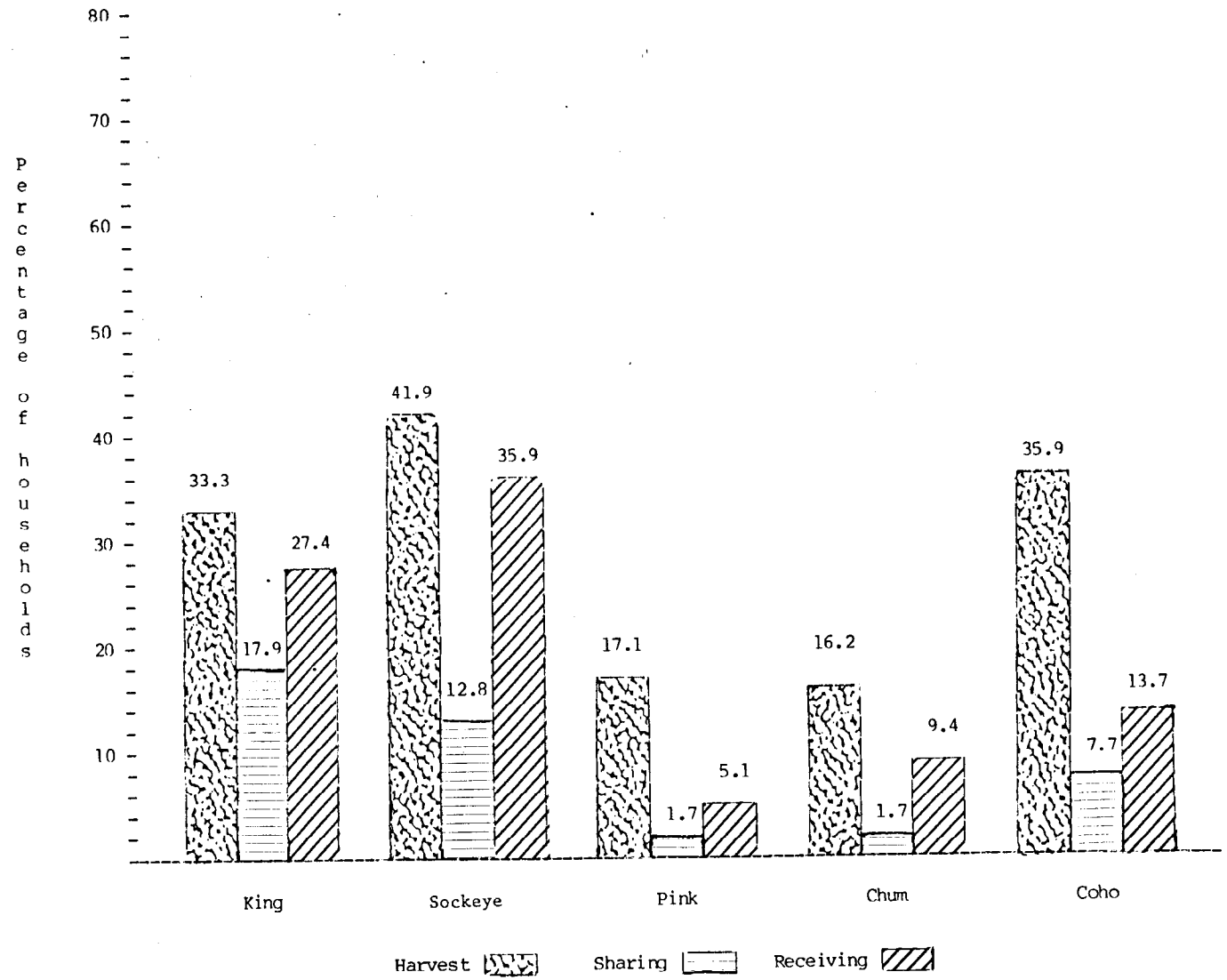

Figure 17. Percentage of sampled Haines households harvesting, sharing, and receiving salmon, by species.

hold. About 79.4 percent of the coho harvest was by rod and reel. The commercial take accounted for 12.6 percent, and the rest was split between gill net (4.3 percent) and unknown gear type (3.6 percent). About 8 percent of the households shared their coho and 13.7 percent reported receiving coho salmon.

The pink salmon catch totalled 319 fish with a mean of 2.7 salmon per household. The rod and reel catch accounted for 65.2 percent of the total, followed by the commercial gear at 31.3 percent. Subsistence net and unknown gear accounted for the remaining 3.5 percent of the catch. About 2 percent of the households reported sharing pink salmon, while 5 percent reported receiving pinks.

Chum salmon catches totaled 161 salmon with a mean of 1.4 salmon per household. Most (69.6 percent) of the salmon was taken by the subsistence net fishery, followed by unknown gear type (11.2 percent), and the rest was split between rod and reel (9.9 percent), and commercial harvest (9.3 percent). Only 1.7 percent of the households shared chum salmon, with 9.4 percent of the households reported receiving some chum salmon.

By weight, salmon accounted for 32.5 percent of the mean household harvest of all resources taken from September 1982 through August 1983 by samples Haines households (Figure 18).

Highway

Respondents in the Highway sample placed their set gill nets in the Chilkat starting at mile 9, with a majority (55.5 percent) of the respondents reporting fishing below Klukwan (see Figure 14). Fishing for salmon with set gill net started the second week in June, with the fishing effort increasing rapidly and reaching an apex during the last week in July (Figure 15). The fishing effort decreased rapidly from the first week in

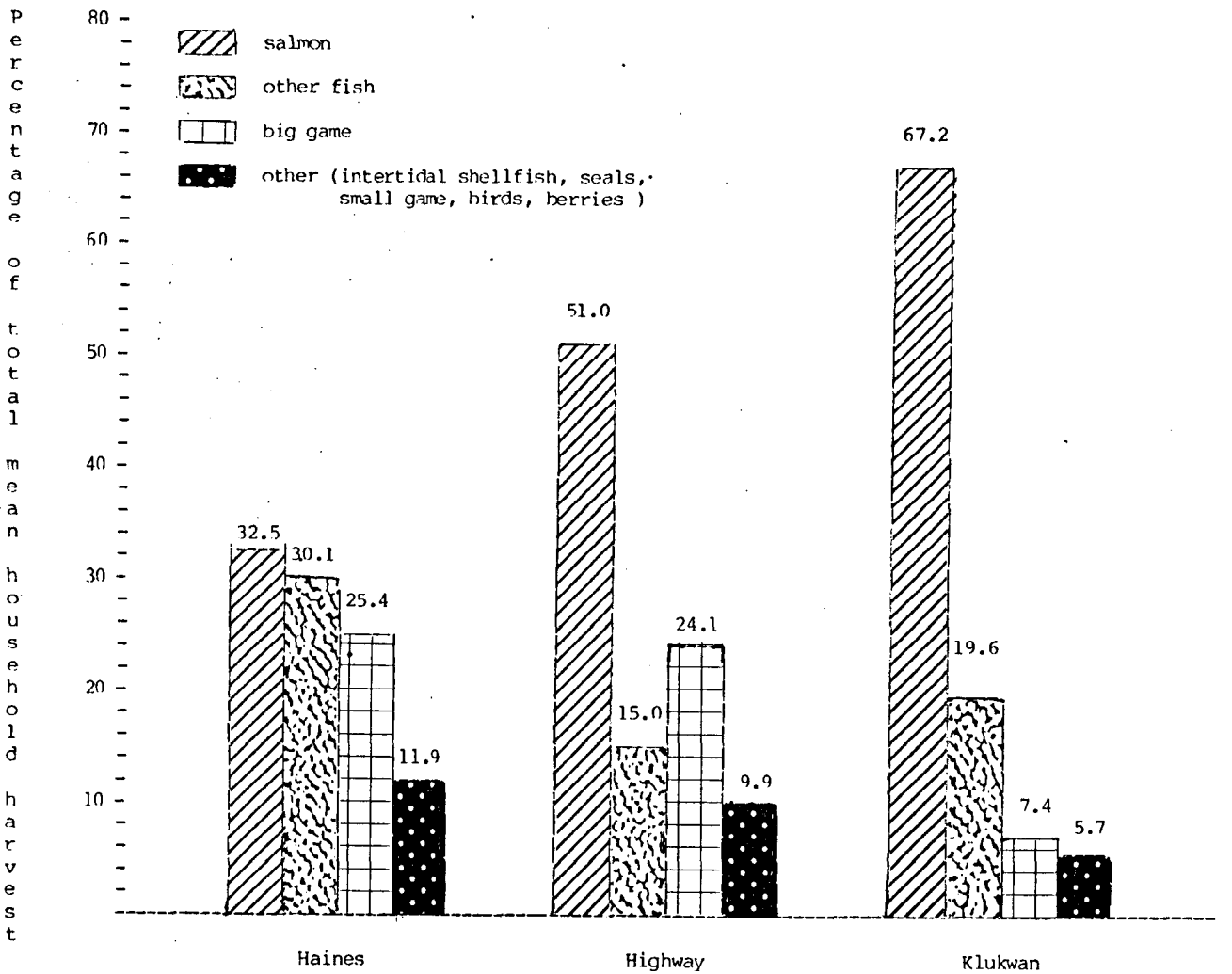

Figure 18. Composition (by weight) of mean household harvest of resources taken September 1982 through August 1983, by sample.

August through the first week in September, when fishing ended. Harvesting by rod and reel by the Highway sample occurred throughout the year in both fresh and salt waters. No Highway household reported using drift gill nets for obtaining salmon in Lynn Canal.

The mean number of fishing days for the Highway sample was 21.6 days (Table 4), with 66.7 percent of the households reporting that they fished for household use and 33.3 percent of sample reporting fishing with a set gill net. Households from the Highway sample spent an average of 3.8 days fishing with set gill nets on the Chilkat from September 1, 1982 through August 31, 1983.

The Highway sample reported a total harvest of 49 king salmon, a mean of 1.6 per household (Table 5). Most king salmon (71.4 percent) were taken with rod and reel, with the remainder being taken by commercial gear (20.4 percent) and unknown gear type (8.2 percent) (Figure 16). Ten percent of the households reported sharing and 13.3 percent received king salmon (Figure 19).

Highway sample respondents caught a total of 335 sockeye, with a mean of 11.2 sockeye per household for the sample. Most (68.4 percent) of the sockeye were harvested by subsistence set gill nets, followed by rod and reel (15.5 percent), commercial gear (9.3 percent), and unknown gear type (6.9 percent). About 13 percent of the households reported sharing sockeye, with 26.7 percent receiving some sockeye salmon.

The number of harvested coho totalled 38 salmon (a mean of 1.3 coho per household), with a majority (65.8 percent) harvested by rod and reel, followed by 15.8 percent taken with commercial gear and the rest (18.4 percent) taken by unknown gear type. Ten percent of the households reported receiving coho, with no one reporting sharing any coho.

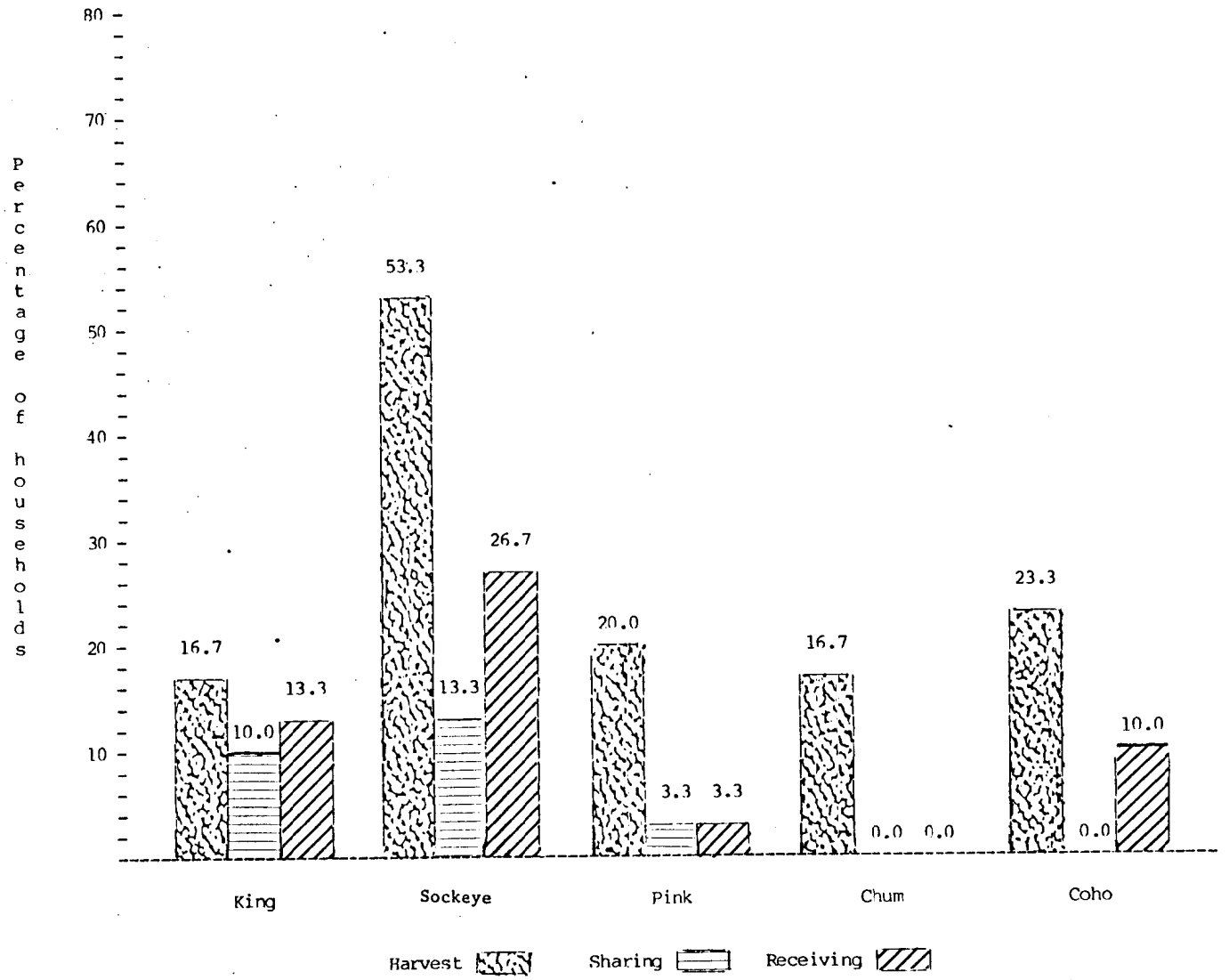

Figure 19. Percentage of sampled Highway households harvesting, sharing, and receiving salmon, by species.

The reported number of pink salmon taken was 29, with a mean of 1.0 pink harvested per household. The harvest was split between rod and reel (55.2 percent) and set gill net (44.8 percent) harvest methods. About three percent of the households reported sharing pinks, an equal percentage receiving pink salmon.

The reported number of chum salmon totalled 409 salmon, with a mean of 13.6 chums per household. Subsistence set net gear accounted for 99.8 percent of the chum salmon harvest. Gear type was not known for 0.2 percent of the catch. None of the households sampled reported receiving or sharing any chums.

By weight, salmon accounted for about half (51.0 percent) of the mean household harvest of all resources taken from September 1982 through August 1983 by sampled Highway households (Figure 18).

Klukwan

The respondents from Klukwan reported fishing in the immediate vicinity of the community, with one respondent reporting fishing below Wells Bridge (Figure 14). Fishing commenced strongly the second week in June, peaking rapidly, with 75 percent of the surveyed households reporting fishing by the third week in June (Figure 15). The fishing effort then decreased slowly until the third week in August. After the third week, fishing effort decreased quickly, with only a few households fishing until the first week in October. The respondents also reported harvesting salmon by rod and reel, and a few obtained salmon from commercial gear. The respondents from Klukwan spent a total of 955 days fishing, a mean of 28.9 days per household (Table 4). They spent an average of 13.2 days set gill net fishing in the Chilkat between the second week in June and the first week in October.

The sampled Klukwan households harvested a total of 96 king salmon, with an average of 2.9 kings per household (Table 5). The harvest was fairly evenly split between that taken by rod and reel (46.9 percent) and from the subsistence set net fishery (42.7 percent). The remaining 10.4 percent was retained from the commercial gear. Households (24.2 percent) reported sharing their kings, and 12.1 percent reported receiving some king salmon (Figure 20).

Klukwan fishers harvested 1,432 sockeye salmon, resulting in an average of 43.4 sockeyes per household. Set gillnetters harvested 95.9 percent of the sockeye, with the remainder taken by rod and reel (0.7 percent) and commercial gear (0.6 percent) in addition to 2.8 percent of the harvest not attributed to any gear type. About 45.5 percent of the households reported sharing their sockeye with 24.2 percent stating that they received some sockeye.

There were 455 cohos harvested by Klukwan sample households, resulting in a mean of 13.8 coho per household. Most of the harvest was by rod and reel, which accounted for 84.6 percent of the catch, followed by 11.2 percent unknown gear type and 4.2 percent obtained from the set gill net. Four households (15.2 percent) reported sharing their catch and 9.1 percent stated that they received some coho.

The set gill net accounted for 100 percent of the 105 pink salmon caught by the fishers of Klukwan, resulting in a mean of 3.2 pinks per household. Pinks were shared by 6.1 percent of the households; no one reported receiving any pinks.

The chum salmon harvest totaled 141 salmon, a mean of 4.2 salmon per household. The set gill net gear accounted for 88.7 percent of the catch followed by 7.1 percent taken by commercial gear and 4.3 percent taken by

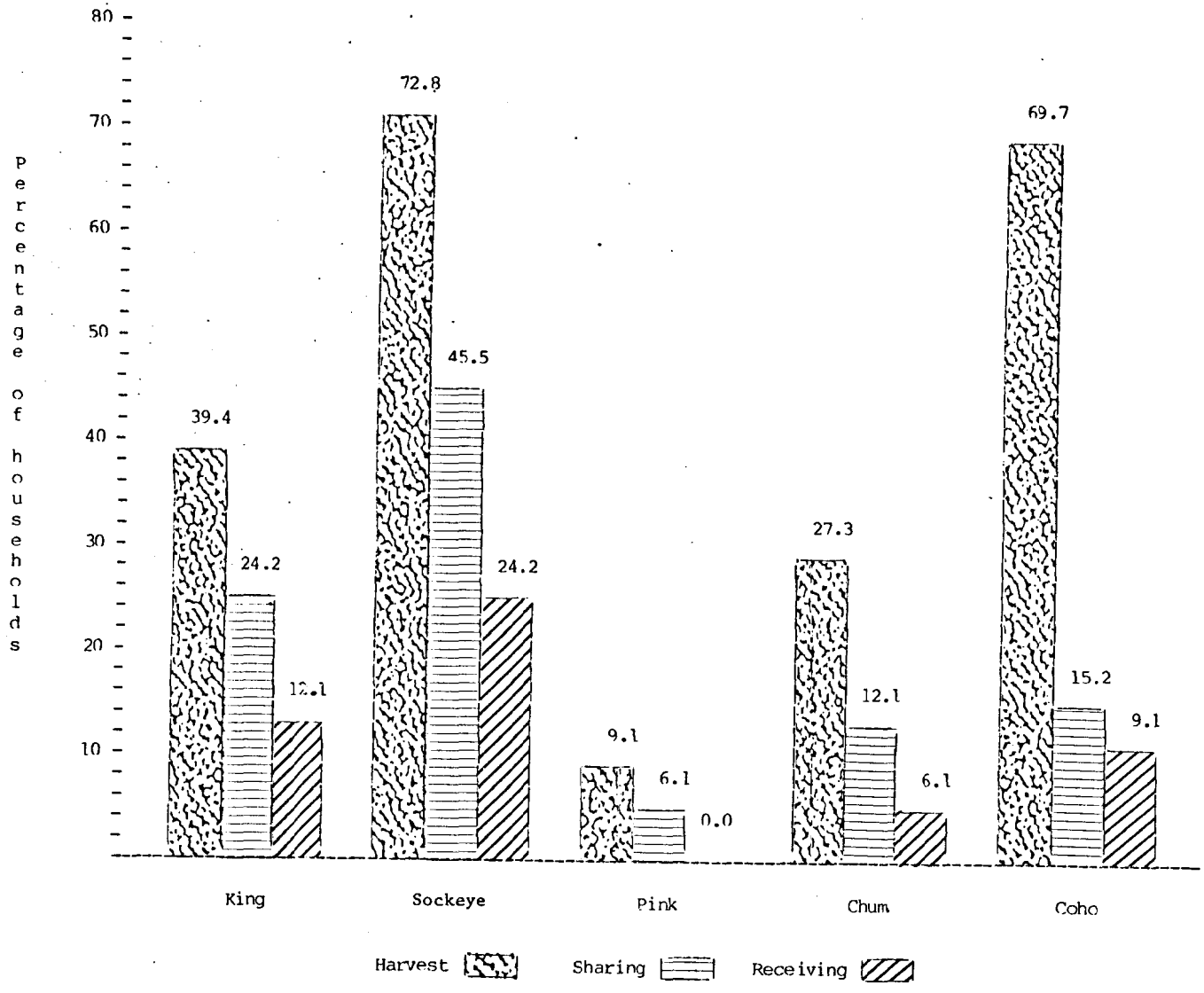

Figure 20. Percentage of sampled Klukwan households harvesting, sharing, and receiving salmon, by species.

rod and reel. About 12.1 percent of the households reported sharing their chums, with 6.1 percent receiving some chums. By weight, salmon accounted for 67.2 percent of the mean household harvest of all resources taken from September 1982 through August 1983 by the sampled Klukwan households.

DISCUSSION

In this section background information presented earlier in the report is analyzed in relation to harvest data. Relationships between harvest quantities (by weight) and methods of salmon harvest, employment, length of residency, commercial fishing, and subsistence fishing will be discussed in order to determine resource use patterns within the samples.

Gear Type and Species Selection

As shown above, in Haines over one-half of the total king salmon harvest used at home in 1983 was obtained from commercial drift net catches either by fishermen themselves or through sharing of fish (Figure 16). The low price offered by fish processors during 1983 for incidentally caught king salmon may have been an important factor influencing the high non-commercial use of this fish. Fish buyers during the summer of 1983 were reportedly paying as little as $.20 per pound for king salmon. As approximately 21 percent of the sampled households in Haines had commercial fishers present in 1983, there was an ample potential source of king salmon in the community. The remaining king salmon harvested in Haines were by means of rod and reel from the saltwater (42.2 percent) or unspecified gear types (4.4 percent). Aside from commercial fishing, rod and reel fishing in saltwater is presently the only legal method of obtaining king salmon in the Haines area, since, as discussed above, the Chilkat River was closed

to subsistence net fishing of king salmon in 1969. As in the commercial drift gill net fishery in the ocean, occasionally king salmon are caught incidentally in subsistence set gill nets on the Chilkat River. These king salmon are normally small, immature fish approximately the size of sockeye salmon which become netted in the sockeye mesh size used in the area. Regulations require that these fish be returned to the River. Many residents find this requirement wasteful, since many fish die in the net after being trapped.

Commercial harvests also accounted for approximately 22 percent of the sockeye salmon taken in 1983 by the Haines households surveyed. Again, the low price offered for commercially caught sockeye salmon in 1983 ($.70 per pound) may have encouraged fishers to use a portion of this salmon within their own households or to share with other local households rather than selling it. Pink, chum, and coho salmon were also retained for non-commercial use, although to a lesser degree.

In the Highway and Klukwan samples, commercial fishers comprised 13 percent and 15 percent of the households surveyed, respectively. Unlike the Haines catch, a relatively smaller percentage of the total salmon catch for the Highway and Klukwan samples came from commercial efforts (Figure 16). This difference between Haines and the Highway and Klukwan samples may be explained in part by the relative proximity of samples to commercial harvesting locations. Since Haines is situated on the ocean, it is relatively convenient and efficient for residents to unload salmon from a commercial vessel and transport it to a nearby home. On the other hand, the Highway and Klukwan samples would need to transport the fish much farther over land. Since the same species of fish can be harvested up the Chilkat River close to their residences, many of the fishers from the Highway and

Klukwan prefer to catch the salmon near their homes where it can be processed in an efficient manner. The lower percentage of commercial fishing households in these samples may also result in a greater portion of the catch being harvested under subsistence fishing permits.

In all samples, it is important to note the large proportion of sockeye salmon harvested compared to the other species of salmon (Figure 16). The relative abundance of this species in part accounts for the prominence. In addition, sockeye salmon is generally the preferred species of salmon because of its taste, texture, and suitability to being preserved for later use. Sockeye were primarily taken with subsistence nets in all three samples (Figure 16).

The unusually high harvest level of chum salmon for the Highway sample is accounted for by two households using a large quantity of dried chums for feeding their dog teams. The remaining quantities in the Klukwan and Haines samples were used for human consumption only.

Across all three samples, coho salmon were harvested primarily with rod and reel. Most of these fish are harvested from side pools along the Chilkat River during the fall shortly after the River turns clear from the decrease of glacial run-off. Rod and reel techniques are preferred by most households over the use of a gill net during the fall, because of the presence of large quantities of chum salmon in the River at this time. These chums would not be targeted but would be netted incidentally. In pre-statehood days, gaff hooks were used to selectively harvest desired salmon.

With the exception of the above mentioned coho fishing, most of the other rod and reel fishing by residents takes place in the saltwater near the community of Haines. Approximately 33 percent of the total salmon har-

vested for home use in Haines came from rod and reel techniques, compared to 14 percent for the Highway sample and 23 percent for Klukwan.

Employment and Harvesting

Figure 21 depicts mean household harvest levels in pounds for salmon and for all resources by household employment type for the entire survey sample. Five types of employment status are contrasted as to mean pounds of salmon harvested per household and mean pounds of other resources harvested per household.

The two most active harvesting groups were the households with part-time, year-round employment and seasonal employment. The seasonally employed group averaged the highest mean number of pounds of all resources harvested, slightly above the part-time employed group. However, the part-time group harvested more salmon on the average.

As previously mentioned, income for the seasonally employed averaged $20,000-$25,000 per year versus the $15,000-$20,000 per year average of the part-time employed. The seasonal and part-time employed also used the widest breadth of resource categories in contrast with the other three employment groups.

The next most successful harvesters of resources by mean pounds harvested was the retired group, whose average annual income range was the same as the unemployed group, but who harvested a larger amount of total resources as well as more salmon. The retired group and the full-time employed group had a similar mean number of resource categories used.

While the average annual gross income was $35,000-$40,000 for the full-time, year-round employed group and $10,000-$15,000 for the unemployed group, their resource harvesting activities and success appear very similar. Their total household harvest as well as salmon harvest are comparable.

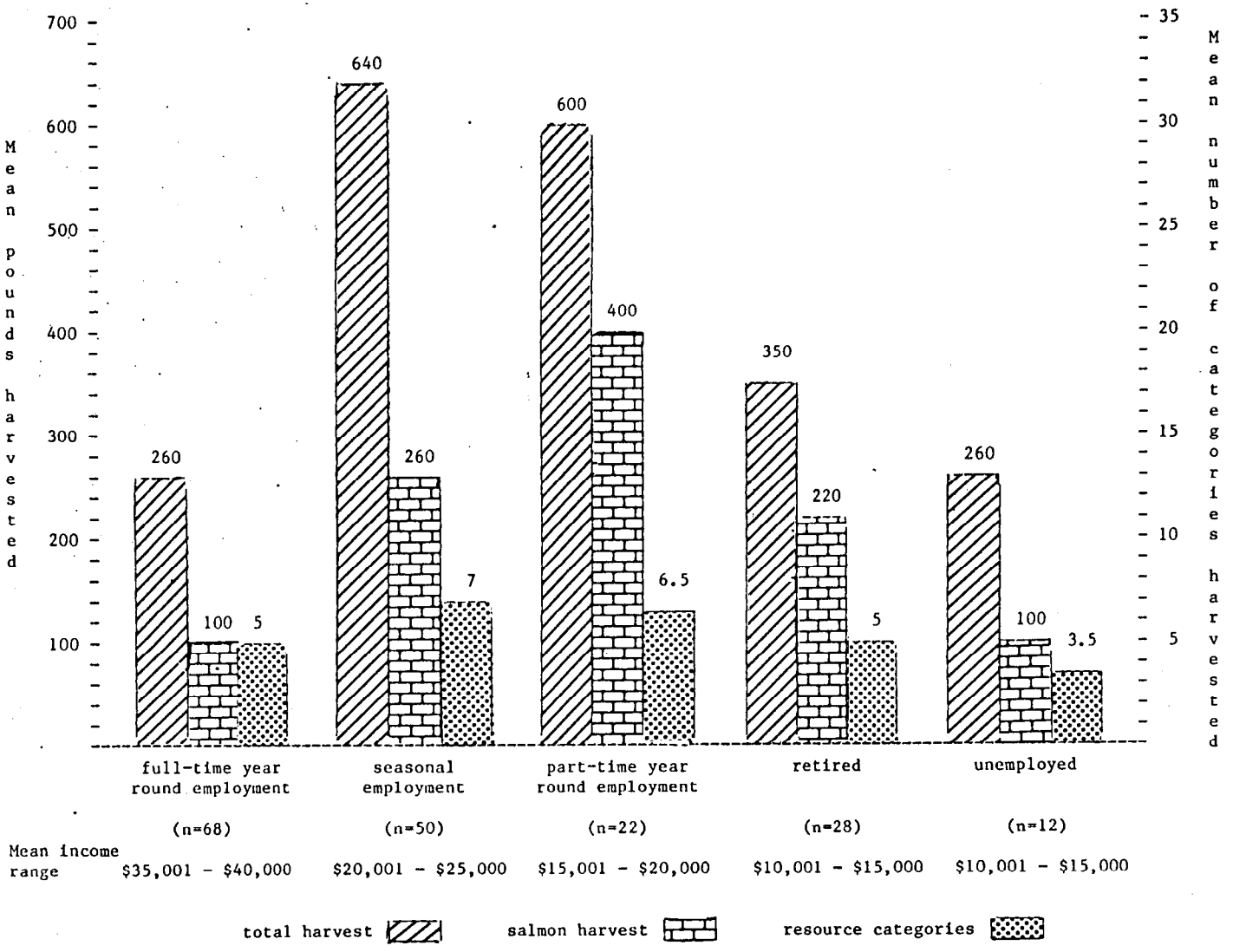

Figure 21. Mean household harvest levels in pounds by employment type and resources category (salmon and total resources), for all sampled households, September 1982 through August 1983.

The unemployed group showed slightly less breadth of resource categories harvested.

Figure 21 may demonstrate the need for both adequate time and monetary income in order to harvest larger quantities and a diversity of resources in the Chilkat and Chilkoot valleys. The part-time employed worked year-round, but only a portion of a normal work week. It is possible that this type of occupation provided these households with an income that could be used to purchase and operate equipment for harvesting resources, as well as time throughout the week to pursue these activities. The seasonally employed group had similar monetary and temporal assets for harvesting resources. This group was employed in full-time, daily work, but only for certain portions of the year. This occupation may have allowed the households, if they desired, to schedule wage employment around resource harvesting activities. The income of seasonal work provided the means to obtain needed equipment and access in order to be successful at harvesting.

The retired group on the average fell into a moderate level of harvesting activity. The retired group theoretically had time available for fishing and hunting. Their more moderate harvest may have been related to a lower average income level compared to the seasonally employed or a general decrease in physical ability to participate as vigorously in harvesting activities. It is interesting to note that the retired group was still found to be more active than the unemployed group, even though they displayed similar gross average annual incomes. The lower productivity of the households with no employed members may have been related to their household composition and other personal circumstances. Households with a full complement of able workers may have had less available time

for harvesting due to family responsibilities. Unemployment may have been related to physical incapacities and other problems which might have decreased participation in fishing and hunting. Also, monetary needs may have been greater for the unemployed household compared to the retired, depending on household composition and the number of dependents present. It is noteworthy that many unemployed households received resources from more active households as a supplement to their own harvesting effort.

The full-time employed may have had a relatively lower harvesting output because of the need to schedule harvesting activities and wage employment. Optimum harvesting times may have conflicted with wage employment hours and therefore fishing and hunting opportunities may have been lost. Holders of full-time occupations also may have come from cultural backgrounds in which fishing and hunting were not traditional activities.

Length of Residency and Harvesting

Figure 22 illustrates the mean household harvest of resources in pounds compared with the length of residency of all sample households. This graph shows an increase in mean pounds harvested as the years of residency in the area increases. The lowest figure of mean pounds harvested is for residents of less than one year. A striking increase is seen for households in the area from 1 to 10 years, another slight rise from 11 to 50 years, and a dramatic upswing for 51 or more years residency.

This trend may be indicative of greater knowledge of resource harvesting techniques, increased familiarity with and knowledge of resource harvest areas, fuller utilization of locally available resources or use of a greater variety of resources, and gradual acquisition of necessary technology. Other factors, such as prior "training" in harvest activities or

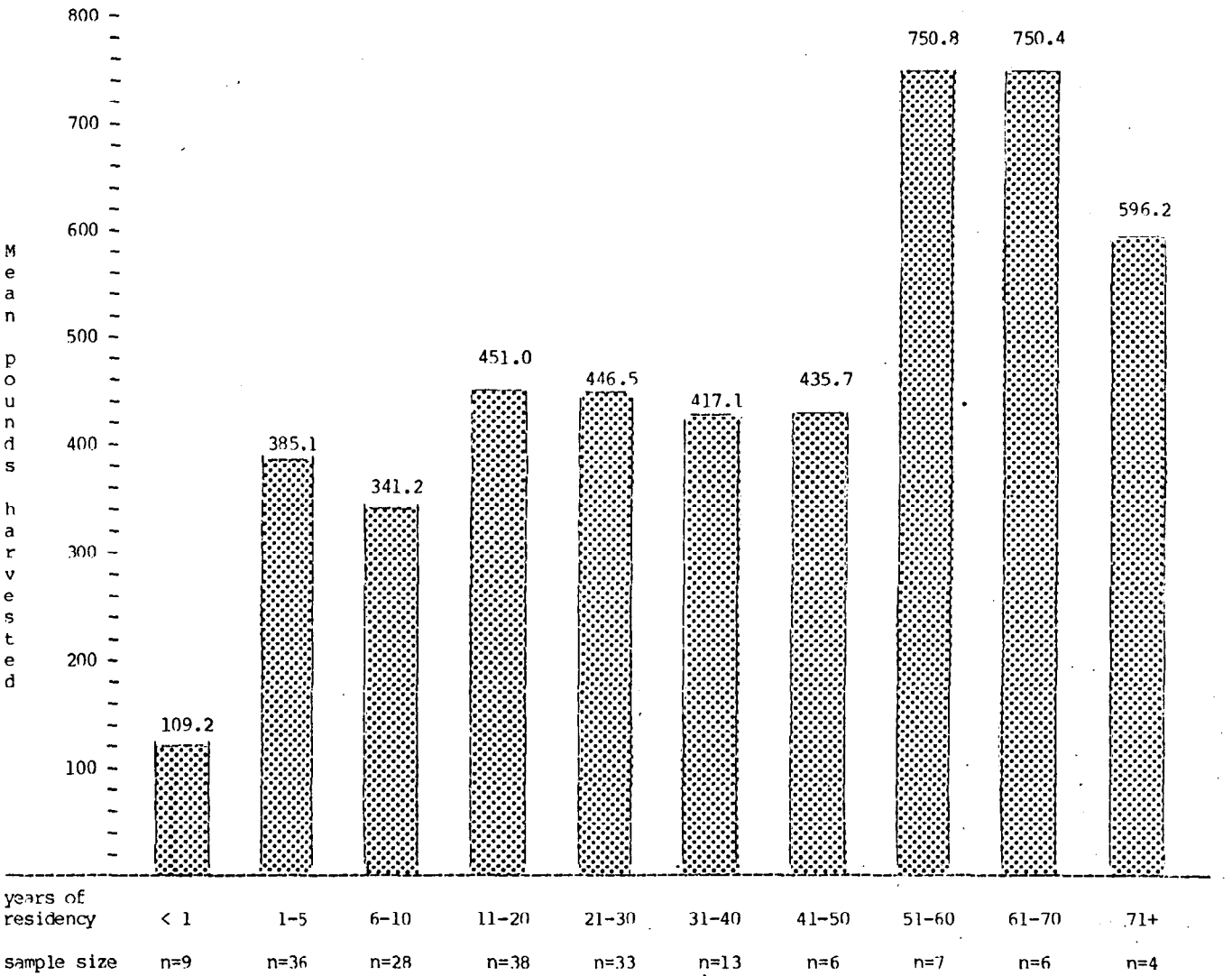

Figure 22. Mean household harvests in pounds by years of residency of the longest permanent resident in each household, all samples (all resources taken September 1982 through August 1983).

distribution of resources, may also account for this relation between residency and harvest levels.

Commercial Fishing and Harvesting

Figure 23 illustrates the greater harvest productivity in all of the selected resource categories by households with commercial fishers versus those without commercial fishers. The average number of pounds harvested for these two groups is illustrated for five different resource categories. On the average, the commercial fishing households harvested over twice the amount of salmon and other fish for domestic use as did the non-commercial fishing households. Although not as dramatic, this same pattern existed for the harvesting of big game, shellfish, marine mammals, and other resource categories.

The fact that commercial fishers had greater access to many fishery resources could explain the differences between the harvest levels of commercial versus non-commercial fishing households. However, this pattern was applicable to resources not harvested commercially. Aside from the increased access to fishery resources, commercial fishers in the area generally fell into the seasonally employed category discussed earlier. This employment pattern coupled with sufficient income may also explain the higher harvest levels of this group. Because of the nature of commercial fishing, many fishers work closely with the natural surroundings, which may provide them with a knowledge of harvestable resources and familiarity of the area that is greater than generally held by non-commercial fishing residents. Commercial fishers in the Haines sample commonly shared portions of their commercial salmon catch with other households and provided a significant portion of salmon used in sample households.

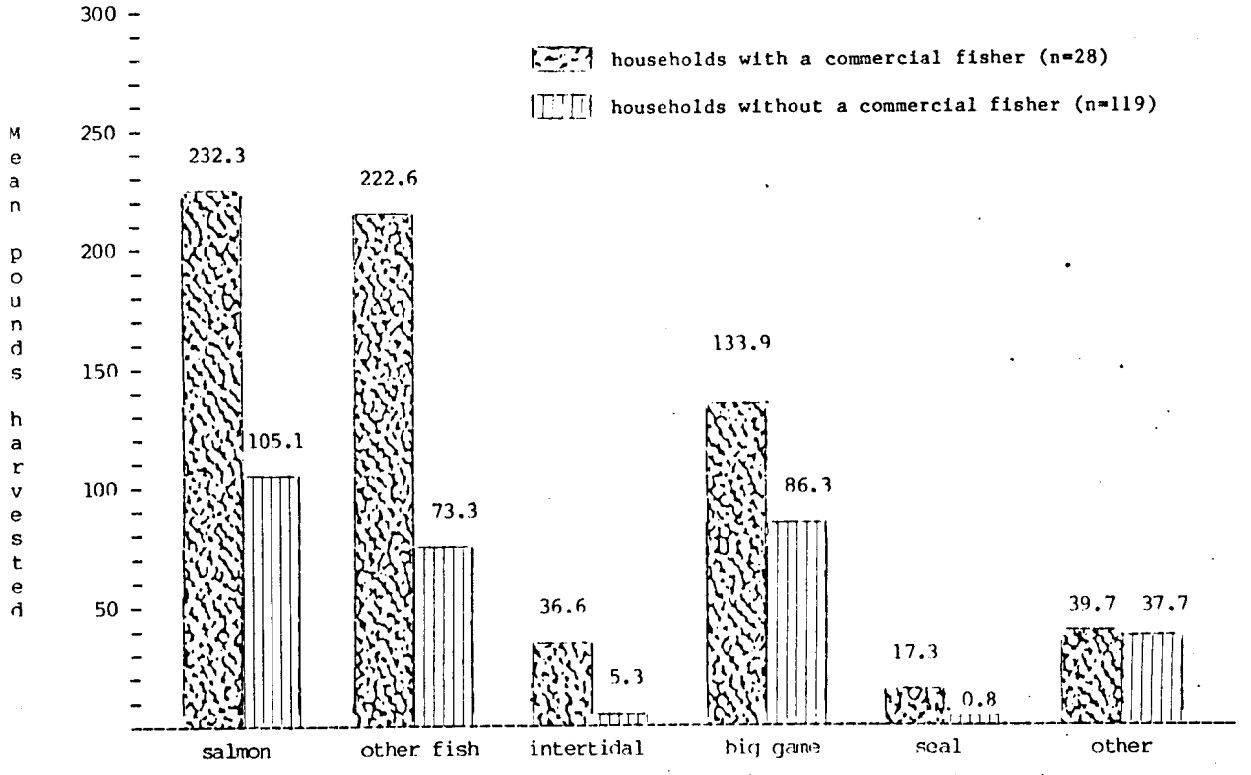

Figure 23. Mean pounds harvested September 1982 through August 1983 by households with and without commercial fishers, by resource category, all samples.

Subsistence Salmon Fishing Households

Figure 24 presents the mean harvest in pounds of selected resource categories harvested by households who participated in subsistence salmon fishing on the Chilkat River in 1983 versus those households who did not. Generally subsistence fishing households harvested a greater variety of resource categories than did the households which did not participate in the fishery. Mean household harvest of salmon for the subsistence fishing group was over six times greater than those households who did not subsistence fish (442.2 to 71.1 pounds respectively). Sockeye salmon comprised the majority of the subsistence catch. The subsistence fishing group also had slightly higher average harvest for most other resource categories. The subsistence fishing group harvested an average of 8.2 resource categories compared to 4.7 categories averaged by the non-subsistence group out of a total of 27 resource categories considered. Also, the subsistence fishing households on the average, harvested almost three times the total quantities of resources than the non-subsistence fishing group (759.2 to 266.1 pounds respectively).

As mentioned previously, households with seasonal or part-time employed members, with flexible schedules and more time for harvesting activities, also had the highest averages in resource production. Of the subsistence fishing households in the sample, 50 percent were either seasonally or part-time employed and only 18 percent held full-time, year-round employment.

A direct relationship was also found between length of residency and quantities of resources harvested. The subsistence fishing group averaged 28.3 years residence in the area, well above the mean for the three samples combined. Households with commercial fishers were also found to have greater success at gathering resources than those without a commercial per-

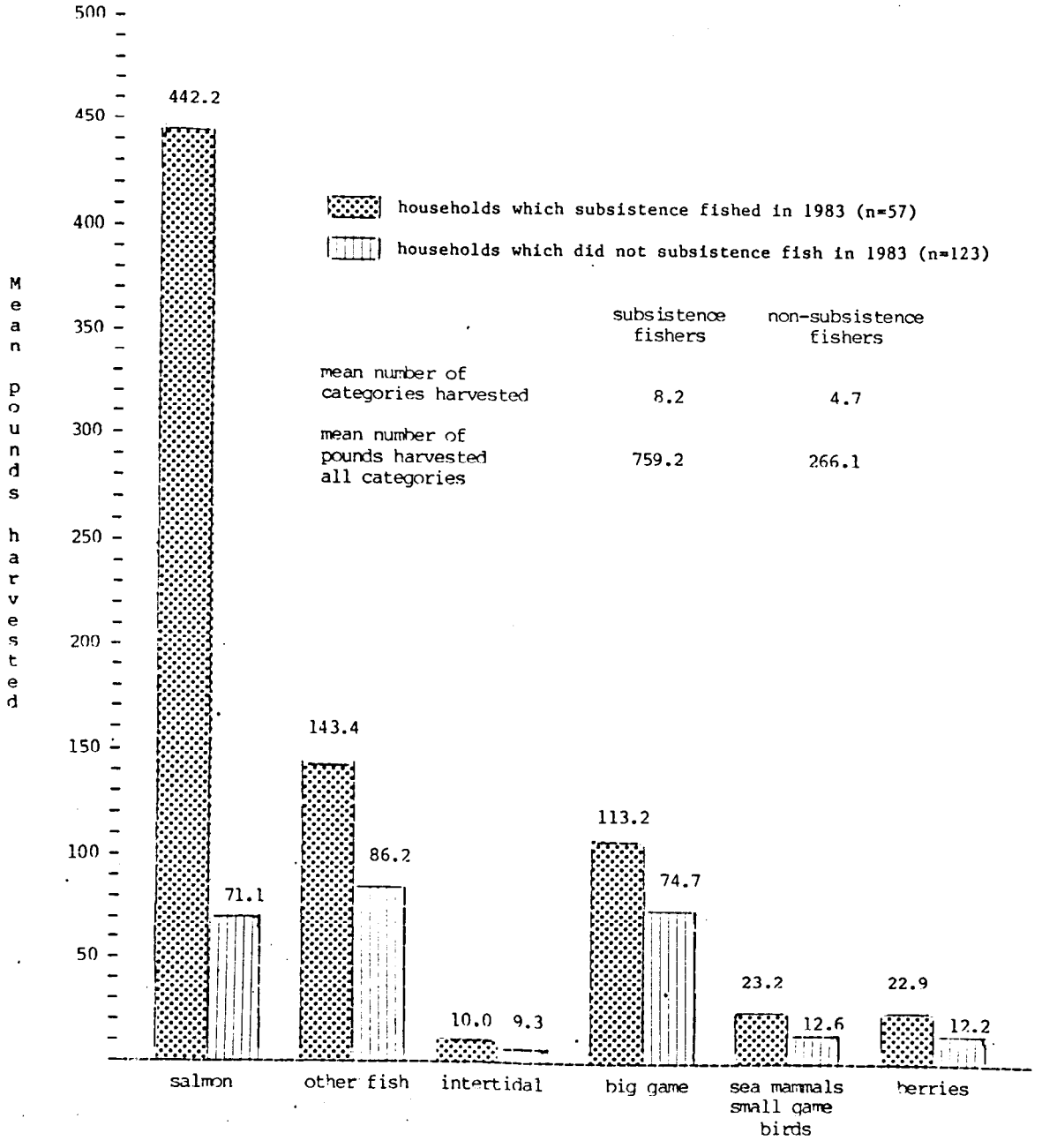

Figure 24. Mean household harvest in pounds of selected resource categories by households which did or did not subsistence fish in 1983.

mit. In the subsistence fishing group, 23.2 percent of the households had commercial fishers present, a greater percentage than any of the three samples (Haines, Highway, and Klukwan). The average annual income for the subsistence fishing group was within the same range as the seasonally employed category ($20,000 to $25,000 per year), the group which averaged the highest total harvest. Thus, it appears that the subsistence fishing households have many of the characteristics which were found to be associated with high levels of resource harvesting in the Haines/Klukwan area.

Figure 25 compares the mean household harvest in pounds by resource category of the subsistence fishing households in the combined Haines and Highway samples with the subsistence fishing households in the Klukwan sample. On the average, the Klukwan subsistence fishing sample harvested approximately 40 percent more salmon than did the combined Haines and Highway samples. However, when comparing all other resource categories harvested, excepting salmon, the Haines-Highway sample harvest was approximately 50 percent greater than that of the Klukwan sample. This may reflect primarily the greater success of the Haines and Highway samples in harvesting big game animals. Also, Haines may have a wider variety of resources available because of its location on the ocean. Out of a list of 27 resource categories, the Haines and Highway sample had an average resource breadth of 8.6 categories, while the Klukwan group used an average of 6.6 categories. The total average household harvest of all resource categories for the Klukwan subsistence fishing household was 804 pounds, 17 percent greater than the 672 pounds recorded for the Haines and Highway group.

Households which participated in subsistence salmon fishing were asked which weeks they fished during the summer and fall of 1983. Figure 26 illustrates the weekly use of the Chilkat River by the Klukwan sample and

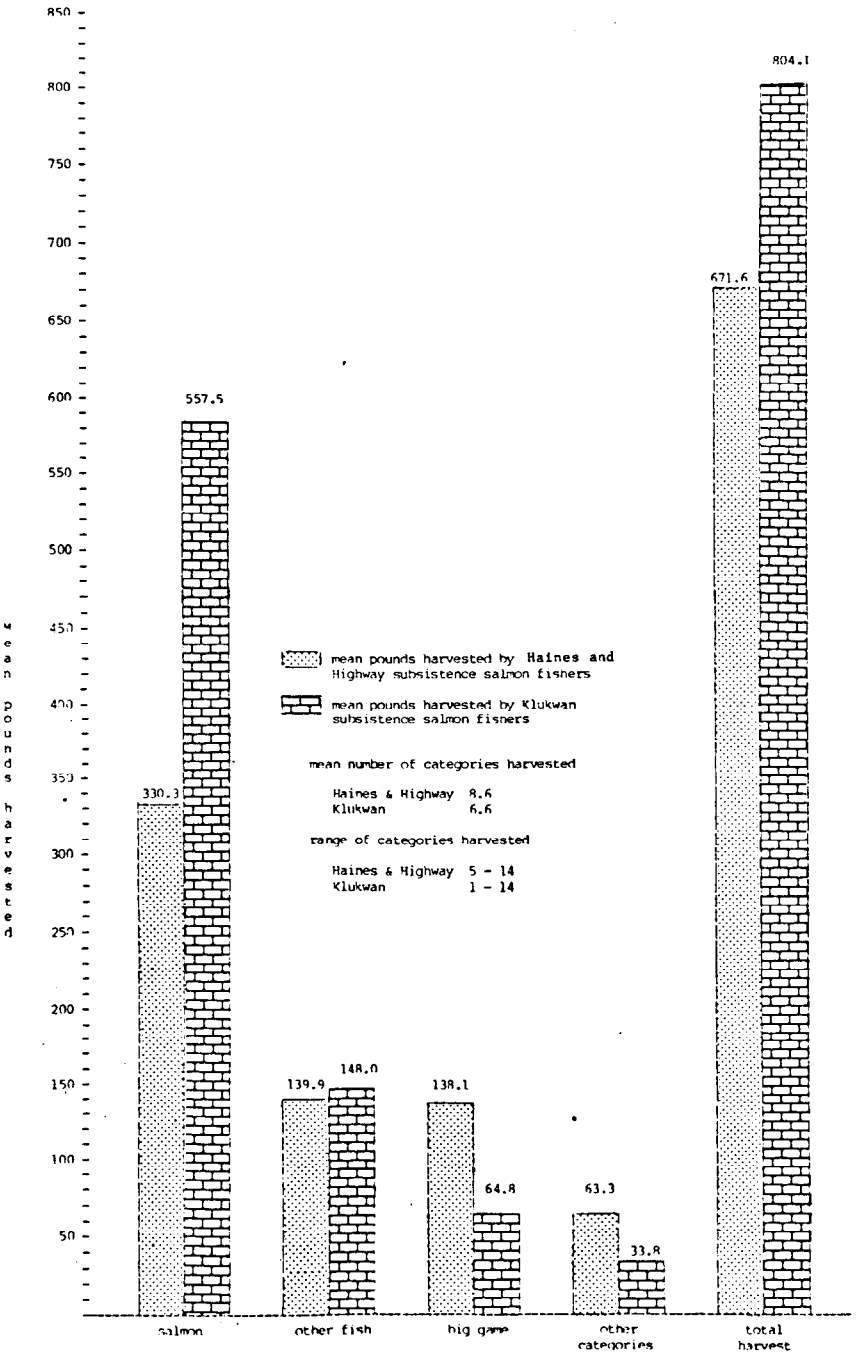

Figure 25. Mean pounds harvested of selected resource categories for subsistence salmon fishing households in the combined Haines-Highway and Klukwan samples.

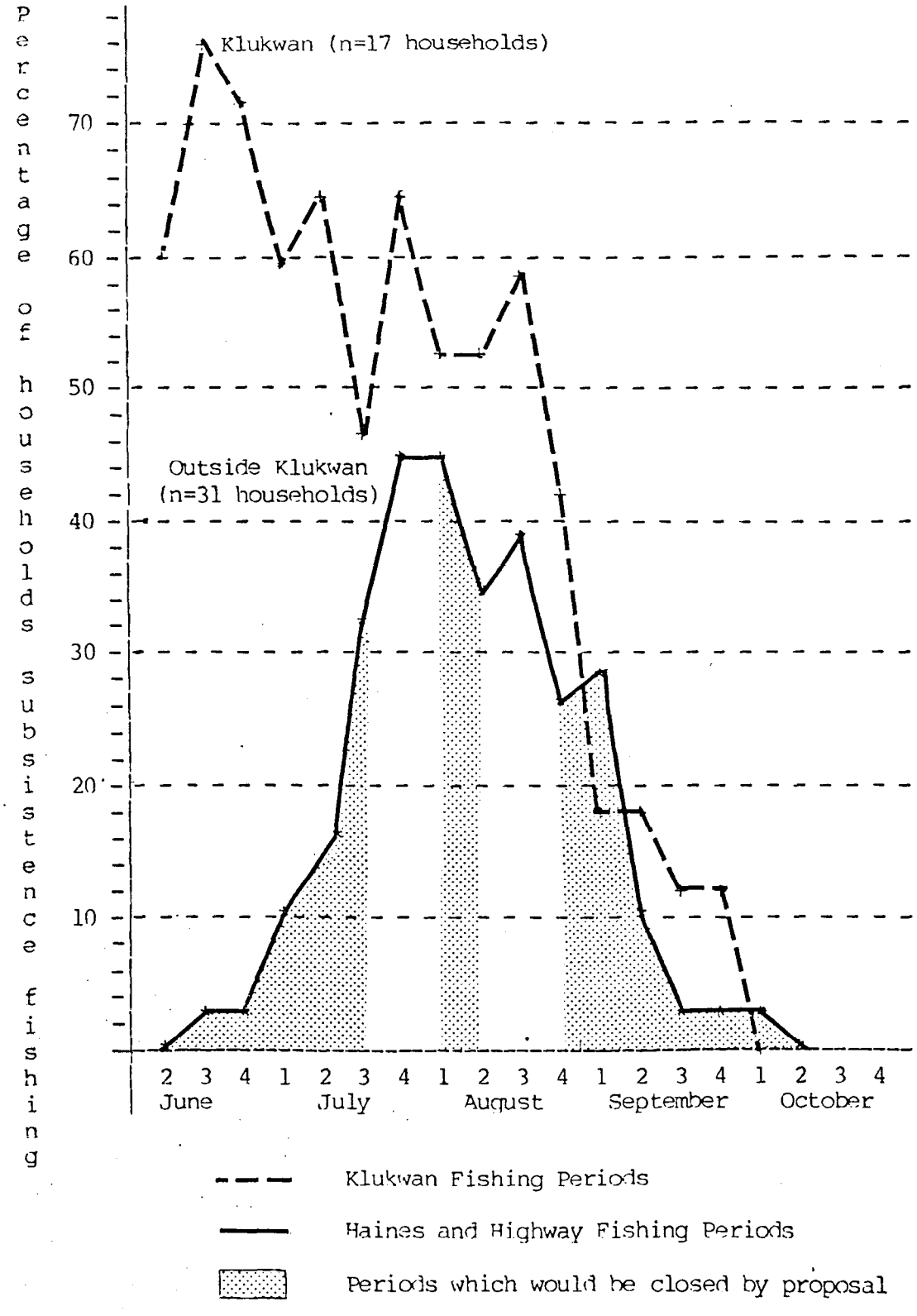

Figure 26. Subsistence net fishing along the Chilkat River by weeks in 1983 by residents of Klukwan and those living outside of Klukwan.

by the combined Haines and Highway samples and indicates the percentage of households actively fishing each week. The Klukwan sample shows an early peak of fishing activity which began in June and gradually tapered off through July and August, dropping sharply in September. The Haines and Highway samples gradually began fishing activities in June and then reached a peak of activity in late July. The percentage of active households then gradually declined through mid-September. Fishing ended at the beginning of October.

The variability that set gill net fishing may have from year to year depending on environmental factors should be considered with this pattern of activity. Occasionally, exceptionally warm summer temperatures can trigger increased glacial melt and runoff, raising the level of the Chilkat River. High waters change or eliminate many of the normal eddy currents used for fishing and also fill the river with floating roots, grass and stumps, which foul and damage gill nets. During these high water periods, fishing is normally discontinued. Present regulations provide an open season throughout the entire summer. In recent years these temporary high water conditions did not appear to detrimentally affect the overall seasonal harvest.

A proposal has been submitted to the Board of Fisheries to limit the subsistence salmon fishing season on the Chilkat River (except for that part of the river adjacent to Klukwan) to two periods, July 17-30 and August 7-21 (Appendix C). The shaded portion of Figure 26 represents the household fishing activity which would have been closed in 1983 had the proposed regulation been in effect. Nearly 50 percent of the fishing activity of Haines and Highway residents during 1983 would have been prevented had the regulation been in effect.

The proposed regulatory change may also have an effect on the location of fishing sites. Figure 27 illustrates the fishing sites used in 1983 by the Haines and Highway sample and the Klukwan sample. It is interesting to note that in 1983, 30 percent of the Haines and Highway sample fished in a portion of the river defined as "adjacent to Klukwan." The closure of the many fishing sites that are used downriver from Klukwan during peak seasons of activity may cause subsistence fishers to compete for the limited number of sites which would remain open to fishing near the village of Klukwan.

CONCLUSIONS

In the three samples studied (Haines, Haines Highway, and Klukwan), a relatively high level of resource gathering activities was found to exist involving a variety of resources. Overall, from September 1982 through August 1983 these three samples harvested an average of 137.6 pounds dressed weight of wild resources per household member. Data collected in this study indicate the harvesting of salmon plays a key role in the overall patterns of local resource use in the Haines, Haines Highway, and Klukwan samples. The following are important conclusions derived from this study.

- Households from Haines, Haines Highway, and Klukwan showed a high percentage of participation in the harvest of both salmon and other fish compared to other resource categories. The percentage of households participating in the harvest of salmon was approximately 61.0 percent for the Haines sample, 60.0 percent for the Haines Highway sample, and 85.0 percent for the Klukwan sample. Salmon was shown to be a significant component of a household's

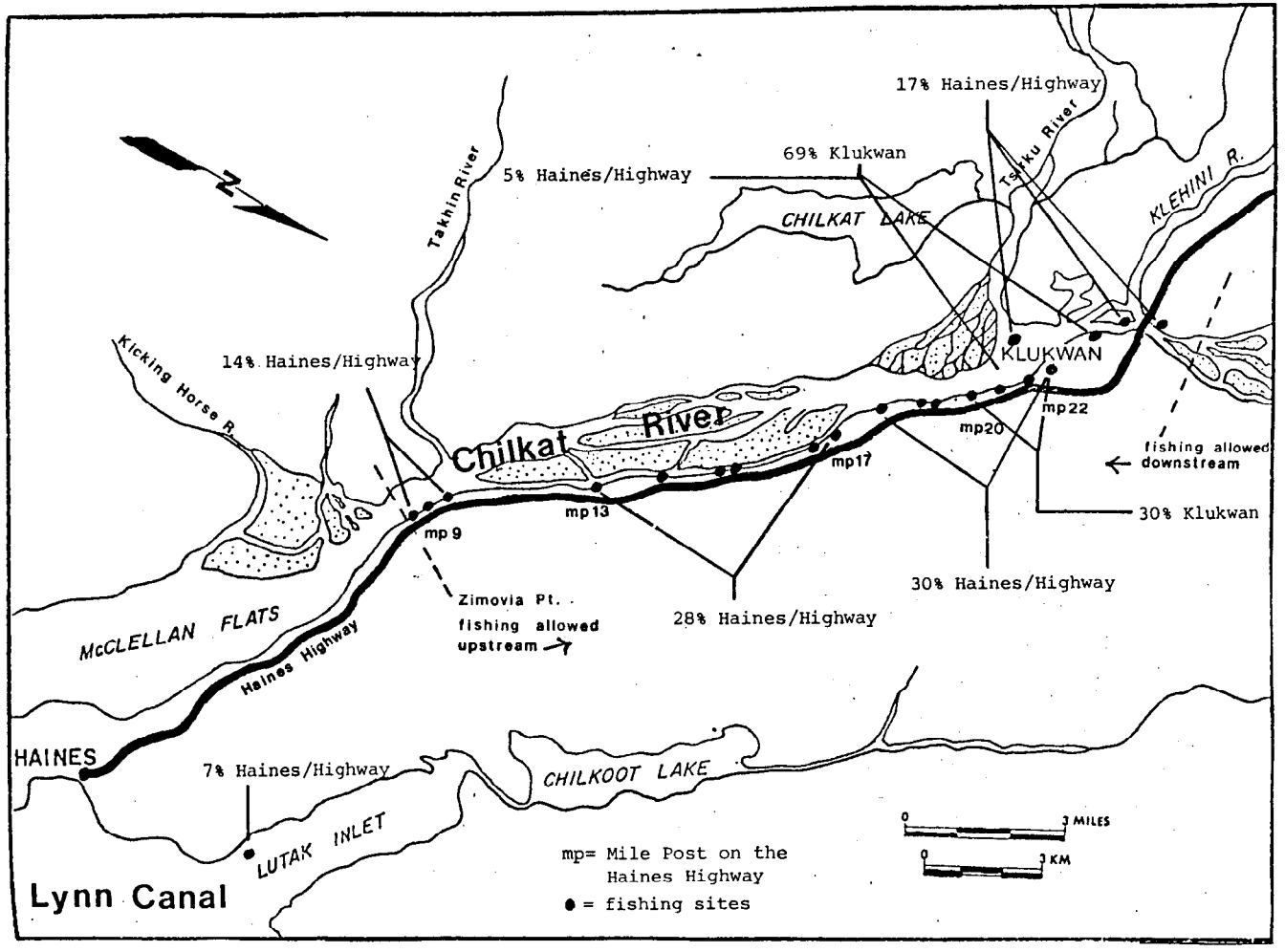

Figure 27: Subsistence net fishing sites for the combined Haines-Highway and Klukwan samples by percentage of harvesters using site, 1983.

total yearly harvest of wild resources, as measured by the mean pounds harvested. In the Haines sample, the mean pounds of salmon harvested was 32.5 percent of the total harvest. Salmon constituted 51.0 percent of the total harvest for the Highway sample and 67.2 percent for the Klukwan salmon.

- King, sockeye, and coho salmon were found to be prominent in distribution patterns. This is shown by the high percentage of households, across samples, that shared or received these resources. For sockeye salmon, about 13 percent of the Haines and Highway sample, and 46 percent of the Klukwan sample, shared this resource. The percentage of households receiving sockeye was about 36 percent for the Haines sample, 27 percent for the Highway sample and 24 percent for the Klukwan sample.

- Sockeye salmon is a preferred species of fish because of its taste, texture, and suitability for smoking, drying, and canning for later use. It is also relatively abundant compared to other salmon species. Sockeye harvest, primarily through subsistence net fishing, is high for all samples relative to the other species of salmon. Sockeye constituted approximately 42 percent of the total number of salmon harvested by the Haines sample, 39 percent of the Highway salmon harvest, and about 64 percent of the Klukwan harvest. A substantial portion of salmon used in Haines households was obtained from commercial catches. Rod and reel fishing for coho salmon, particularly in the Haines and Klukwan samples, is also a source of significant amounts of fish.

- The data suggest that employment type is related to harvest levels. Seasonal and part-time employment in households appear to be related to a high mean harvest (637.4 pounds for seasonally employed and 597.7 pounds for part-time employed) and high harvest breadth (seasonally employed averaged 7.1 categories, part-time employed 6.5 categories). The average income for these employment types ranged from $15,000 to $25,000. Full-time employed and unemployed households had large income differentials, although the mean pounds harvested for each group were similar (258.4 pounds for full-time employed and 249.2 pounds for unemployed). This would suggest that there may be an interplay between income and employment with a significant effect on harvesting, and one of these factors alone is insufficient to determine potential harvest trends.

- The data suggest that length of residency is related to quantities harvested. The greatest harvests occurred within households with a member residing in the Chilkat/Chilkoot area for more than 50 years.

- The data suggest that if a household participates in the commercial fishery, the household harvests larger quantities of resources, perhaps in part related to the seasonality of this activity, greater access to resource harvest areas, access to technology, or increased familiarity with and knowledge of resource harvest areas. Households with commercial fishers had

a mean salmon harvest of about 232.0 pounds compared to an average of about 105.0 pounds for households without a commercial fisher. The mean harvest for other resource categories is also higher for commercial fishing households.

- Households that subsistence fished for salmon showed a higher overall mean harvest of salmon (442 pounds) than households which did not subsistence fish (71 pounds). For all resources, total mean pounds harvested by subsistence fishing households was 759 pounds while households that did not subsistence fish had a total mean harvest of 266 pounds. Subsistence fishing households displayed, to a significant degree, some of the other characteristics that were also found to be associated with high resource harvest. These include length of residency, employment type and income, and presence of a commercial fisher.

- Although Klukwan subsistence fishers harvested a greater amount of salmon than did the Haines and Highway samples combined, the other two samples harvested greater amounts in some other resource categories. For example, with big game harvest, Haines and Highway subsistence fishing households averaged 138.1 pounds compared to 64.8 pounds for Klukwan subsistence fishers.

- Environmental conditions such as the water level of the Chilkat River, timing of the salmon run, and weather have an important effect on the feasibility of subsistence fishing at any given time.

- If fishing periods had been limited to two two-week periods, as outlined in Proposal #3 (Appendix C), the effect during the past

year would have been to eliminate 50 percent of the fishing activity of the Haines and Highway samples. Another possible effect would be the concentration of fishing activities or an increase in competition for fishing sites in the vicinity of Klukwan where 30 percent of Haines and Highway subsistence fishers fished in 1983, since it would remain open throughout the summer and fall.

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Division of Subsistence Haines/Klukwan Survey

Community_____ Household # _____ Date_____ Interviewer _____

(+ - head of household, * - respondent) (Adults) (Adults) (Adults)

House-hold Individ (ID #)	Relation to Head/ Sex	Where did your mother live when you were born?/ Birthdate	Ethn.	Years of Community Residency	Prior Residency Place & Years	Highest Level of Educ 1-20	Cash Employment Past 12 months- Occupation/ FT/PT # months	Wage employ. Yes/ No	Self employ. Yes/ No	Comm. Fish. # of Months	Fish. Part. yes/no/ used to	Hunt. Part.

MEASUREMENTS

Individual Quantities:

Salmon	Crab
Trout	Abalone
Dolly Varden	Octopus
Irish Lords	
Bass	All Mammals
Flounder	and birds
Red Snapper	
Cod	

Volume:

Hooligan - barrels, pit size (square feet)
Hooligan Oil - gallons
Clams - buckets (square feet)
All Plants - quarts, gallons, cans, cases
Sea Urchins - .gallons, bucket
Sea Cucumbers - gallons, bucket
Herring -
Seaweed, wet - sacks dry - quarts, gallons
Gumboots

Poundage:

Halibut (numbers and pounds)
Hooligan (or volume)
Herring Roe on Kelp
Shrimp
Scallops

METHOD OF HARVEST

Fish

CG -	Commercial Gillnet
	Subsistence Gillnet
SGS -	Setnet
SGD -	Driftnet
RR -	Rod and Reel, Line and Hook
DN -	Dip Net
GH -	Gaff Hook
CS -	Commercial Seine
SS -	Subsistence Seine
CT -	Commercial Troll
ST -	Sport Troll
CS -	Commercial Skate
SS -	Subsistence Skate

METHOD OF TRANSPORTATION

Fishing and Hunting:

RB	- River Boat
OB	- Ocean Boat
A	- Airplane
HV	- Highway Vehicle
ORV	- Offroad Vehicle
SM	- Snowmachine
F	- Foot
S	- Ski or Snowshoe
DT	- Dog Team

APPENDIX A (continued)

Non-commercial resource harvest and use

Time period - Sept. 1, 1982 to Aug. 31, 1983

RESOURCE	DID YOUR HOUSEHOLD TRY TO TAKE...? YES/NO	AMOUNT HARVESTED FROM ALL SOURCES - HOME USE	HARVEST METHOD COMM. GEAR/ #	HARVEST METHOD SUBS. GEAR/ #	HARVEST METHOD ROD & REEL/ #	AMOUNT GIVEN AWAY OR TRADED	AMOUNT RECEIVED FROM OTHER HOUSEHOLDS	PART. RESOURCE CATEGORY (YES/NO)	POUNDS RESOURCE CATEGORY
SALMON - KING									
-SOCKEYE									
- PINK									
- CHUM									SALMON:
- COHO									
HALIBUT									
STEELHEAD				XXXXX XXXXX					
RAINBOW				XXXXX XXXXX				TROUT:	
DOLLY VARDEN				XXXXX XXXXX					
HOOLIGAN			XXXXXXX XXXXXXX	XXXXX XXXXX	XXXXXX XXXXXX				
HERRING EGGS ON KELP			XXXXXXX XXXXXXX	XXXXX XXXXX	XXXXXX XXXXXX				
HERRING									
IRISH LORDS			XXXXXXX XXXXXXX	XXXXX XXXXX	XXXXXX XXXXXX				
ROCK FISH			XXXXXXX XXXXXXX	XXXXX XXXXX	XXXXXX XXXXXX				
FLOUNDER			XXXXXXX XXXXXXX	XXXXX XXXXX	XXXXXX XXXXXX				
RED SNAPPER				XXXXX XXXXX					
COD				XXXXX XXXXX					
OTHER FISH								OTHER FISH:	OTHER FISH:
OTHER FISH									

APPENDIX A (continued)

Non-commercial resource harvest and use

Time period - Sept. 1, 1982 to Aug. 31, 1983

RESOURCE	DID YOUR HOUSEHOLD TRY TO TAKE...? YES/NO	AMOUNT HARVESTED FROM ALL SOURCES - HOME USE	HARVEST METHOD COMM. GEAR/ #	HARVEST METHOD NON-COM GEAR/ #	AMOUNT GIVEN AWAY OR TRADED	AMOUNT RECEIVED FROM OTHER HOUSEHOLDS	PART. RESOURCE CATEGORY (YES/NO)	POUNDS RESOURCE CATEGORY
CRAB - KING								
- TANNER							"CRAB"	
-DUNGENESS							_____	
CLAMS - BUTTER			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX				
- COCKLES			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX				
- MUSSELS			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX			"CLAMS"	
-GEODUCKS			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX			_____	
ABALONE			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX			ABALONE	
OCTOPUS			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX			_____	
SHRIMP								
GUMBOOTS - TYPE			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX				
SCALLOPS			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX				
SEA URCHINS			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX			"OTHER SHELLFISH"	
SEA CUCUMBERS			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX			_____	
SEAWEED - TYPE			XXXXXXX XXXXXXX	XXXXXXX XXXXXXX			SEAWEED	
OTHER							_____	
								INTERTIDAL
								_____

APPENDIX A (continued)

Time period - Sept. 1, 1982 to Aug. 31, 1982

RESOURCE	DID YOUR HOUSEHOLD TRY TO TAKE...?	QUANTITY HARVESTED BY HOUSEHOLD	AMOUNT GIVEN AWAY OR TRADED	AMOUNT RECEIVED FROM OTHER HOUSEHOLDS	PART. RESOURCE CATEGORY	POUNDS RESOURCE CATEGORY
MOOSE					_____	
MOUNTAIN GOAT					_____	
DEER						
BLACK BEAR						
BROWN BEAR					FOOD: YES__ NO__	
SHEEP						
CARIBOU					OTHER BIG GAME:	BIG GAME:
OTHER					_____	_____
SEAL					SEA MAMMALS:	
SEA LION					_____	_____

APPENDIX A (continued)

Time period - Sept. 1, 1982 to Aug. 31, 1982

RESOURCE	DID YOUR HH TRY TO TAKE? YES/NO	QUANTITY HARVESTED BY HOUSEHOLD	USED FOR (CHECK) FURS	USED FOR (CHECK) FOOD	AMOUNT GIVEN AWAY OR TRADED	AMOUNT RECEIVED FROM OTHER HOUSEHOLDS	PART. RESOURCE CATEGORY	POUNDS RESOURCE CATEGORY
MARMOT							EDIBLE SMALL GAME	
"RABBIT"								
PORCUPINE								
GROUND SQUIRREL								
BEAVER							_____	
LYNX								
MINK								
MUSKRAT								
MARTEN								
WEASEL								
COYOTE								
WOLF								
WOLVERINE								
FOX							FUR BEARERS:	SMALL GAME:
LAND OTTER								
OTHER							_____	_____

APPENDIX A (continued)

Time period - Sept. 1, 1982 to Aug. 31, 1982

RESOURCE	DID YOUR HOUSEHOLD TRY TO TAKE...?	QUANTITY HARVESTED BY HOUSEHOLD	AMOUNT GIVEN AWAY OR TRADED	AMOUNT RECEIVED FROM OTHER HOUSEHOLDS	PART. RESOURCE CATEGORY	POUNDS RESOURCE CATEGORY
PTARMIGAN - TYPE					GAME BIRDS:	
SPRUCE GROUSE						
GEESE - TYPES					_____	
_____						
_____						
DUCKS - TYPES						
_____						
_____						
CRANES						
LOONS						
CORMORANTS					WATERFOWL:	
OTHER					_____	BIRDS:
BIRD EGGS					_____	_____

APPENDIX A (continued)

Does your household harvest any of the following berry and plant resources?

Berries	Amount In Quarts
Blueberries	
High Bush Cranberries	
Low Bush Cranberries	
Cloudberries	
Elderberries	
Huckleberries	
Nagoonberries	
Raspberries	
Salmonberries	
Smilingberries	
Soapberries	
Strawberries	
Thimbleberries	
Other	

Plants	Check If Harvested
Beach Asparagus	
Chamomile	
Cow Parsnip	
Crabapple	
Dandelion	
Devil's Club	
Ferns	
Fireweed	
Hudson Bay Tea	
Indian Potatoes	
Mint	
Neetles	
Red Clover	
Rosehips	
Swamp Tea	
Wild Celery	
Wild Cucumber	
Wild Rhubarb	
Wild Rice	
Wintercrest	
Yarrow	
Other	

Berries, participation _____

Lbs., berries _____

Other plants, participation _____

Total Resource Categories Harvested (0-26+) _____

Total pounds harvested, All Resources _____

APPENDIX A (continued)

1. Did your household raise a garden in 1983? Yes_____ No_____

2. How many days last year (Sept 1 - Aug 31) did your household spend:

	Number of Days
Hunting	
Non-Commercial Fishing	
Gathering Wild Foods	

3. How many days last year (Sept 1 - Aug 31) did your household spend subsistence net salmon fishing on the Chilkat River? _____

   If none: Did you have a subsistence fishing permit during that time?
   Yes_____ No_____

4. Weeks fished with net for salmon on the Chilkat River during the past year:

	Week			
Months	1	2	3	4
Sep. 82				
Oct. 82				
Nov. 82				
Dec. 82				
Jan. 83				
Feb. 83				
Mar. 83				
Apr. 83				
May 83				
June 83				
July 83				
Aug. 83				

5. Last year, where did you fish for salmon along the Chilkat River? (Refer to map)

_____

_____

Where have members of your household fished for subsistence salmon along the Chilkat River drainage in their lifetimes?

_____

_____

6. How many years has your household fished for subsistence salmon on the Chilkat River (longest in household)?

_____

7. Before the Chilkoot River was closed to subsistence fishing, did you fish for salmon by means other than rod and reel along the Chilkoot River?

Yes _____ No _____

Where were you living at that time? _____

Did you have a camp near the Chilkoot? Yes _____ No _____

Type of gear used. Set Net _____ Gaff _____ Dip Net _____ Other _____

Species taken: Sockeye_____ Chum_____ Coho_____ Pink_____
Hooligan_____ Other_____

Where did you fish after it closed? Why? _____

_____

8. During the last year, what percent of your salmon catch was prepared or stored in the following ways:

Used fresh _____% Canned or jarred _____% Salted _____%

Frozen _____% Dried _____% Other _____%

Smoked _____% Fermented _____%

9. In the past year, did your household get enough salmon?

Yes_____ No_____

If not, why?

No fish	_____	Too expensive	_____
Regulations	_____	Lack of Time	_____
Too old	_____	Lack of Equipment	_____
Bad Health	_____	No Luck	_____
Other	_____		

10. If you hunted moose within the past year, what methods of transportation did you use?

_____

_____

11. Does your household own any of the following? How many? Do you have access? (Do you use someone else's? - A)

Boats (indicate sizes)	_____	Airplane	_____	Dog Team	_____
	_____	Snow machine	_____	Pack Animals	_____
Motor (HP)	_____	Rifle/Shotgun	_____	Hooligan pit	_____
Skiff	_____	Gillnets	_____	Freezer	_____
ATV (off road)	_____	(mesh & size)	_____	Smokehouse	_____
				Drying racks	_____

12. During the past year, have you given or traded food to households in any of the following places? How many?

	Klukwan		Haines		Juneau		Other[1]	
Resource	Given to	Received from	Given to	Received from	Given to	Received from	Given to	Received from
Fish								
Game								
Furs								
Berries/ Plants								

[1]Specify_____

_____

_____

13. Annual household gross income range: (circle)

0	$20,001-25,000	$45,001-50,000	$70,001-75,000
$1-5,000	$25,001-30,000	$50,001-55,000	$75,001-80,000
$5,001-10,000	$30,001-35,000	$55,001-60,000	$85,001-90,000
$10,001-15,000	$35,001-40,000	$60,001-65,000	$90,001-95,000
$15,001-20,000	$40,001-45,000	$65,001-70,000	$95,001-100,000
			over $100,000

14. Is there any other information that you feel is important for us to know?

15. In your own words, what is the importance of hunting, fishing, and gathering to you and your household?

APPENDIX B

CONVERSION FACTORS FOR DETERMINING USEABLE WEIGHTS OF VARIOUS RESOURCES

Fish	Usable Weight	Source
King Salmon	11.2 lbs.	ADF&G[1]
Jack Salmon (King)	6.0 lbs.	
Sockeye Salmon	6.0 lbs.	ADF&G[1]
Pink Salmon	2.8 lbs.	ADF&G[1]
Chum Salmon	9.0 lbs.	ADF&G[1]
Coho Salmon	7.0 lbs.	ADF&G[1]
Jack Salmon (Coho)	1.0 lbs.	
Halibut	25.0 lbs.	Researcher estimate
Steelhead	6.0 lbs.	Researcher estimate
Rainbow Trout	1.0 lbs.	Behnke (1982)
Dolly Varden	1.4 lbs.	Researcher estimate
Hooligan, (Eulachon), whole	0.7 lbs.	Stratton (1983)
oil conversion	0.07 lbs.	
tub = 20 gallons	80.0 lbs.	
Herring Eggs on Kelp	1.0 lbs.	Researcher estimate
1 quart	1.0 lbs.	Researcher estimate
1 gallon	4.0 lbs.	Researcher estimate
1 plastic bag	10.0 lbs.	Researcher estimate
Herring	0.4 lbs.	Wolfe (1981)
Irish Lords	1.0 lbs.	K.A.N.A. (1983)
Rockfish	1.0 lbs.	K.A.N.A. (1983)
Flounder	1.0 lbs.	K.A.N.A. (1983)
Red Snapper	2.0 lbs.	K.A.N.A. (1983)
Cod	2.0 lbs.	K.A.N.A. (1983)

[1] Ray Staska, Division of Commercial Fisheries, Alaska Department of Fish and Game.

APPENDIX B (continued)

Fish	Usable Weight	Source
Cutthroat Trout	1.4 lbs.	Behnke (1982)
Whitefish	0.9 lbs.	Stratton (1983)
Grayling	0.7 lbs.	Behnke (1982)
Lake Trout	2.0 lbs.	Stratton (1983)
Large Mammals		
Moose	400.0 lbs.	Researcher estimate
Mountain Goat	55.0 lbs.	Researcher estimate
Deer	80.0 lbs.	Researcher estimate
Black Bear	150.0 lbs.	Behnke (1982)
Brown Bear	420.0 lbs.	ADF&G[2]
Sheep	65.0 lbs.	Stratton (1983)
Caribou	130.0 lbs.	Stratton (1983)
Elk	800.0 lbs.	ADF&G[2]
Seal	45.0 lbs.	K.A.N.A. (1983)
Coyote	20.0 lbs.	Researcher estimate
Small Mammals		
Squirrel	0.5 lbs.	Researcher estimate
Muskrat	2.4 lbs.	ADF&G[2]
Marmot	1.5 lbs.	ADF&G[2]
"Rabbit" (Hare)	1.5 lbs.	Stratton (1983)
Porcupine	4.5 lbs.	Stratton (1983)
Beaver	15.0 lbs.	Wolfe (1979)
Lynx	4.0 lbs.	Stratton (1983)

[2] Wildlife Notebook Series, Alaska Department of Fish and Game.

APPENDIX B (continued)

Fowl		
Ptarmigan	0.7 lbs.	Behnke (1982)
Spruce Grouse	0.7 lbs.	Behnke (1982)
Geese	8.0 lbs.	Researcher estimate
Ducks	1.5 lbs.	Behnke (1982)
Bird Eggs	0.05 lbs.	Wolfe (1981)
Crane	5.0 lbs.	Researcher estimate
Plant Resources		
Berries, 1 quart	1.0 lbs.	Stratton (1983)
Intertidal Species		
King Crab	2.3 lbs.	Stratton (1983)
Tanner Crab	1.6 lbs.	Stratton (1983)
Dungeness Crab	0.7 lbs.	Stratton (1983)
Butter Clams	0.13 lbs.	Stratton (1983)
Cockles	1 bucket = 2 lbs.	Researcher estimate
Mussels	5 gallon bucket = 5 lbs.	Researcher estimate
Octopus	10.0 lbs.	K.A.N.A. (1983)
Gumboots	5.0 lbs. = 5 gallon bucket	K.A.N.A. (1983)
Sea Urchins	5.0 lbs. = 5 gallon bucket	K.A.N.A. (1983)
Seaweed	1 gallon = 8 oz., dried	Researcher estimate

APPENDIX C

FISHERIES PROPOSAL #3

Subsistence proposal #3 before the Alaska Board of Fisheries
February 1 - 5, 1984
Juneau, Alaska

SOUTHEASTERN ALASKA AREA
SUBSISTENCE

3) Set a subsistence salmon fishing season for the Chilkat River, except for that part of the river adjacent to Klukwan. The recommended season is July 17 through July 30 and August 7 through 21.

JUSTIFICATION

To facilitate safe escapement of kings in the Chilkat and lower the pressure on the depressed early sockeye runs.

Proposed by: Upper Lynn Canal Advisory Committee (102, 103)