Patterns and Trends in the Subsistence Salmon Fishery of the Upper Copper River, Alaska

by

William E. Simeone and James A. Fall

Division of Subsistence
Alaska Department of Fish and Game

In collaboration with
Copper River Native Association
Cheesh'Na Tribal Council
Chitina Tribal Council

Prepared for the U.S. Fish and Wildlife Service
Agreement No. 7018101296
Project No. FIS 00-40

Alaska Department of Fish and Game
Division of Subsistence
333 Raspberry Road
Anchorage, Alaska 99518
August 2003

ADA PUBLICATIONS STATEMENT

The Alaska Department of Fish and Game operates all of its public programs and activities free from discrimination on the basis of sex, color, race, religion, national origin, age, marital status, pregnancy, parenthood, or disability. For information on alternative formats available for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD) 1-800-478-3548 or (fax) 907-586-6595. Any person who believes she or he has been discriminated against should write to: Alaska Department of Fish and Game, PO Box 25526, Juneau, AK 99802-5526; or, O.E.O., U.S. Department of the Interior, Washington, D.C. 20240.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I
INTRODUCTION

This is part two of a report on the investigation of the Copper River subsistence salmon fishery. Part one provided information on the traditional knowledge and salmon fishing practices of the Ahtna of the Copper River Basin (Simeone and Kari 2002). Part two consists of an update of information about the Upper Copper River subsistence and personal use fisheries based on recent harvest and permit data. This report also includes the results of a survey conducted in 2000 designed to update information related to customary and traditional use of salmon in the Glennallen and Chitina subdistricts of the upper Copper River (Fig. 1-1). Previous descriptions of this fishery by the Alaska Department of Fish and Game (ADF&G), Division of Subsistence include Stratton (1982), Fall and Stratton (1984), and Simeone and Fall (1996).

The Copper River flows out of the Wrangell Mountains 250 miles to the Gulf of Alaska (see Fig. 1-1). Its extensive network of tributaries and lakes are the spawning grounds for three species of salmon. Of these, the most numerous are sockeye salmon *(Oncorhynchus nerka)* found in all parts of the Copper River ecosystem, except for its extreme western edge. Chinook *(Oncornhynchus tshawytcha),* and coho *(Oncorhynchus kisutch)* salmon are also present. The former can be found throughout much of the Copper River drainage while the latter are not usually present above the mouth of the Tazlina River.

Each species of salmon has been used for subsistence purposes in the Upper Copper River Basin for thousands of years. For the indigenous Ahtna Athabascans, salmon have been critical to their economic and cultural survival since at least 1000 AD (Workman 1976). Over the last 125 years new groups of fishermen have been attracted to the abundant Copper River salmon resource. In 1889 a commercial salmon fishery began at the mouth of the Copper River and has remained a cornerstone of the economy of Cordova to this day. More recently, Alaskans living outside the Copper Basin have participated in subsistence, personal use, and sport fisheries. The growth of these

Figure 1-1. Copper River Drainage, showing the location of the Chitina and Glennallen Subdistricts

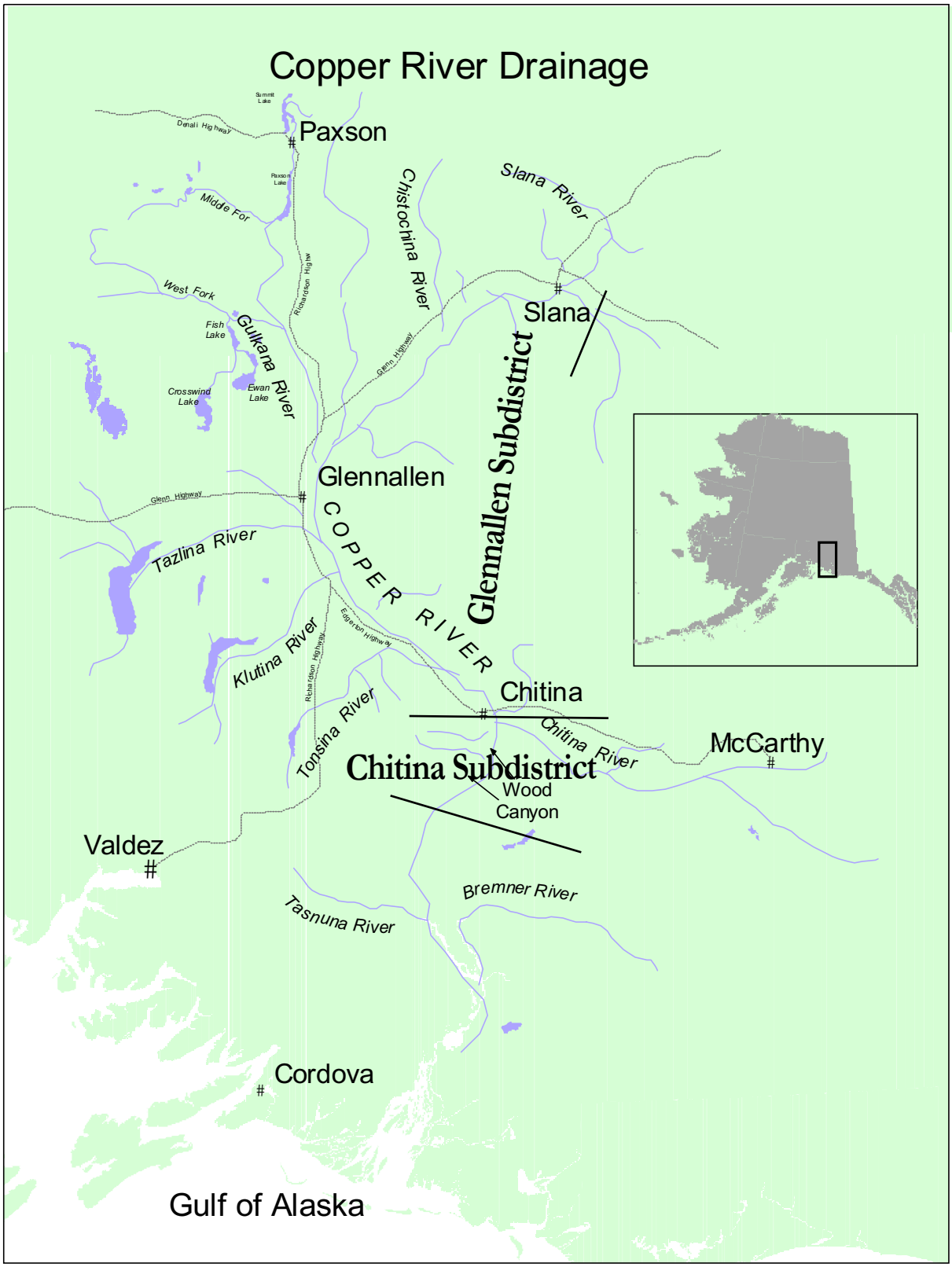


Table 1-1. Population of the Copper River Basin, Adjacent (Road-connected) Areas, and Alaska

Year	Copper River Census Subarea[1]	Anchorage Municipality	Matanuska-Susitna Borough[2]	Fairbanks North Star Borough[3]	Southeast Fairbanks Census Area	Valdez	Alaska
1818	567						
1839	300						
1880	250						33,426
1890	ND						32,052
1900	ND					315	63,592
1910	553		677	7,675		810	64,356
1920	511	1,856	158	2,182		466	55,036
1930	729	2,277	848	3,446		442	59,278
1940	742	3,495	2,354	5,692		529	72,524
1950	808	11,254	3,534	19,409		554	128,643
1960	2,193	54,076	2,320	15,736	605	555	226,167
1970	1,852	124,542	6,509	45,864	4,179	1,005	302,583
1980	2,721	174,431	17,816	53,983	5,676	3,079	401,851
1990	2,763	226,338	39,683	77,720	5,913	4,068	550,043
2000	**3,084**	260,283	59,322	82,840	6,174	4,036	626,932

[1] "Mednovtze" in 1818 and 1830; "Atnah villages" in 1880; no Copper River villages listed for 1890 and 1900; Copper Center District, 1910, 1920: Chitina District 1930, 1940, 1950.
[2] Cook Inlet District (Knik and Susitna) in 1910; Knik, Susitna, and Talkeetna in 1920; Wasilla and Talkeetna Districts, 1930; Palmer, Wasilla, and Talkeetna Districts, 1940 & 1950.
[3] Fairbanks District, 1910 through 1950.

Sources: Rollins 1978, Alaska Department of Labor 1991; US Census Bureau, Census 2000

Figure 1-2. Population of the Copper River Basin, 1818 to 2000

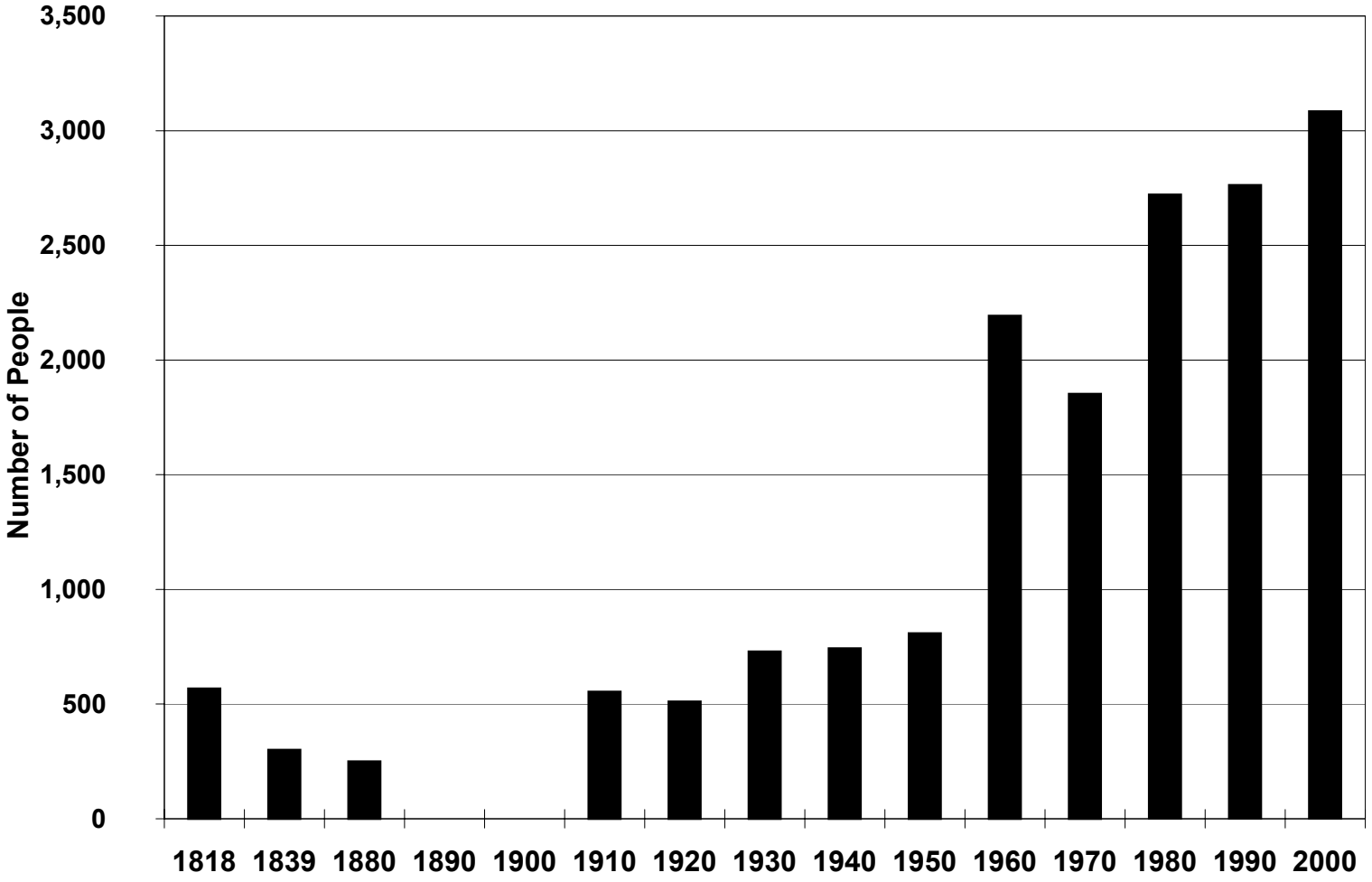


Figure 1-3. Population of Copper River Basin and Adjacent Areas Connected by Road, 1960 - 2000

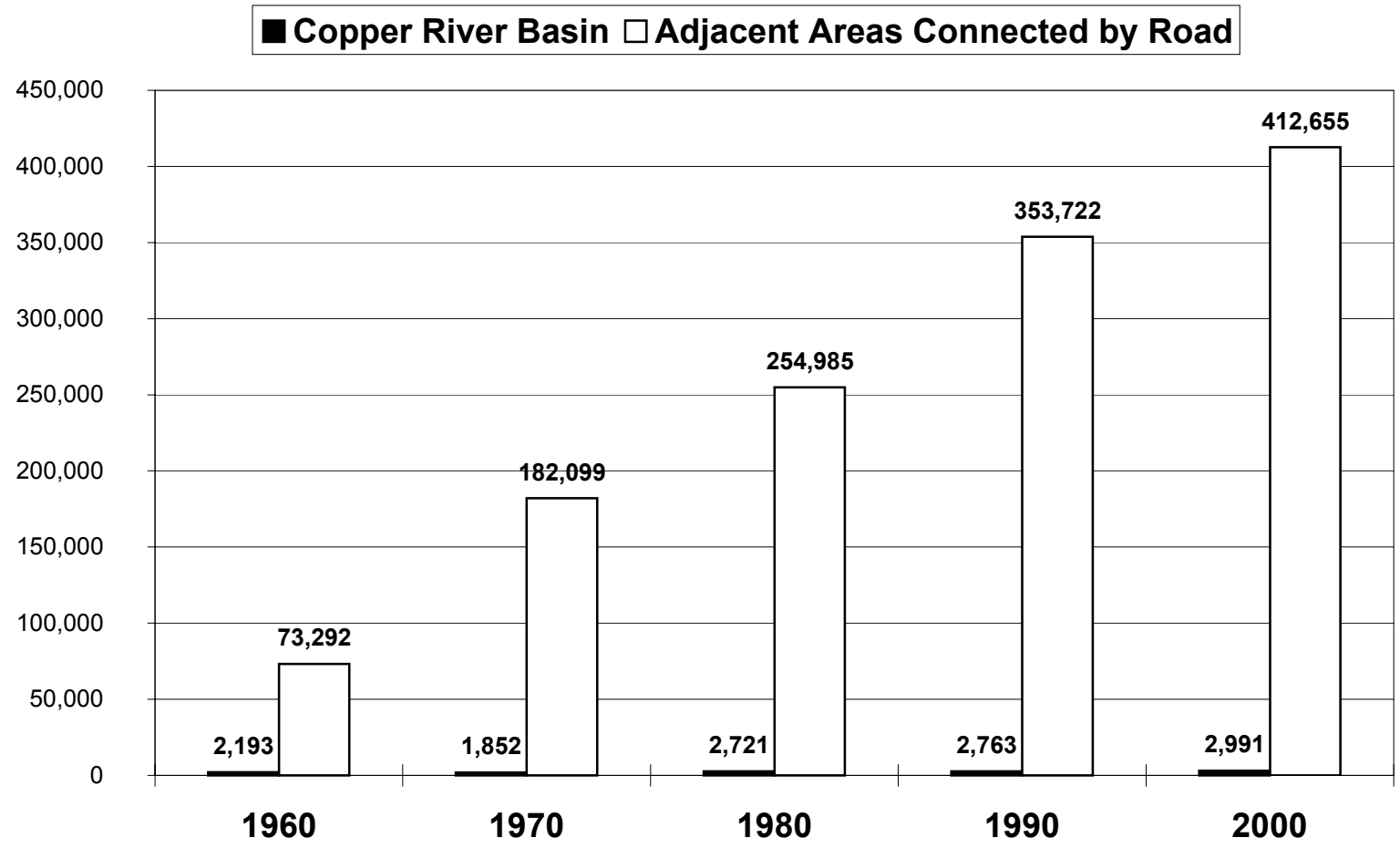
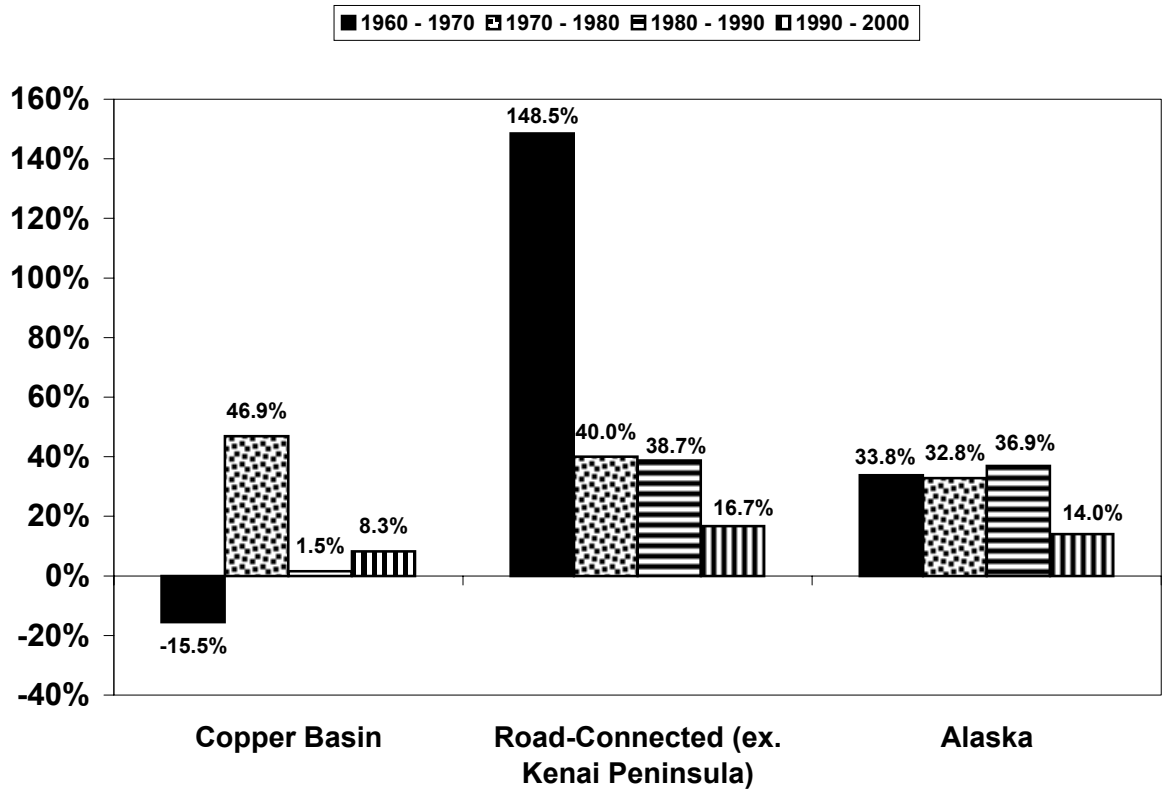


Figure 1-4. Change in Population by Decade, Copper Basin, Selected Road-Connected Areas, and Alaska



fisheries have been facilitated by a road system connecting the Copper River Basin with the population centers of Alaska that have grown far more rapidly than the Copper Basin's communities (Table 1-1, Figure 1-2, Figure 1-3, Figure 1-4). As a result, management of Copper River salmon stocks has been challenged with increasing demand by a diverse set of user groups.

Purpose of the Report

The purpose of this report is to document the current trends and characteristics of the subsistence and personal use salmon fisheries of the Upper Copper River District. This research was supported by a cooperative agreement between the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service, Fisheries Information Service. The research plan contained the following three objectives:

1. Using quantitative and qualitative methods assess the current trends and characteristics of the subsistence fish wheel fishery by describing and analyzing the relationship between fish wheel owners, fish wheel users, and the number of permits issued, document current harvest levels, local observations of abundance, location of effort, and issues of displacement. Topics pertaining to this objective include:
    - The ratio of fish wheels to permits
    - How fish wheel owners regulate the use of their wheels.
    - Describe functioning of fish wheel groups, including demographic composition (age, sex, place of birth, residence, kinship relationships, history of involvement in the fishery)
    - Sharing of harvest within and outside the group
    - Roles each person plays in fishing, processing and disposition of the catch
    - Expenses incurred for a season of fishing by the owners of fish wheels and other users
    - Document and analyze how the current status of property ownership along the Copper River influences access to fishing sites.

2. Document traditional knowledge of the Copper River fishery by interviewing both Ahtna and non-Native elders about their knowledge of salmon, salmon ecology, harvest sites and harvest practices. Topics pertaining to this objective include:
    - Ahtna taxonomy of salmon
    - Ahtna knowledge of the natural history or life cycle of salmon (timing of migrations,spawning areas,)
    - Factors influencing fish migrations (habitat, weather, water temperature)

- Social and cultural significance of salmon
- Historic locations of fishing sites

3. Assess the potential effects of the regulatory reclassification by the Alaska State Board of Fisheries of the personal use dip fishery to a subsistence fishery. Topics pertaining to this objective include:
    - What factors influence people's decisions to participate in the Chitina dipnet fishery?
    - Has the regulatory change influenced participation rates in the new subsistence dipnet fishery? Has the reduction in catch limit of Chinook salmon affected participation and location of effort?
    - Have the regulatory changes affected the abundance of salmon upriver, above the Chitina/McCarthy Bridge? Fishery performance in the subsistence fish wheel fishery will be evaluated using two case studies of specific fishing areas: the Chitina Airport and the village of Gulkana. Interview topics will focus on issues of fish abundance, crowding, the availability of productive fishing sites, and the migration of dipnet fishers into the upriver subsistence fishery.

All of objective two was addressed in the report *Traditional Knowledge and Fishing Practices of the Ahtna of the Copper River*, Alaska submitted in July of 2002. Parts of objectives one and three are addressed in this report. These included the following:

- Current harvest levels
- Local observations of abundance
- Location of effort
- Sharing of the harvest within and outside the group
- Demographics of the fishery,
- Length of participation in the fishery,
- Methods used to prepare the harvest,
- How respondents learned about the fishery,
- Satisfaction with current harvest limits,

Several topics from objective 1 and 3 have not been addressed for the following reasons. First, the traditional knowledge component of the project grew in size and scope and became the primary focus of the research, consuming more time and funding than originally planned for. Second, because of the Alaska Board of Fisheries (BOF) decision in 1999 to reclassify the Chitina dipnet fishery as a subsistence fishery, a need developed to update information about participants in the subsistence fisheries in both the Chitina

and Glennallen subdistricts. Project staff determined that the best way to address this need for new, updated information was by surveying fishery participants.

To assist the BOF in its deliberations about customary and traditional use status and classification of Copper River fisheries, the Subsistence Division in 1999 had presented information organized as a contrast between Basin and non-Basin participants in the fisheries. Information organized in a similar fashion had been presented to the BOF in 1984 when it made the initial decision to classify the dipnet fishery as a personal use fishery. In 1984, the BOF had determined that there was a distinction between the use pattern of the Chitina Subdistrict, characterized by non-local participants, and the Glennallen Subdistrict, the key features of which had been established by local Basin residents and especially by the Ahtna. In 1999, fifteen years after the original finding, the division had no new information to suggest that this contrast no longer held. The Fairbanks-based Chitina Dipnetters Association, on the other hand, argued that since dipnetters had first begun fishing at Chitina 50 years before, they had developed customary and traditional use of the salmon in the Chitina Subdistrict. A majority of BOF members agreed that the use pattern at Chitina was not so different from that in the Glennallen Subdistrict as to warrant different classifications. Almost immediately the BOF's decision was appealed the Ahtna, but was turned down by the BOF on the grounds that there was no new information on which to base a reconsideration. As a result the Subsistence Division decided it was necessary to update information for the BOF and to focus the survey on the eight criteria for customary and traditional use.

Data Sources

The information included in this report is derived from several sources. These include published and unpublished written accounts of the subsistence fishery, such as Bureau of Fisheries reports and records of ADF&G. Since 1960, a permit has been required to participate in the fishery. The existing permit records have been summarized in a series of tables and figures. A database of permit returns for the period 1988-2001 was also utilized. Another source of information was previous research on the fish wheel and dip net fisheries conducted by the division in 1982 (Stratton 1983; Fall and Stratton 1984)

and again in 1995-96 (Simeone and Fall 1996). Further information was available from two rounds of systematic household surveys administered in 1984 and 1988 (Stratton and Georgette 1984; McMillan and Cuccarese 1988, Scott et al. 2001). Besides using extant data, the principal investigator, with the assistance of Stan Bloom of the Chitina Dipnetters Association, interviewed five long-term participants in the dipnet fishery. These interviews took place in Fairbanks and were recorded on both audio and videotape. The interviews provided details on the beginnings of the modern dipnet fishery at Chitina.

Additional information was collected by the division in a new survey conducted in the summer of 2000 in connection with this study and described in detail in Chapter III of this report. The survey instrument consisted of 36[1] questions; most required forced answer responses (see Appendix A).[2] The questions were designed to elicit information concerning the eight criteria for determining customary and traditional use. They included the number of years people have fished, months fished, types of gear used, preparation of the catch, sharing, and transmission of knowledge. Employment characteristics, and opinions about the harvest, and changes in the quality of salmon were also examined.

To identify a pattern of use based on the eight criteria it is necessary to describe how particular groups of people use a stock of fish or game population. Groups and communities establish patterns of use through their activities and carry on the traditional use of a stock or population over time (Fall 1999). The pattern in the Glennallen Subdistrict was established by Ahtna Athabascans at the beginning of the 20th and subsequently adopted by many local non-Native Basin residents. This pattern was characterized by long-term use of salmon by local residents of the Copper Basin; the efficient use of fish wheels operated at traditional sites near people's homes, engaged in by kinship groups who taught skills and values to young family members, and fit into a

[1] An additional question (8A1) was added to survey after the survey was printed. This question was about employment type. Of the 509 people interviewed, 362 (64 percent) answered this question.
[2] A 'forced answer' is when the respondent is provided with a specific set of potential answers to a question.

local mixed subsistence/cash economy featuring use of a wide variety use of the Copper Basin's wild resources.

Respondents were selected because of their active participation in the fishery. There was no attempt to obtain a random sample of any group but those interviewed were assumed to be representative of all active fishers. Non-basin fishermen were selected opportunistically and interviewed while on the fishing grounds. Interviews with all non-locals took place in the Chitina Subdistrict or at sites located just above the Chitina McCarthy Bridge.

Sandy Scotten, a local Basin resident, interviewed non-Native fishers while staff members of the three Ahtna organizations collaborating in the project, conducted interviews with tribal members involved in the subsistence fishery. Ahtna fishers were chosen from tribal lists and a local assistant interviewed them in their homes. Selection of other local fishermen was based on knowledge of the local assistants. To avoid biasing results surveys were conducted on various days of the week and in different weather conditions.

CHAPTER II
HISTORICAL OVERVIEW OF THE UPPER COPPER RIVER SUBSISTENCE FISHERY

The Ahtna Salmon Fishery[1]

The Ahtna are the earliest known residents of the Copper River Basin. Historically their economy was based on hunting, fishing, and gathering. In the fall and winter Ahtna hunted big and small game and fished for resident species of fish, such as whitefish and grayling. But it was the great summer runs of salmon that provided the critical mass of protein and staples of dried fish and oil for the Ahtna villages. Of the three species of salmon that spawn within the Copper River drainage, sockeye salmon (*Oncorhynchus nerka*) were the most critical to the Ahtna (Simeone and Kari 2002).

The arrival of the salmon signaled the beginning of the Ahtna yearly cycle. Spring was the most difficult time of the year because stocks of dried salmon were often depleted and poor traveling conditions made it difficult to hunt for big game. Beginning in mid-May Ahtna congregated at fish camps along the Copper River and its major tributaries: the Chitina, Tonsina, Klutina, Tazlina, Gulkana, Chistochina, and Slana rivers. There were also fish camps along smaller tributaries like Mendeltna and Suslota creeks. Fish camps were also located at particular lake outlets such as those of Tazlina and Suslota lakes (Table 2-1).

Nineteenth century Ahtna fishing technology varied with location and environmental conditions. Because of the strong current in the main stem of the Copper River, Ahtna fished with long handled dip nets. Fishers stood on rock outcroppings that extended into the river or on platforms built out over the water. In the slower moving tributaries, Ahtna built long funnel-shaped traps, which they lodged in a system of weirs that temporarily blocked the salmon from swimming upstream. Salmon were also taken in lakes during the winter with hook and line through holes chopped in the ice (de Laguna and McClellan 1981).

[1] Since part one of this report provided a full description of Ahtna traditional knowledge and salmon harvesting practices, only a brief summary will be provided here. Information for this section comes from interviews conducted with Ahtna elders by division and CRNA staff, and an overview of Ahtna ethnography by de Laguna and McClellan (1981).

Table 2-1. Historic Ahtna Salmon Fishing Sites in the Copper River Basin

Location	Ahtna Name	Type of Fishing	Approximate Dates of Use
Eskilida Creek	"dry - berries mouth	summer fishing	1800s
Tenas Creek	"spring water flows down"	summer fishing	1800s
Taral	"dike in water"	summer fishing	1800s-1911
Susie Lake	Tah-klez-kah		1800s
Tebay Lakes	"winter salmon lake"	winter fishing	1800s
Lakina River at the outlet of Long lake	"spawning place"	summer fishing	1800s
Mouth of the Kotsina River	cold mouth"	summer fishing	1800s to 1970s
Fivemile Creek (Chitina airport)	"where-things-happen-again"	summer fishing	1800s to the present time
Horse Creek (old village site)	"where fish run up"	summer fishing	1800s-1928
Mouth of Liberty Creek	"splintered-rock mouth"	summer fishing	1800s
Mouth of the Tonsina River	"sprucebark-boat mouth"	summer fishing	1800s-1950s
Tonsina Lake	"sprucebark-boat lake	winter and summer fishing	1800s-1930
Above the mouth of Chetaslina River	"sweet-gale mouth"	summer fishing	1800s
Vicinty of the mouth of Nadina River	"upriver river"	summer fishing	1800s
Opposite the mouth of Nadina River	"handyman's father's camp"	summer fishing	1800
Opposite the mouth of Klutina River	"fish-run creek'	dip fishing for salmon	1800s-1950
Klutina Lake outlet	"headwaters-lake outlet"	fish traps, spearing salmon	1800s
Klutina Lake	"headwaters lake"	winter fishing	1800s
Mouth of Klutina River	"headwaters mouth"	summer fishing	1800s-present
Hudson Lake	"beneath (mountains) lake"	winter fishing	1800s - 1900s
Outlet of Tazlina Lake	"flows-to-lake lake outlet"	salmon traps, spearing	1800s
Mendeltna Creek	"flows-to-lake lake creek"	summer fishing	1800s-1950s
Mouth of Kaina Creek	"ridge mouth'	summer fishing	
Sanford River	"flows straight fish"	summer fishing	1800s-1900s
Tuslona Creek	"yellow water fish"	summer fishing	1800s
Caribou Creek		summer fishing	1800s
Creek south of Boulder Creek	"fish of water flows against a place"	summer fishing	1800s
Boulder Creek	"rough rock fish"	summer fishing	1800s
Sinona Creek	"brushy fish"	summer fishing	1800s-early 1900s
Mouth, east fork Chistochina River	"waterfall creek"	summer fishing	1800s-1990s
Indian River	"fish swim in (river) fish"	summer fishing	1800s
Creek north of Boulder Creek	"moldy rock fish"	summer fishing	1800s
Creek south of Drop Creek	"king slamon fish"	summer fishing	1800s
Upper Copper River and Copper Lake	"rarely mentioned fish"	summer fishing	1800s-early 1900s
Tanada Creek (Batzulnetas)	"roasted salmon fish"	summer fishing	1800s-1990s
Ahtell Creek		summer fishing	1800s
Rufus Creek	"spring water fish"	summer fishing	1800s
Mouth of Slana River	"rear mouth"	summer fishing	1800s
Mouth of Suslota Creek	"small sockeye salmon"	summer fishing	1800s
Suslota Lake	"small-sockeye salmon lake	summer fishing	1906
Sulotina Creek	"small fish"	summer fishing	1800s-1906
Bear Valley Creek		summer fishing	1800s-1950s
Mentasta Outlet and Menstata Lake	"shallow lakes fish"	summer fishing	1800s-1960s
Bone Creek	"arm bone fish"	summer fishing	1800s
Granite Creek	"fish soup fish"	summer fishing	1800s
Upper Slana River	"trail goes on sand fish"	summer fishing	1800s

Sources: Reckord 1983b, Kari 1986

During the fishing season, both men and women were fully occupied in catching and preparing fish, especially at the height of the runs. The objective was to catch as many fish as possible at the beginning of the season, before the arrival of the flies and damp weather in July and August made drying fish difficult. Most people stopped fishing around the end of June, although some continued to fish later into the summer. The major harvest of salmon was completed by the end of the August when Ahtna left the river to take up big game hunting.

At the beginning of the 20th century, Ahtna salmon fishing practices changed when the Ahtna replaced the dip net with the fish wheel. Frank Carol introduced the fish wheel into the Copper Basin in about 1910, and it was well suited to the fast current of the Copper River and some its tributaries (Simeone and Fall 1996:13). Use of the fish wheel eased the work of dip net fishing for the men but increased the work of the women, who were responsible for processing and preserving the fish. More fish could be caught in a short amount of time and the wheel had to be continually monitored. One observer noted that in 1919 fish wheels were "kept under continuous observation and visited fairly regularly by the women. So even if the men were away on hunting trips or working on the road, the records of the wheel represent a continuous service" (Ward 1919:2).

The Early Commercial Salmon Fishery

Between 1889 and 1905, a commercial fishery targeting Copper River stocks of salmon developed on the Copper River delta (Thompson 1964) (See Table 2-2 for a chronology of key events in the recent history of the Copper Basin.) Before 1915, the average commercial harvest was approximately 250,000 sockeye and had little effect on the runs (Gilbert 1921:1). In 1915 commercial fish traps were introduced into the river, and a year later a cannery was constructed at Abercrombie, located at Mile 55 on the Copper

Table 2-2. Significant Events and Dates, Upper Copper River Subsistence Fishery

AD 1000	(or before) Arrival of Ahtna Athabaskans
1889	Beginning of commercial salmon fishery, Copper River mouth
1904	Completion of first Valdez to Fairbanks trail through Basin
1910s	Introduction of the fish wheel to the Copper River subsistence fishery
1911	Copper and Northwestern Railroad completed from Cordova to Kennicott Mines; passes through Chitina
1916	Rapid expansion of the commercial fishery into the Copper River
1921	Commercial fishery removed from the Copper River itself
1927	Richardson Highway open to automobile traffic, link to Fairbanks
1938	Copper River and Northwestern Railroad shuts down
1940s	Completion of Glenn Highway links Basin to Anchorage
1960	State management of fishery begins; subsistence permit required
1964	Copper River tributaries closed to subsistence fishing
1966	Attempt to move opening from June 1 to June 15
1970	Introduction of portable fish wheels
1970	Completion of improvement of road to Chitina
1971	Chitina/McCarthy Bridge completed over the Copper River
1970s	Pipeline construction
1978	First operation of sonar at Miles Lake
1984	Separation of subsistence and personal use fishery
1989	McDowell Decision
1999	Subsistence fishery reestablished in the Chitina Subdistrict

River and Northwestern Railroad (ibid). Fishermen, using dip nets and gill nets, from this and several Cordova canneries, were stationed in Abercrombie Canyon and at Miles Lake (Thompson 1964:7). As a result, the commercial harvest jumped to 653,402 in 1915, and rose to 1,253,129 by 1919 (Gilbert 1921:1). There was an almost immediate effect on salmon abundance up river, and by 1916 the situation for Ahtna fishermen was critical (Thompson 1964:8). According to reports from the Copper Basin, the local population faced starvation because of the depleted runs (Bourke 1917, Miller 1916). In addition, the health of the runs themselves was in danger from over harvest (Gilbert 1921:2).

Responding to pleas by Ahtna fishermen that subsistence harvests and spawning escapements were low, the Bureau of Fisheries launched investigations along the Copper River in 1916, 1917, and 1919, which confirmed local observations and testimony (Thompson 1964). Despite these reports, the U.S. Department of Commerce was reluctant to restrict the commercial fishery within the Copper River because it believed that the problem lay, not with the commercial activity, but with Native people who "are about as shiftless as any in Alaska and that they are prone to complain unless they can secure salmon with but little effort" (Redfield 1917a: 2). Besides, the Secretary of Commerce wrote, "the fisheries companies have rights that are to be respected and there is the broad question of policy as to whether a fishery enterprise which produces food for the world at large must be made to suffer in order that 300 Indians can secure fish easily" (ibid.).

Nevertheless, the imminent destruction of the runs was well documented (Gilbert 1921) and regulations partially closing the Copper River to commercial fishing were adopted for the 1918 season (Redfield 1917b). Stocks were still depressed in 1921, however (Gilbert 1921), and in September of that year all commercial salmon fishing was prohibited in the Copper River, its tributaries and lakes and within 500 yards of each mouth of the Copper River (Thompson 1964). The fishery in the Gulf of Alaska remained open. In 1924 Congress passed the White Act that authorized regulations governing where, when, and how salmon and other fish could be taken for commercial

purposes in Alaska (Thompson 1964). There was never again any authorized commercial salmon fishery within the Copper River or its tributaries.

The Opening of the Copper River Basin

In 1898 and 1899, thousands of prospectors bound for the Klondike gold fields passed through the Copper River valley. Hundreds over-wintered at the present site of Copper Center. Beginning in 1899, a trail and telegraph line were constructed from Valdez on Prince William Sound into the Basin. By 1905 the forerunner of the Richardson Highway was open to horse-drawn wagons and in 1927 the highway was open to automobile traffic. Many contemporary Basin communities grew up around roadhouses and trading posts along this route (Reckord 1983b). Former Ahtna villages were abandoned as the Ahtna were drawn to the road to take advantage of imported trade goods and temporary wage employment in the developing commercial economy. The presence of schools and missions also attracted people to these centers. Development of the Kennecott copper mines near McCarthy in the Chitina River drainage in the early 1900s resulted in construction of the Copper River and Northwestern Railway between the mine and Cordova, and the growth of the community of Chitina. Both the mine and the railway were abandoned by 1938 (Hanable 1982).

By the beginning of the 20th century, a mixed, subsistence based economy had evolved in the basin (Reckord 1983a). Hunting and fishing remained major sources of food along with imported items purchased at local stores. Trapping, market hunting, and fishing were major sources of cash. After spending the months of March, April and May trapping muskrats, the Ahtna people would typically move down to the river to put in their fish wheels. They fished about one and a half months. At the end of that time they usually had enough salmon that they dried and cached for their own consumption, for use as dog food, and for trade. Ahtna elders remember selling dry salmon and meat to local roadhouses and the Alaska Road Commission or exchanging these items for rice, tea, tobacco and beans with local traders. Most marketed dry fish was used for dog food (Reckord 1983a:149).

A harvest survey conducted by the Bureau of Fisheries of the U.S. Department of Commerce in 1921 recorded a subsistence harvest of 25,979 salmon by about 170 fish wheel operators (these were probably individuals and families sharing wheels, and is certainly not the number of fish wheels operating in the river in 1921), for a per capita catch for the basin of 219.9 pounds[2] (Table 2-3). These catches were reported to be lower than those prior to the growth of the commercial fishery in 1915, but represented an improvement over the year before (Baker 1921). The improved success of the subsistence fishery in 1921 was thought to be the result of the low commercial catches at the river mouth in that year caused by unfavorable weather during the commercial season (Gilbert 1921).

Records of the U.S. Bureau of Commercial Fisheries (the management agency for Alaskan fisheries before statehood) indicate that in the late 1940s and 1950s, residents of the Copper River basin took approximately 5,000 sockeye salmon annually. The Bureau estimated that about "100 individuals and families, mostly of Indian origin," operated fish wheels and dip nets to take salmon for subsistence use (Pirtle 1971:4). However, given the estimate of a minimum of 13,000 salmon harvested in subsistence fish wheels in 1958 (see below), this estimate of 5,000 salmon annually appears far too low. In 1955 the Bureau surveyed 13 Ahtna fish wheels, including 10 on the main stem of the Copper River, one on Mendeltna Creek and one each on the Kultina and Tonsina rivers. The reported harvest for all 13 wheels was 1,787 sockeye and 309 Chinook salmon (Table 2-4). Note that these figures do not include fish wheel locations on the middle or upper Copper River, and are therefore only partial estimates of the total subsistence harvest in 1955.

The Bureau conducted another, more extensive survey between June 1 and August 14, 1958 (Clemmans and Koppen 1958). This survey located 30 fish wheels, 25 of which were situated on the Copper River with the remaining five located on the Tonsina and Klutina Rivers, and Mendeltna Creek. The total reported catch for all wheels was 12,909

[2] Per capita harvests were calculated for sockeye by using a conversion factor of 4 pounds (usable weight). For chinook salmon we used a conversion factor of 8 pounds and for coho a factor of 3 pounds.

Table 2-3. Subsistence Salmon Harvests, Upper Copper River, 1921

Location of Fishing	Number of Fish Wheel Operators	Number of Salmon Harvested			
		Sockeye	Chinook	Coho	Total
Chitina	76	3,900	234	0	4,134
Mouth of Tonsina	1	360	80	40	480
Copper Center	31	3,932	1,408	0	5,340
Mouth of Tazlina	1	75	15	0	90
Mouth of Gulkana	3	461	182	0	643
Paxson Lake	2	565	225	0	790
Mentasta, Batzulnetas, Suslota, & Tanada	50-60	14,500[a]			0 14,500 0
Totals	164-174	23,793	2,146	40	25,979
Per capita harvest[b]		186.2lbs[c]	33.5lbs[d]	0.2lbs[e]	219.9lbs

[a] Reported as 14,000 to 15,000 salmon, primarily sockeye.
[b] Based on 1920 census estimate of Copper Basin population of 511
[c] Based on a conversion factor of 4 lbs/fish (usable weight)
[d] Based on a conversion factor of 8 lbs/fish (usable weight)
[e] Based on a conversion factor of 3 lbs/fish (usable weight)
Source: Baker 1921

Table 2-4. The Upper Copper River Subsistence Fishery, 1955

Location of Fish Wheels (13 wheels)	Reported Harvest		
	Sockeye	Chinook	Total
Mendeltna	10	0	10
Chitina	200	75	275
Chitina	20	60	80
5 Mile, Chitina	234	16	250
Copper Center	50	50	100
Copper Center	400	20	420
Copper Center	48	2	50
Copper Center	30	15	45
Copper Center	125	25	150
Copper Center	250	5	255
Copper Center	300	40	340
Klutina River, upstream from bridge	100	10	110
Tosina River, downstream from bridge	0	1	1
Totals	1767	319	2086

Note: this is certainly only a partial list of fish wheels, and a minimum estimate of the subsistence harvest.

Source: Wallace 1955

sockeye and 354 Chinook salmon (Table 2-5). Even this total was thought to be lower than the actual catch because there was an apparent reluctance on the part of some fish wheel owners to supply figures. According to the report, most of the fish were caught for personal use, usually among two or three related families, but there was some evidence of selling or bartering, "but only on a small scale" (Ibid: 28). To avoid directly selling the fish to tourists the fish wheel owners gave the fish away but charged 50 cents or $1.00 for cleaning each fish. The owners gave away smoked fish to tourists but charged $1.00 per pound for smoking it. Some fish were sold directly to tourists for $1.00 a pound and if a person wanted more fish they could rent the wheel for the day (National Marine Fisheries Service 1958:34).

American involvement in World War II resulted in the construction of the Glenn Highway between Anchorage and the Basin. At the same time, the Richardson Highway was linked with the new Alaska Highway to Fairbanks. Following the war, settlement and demographic patterns changed as the Ahtna were forced to relocate to communities along the road system so that their children could attend school (Reckord 1983b:181). Ahtna elders recall that it was during the early 1950s that enforcement of fish and game regulations also became more stringent, and as a result their hunting patterns changed.

Improvements in the road system to and within the Copper Basin facilitated access to the region from Alaska's population centers (Stratton and Georgette 1984: 24-25). As illustrated in Figure 1-3, the population of areas adjacent to the Copper Basin and connected by road (Fairbanks, Anchorage, the Matanuska-Susitna area, Valdez and the Upper Tanana area) rose from 73,292 in 1960 to 254,985 in 1980 and 412,655 in 2000. This population growth has placed increasing demand on the natural resources of the Copper Basin.

Table 2-5. The Upper Copper River Subsistence Fish Wheel Fishery, 1958

General Location Specific Placement	Harvest[1] Sockeye	 Chinook
Chitina (4 wheels)		
Mouth of O'Brien Creek	908	23
Mouth of Fox Creek	420	10
Side of Chitina Airfield	590	17
End of Chitina Airfield	171	2
Lower Tonsina (2 wheels)		
2 Miles below Lower Tonsina	276	126
100 yrds below Tonsina Bridge	36	3
Copper Center (13 wheels)		
50 yrds above Klutina Bridge	450	20
50 yrds below Klutina Bridge	55	4
Mile post 102	395	10
Mile post 102	122	
Mile post 102	173	
Mile post 102	376	8
Mile post 102	75	2
Mile post 103	1,449	13
Mile post 103	654	6
Mile post 103	215	20
Mile post 103	180	
Mile post 103	349	
Mile post 103	227	32
Tazlina (2 wheels)		
1 mile behind Copper Valley School	115	
1 mile behind Copper Valley School	130	6
Gulkana (3 wheels)		
Behind Gulkana Village	706	1
Behind Gulkana Village	174	6
Behind Gulkana Village	476	
Gakona (2 wheels)		
Mile post 3, Tok Road	1,515	12
Mile post 3, Tok Road	1,220	26
Chistochina (3 wheels)		
2 miles above Chistochina River	570	2
2 miles above Chistochina River	679	
2 miles above Chistochina River	203	5
Mendeltna (1 wheel)		
100 yrds below Mendeltna Bridge	no data	no data
Harvest Totals (30 wheels)	12,909	354
Average Catch per Wheel	430.3	11.8

[1] Interviewers reported these as minimum estimates.

Source: Clemmans and Koppen 1958

The Beginning of the Modern Chitina Dip Net Fishery[3]

Residents of Fairbanks began fishing regularly at Chitina in the late 1940s. According to oral tradition, at least one Fairbanks resident fished at Chitina as early as 1938 or 1939[4], but the fishery did not become popular until after World War II. Walter Eberhard and Bud Weise represent two typical early participants in the fishery. They are two of the six Fairbanks residents interviewed for part of this project. Both said they began fishing at Chitina in the late 1940s. Eberhard, for instance, began fishing at Chitina in 1949. He did not remember how he had heard about the fishery, but at the time he was working for the Northern Consolidated Airlines. One day he got off work and he and his wife headed down to Chitina and "got there about midnight." Eberhard recollected there was only a narrow, dirt road. "It wasn't gravel or anything," he said, "just an old road going down to Chitina, and it wasn't straight like it is now."

Weise first went to Chitina in 1947. Both he and Eberhard recalled that the only place to fish was Salmon Point. Located on the west bank of the Copper River opposite the mouth of the Chitina River, Salmon Point was a fishing site used by local Ahtna from the village of Chitina. To get there you had to either climb a particularly steep hill or follow a trail that led through a railroad cut and along the edge of the Copper River. Eberhard said that he learned about Salmon Point from a Chitina Native named Paddy King.[5] According to Eberhard, Paddy King, along with several other Ahtna, operated fish wheels between Salmon Point and Fox Creek. Walter said,

> …Yeah, he's the one who showed me how to get over there [Salmon Point], and we went over there the first time and we fished and fished and we couldn't catch anything, and he was

[3] The dip net fishery takes place in the Chitina subdistrict and is currently limited by State regulation to a portion of the Copper River between the lower edge of the Chitina-McCarthy Bridge and Haley Creek. The Edgerton Highway, connecting Chitina to the Richardson Highway, provides surface access to the area. From Chitina access to the fishery is provided by the proposed route of the Copper River Highway that follows the old railroad grade of the Copper River Northwestern Railroad. Up until 1989 this road provided access only as far as O'Brien Creek but in 1989 the State improved the road providing vehicular access all the way to Haley Creek. However, in 2000-2001 a major landslide blocked the road beyond O'Brien Creek so that vehicular access became limited.

[4] According to Bud Wiese and Stan Bloom, Andrew Kemak of Fairbanks began to fish at Chitina in about 1939.

[5] Paddy King figures prominently in the narratives about the beginning of the dip net fishery, but not much is actually known about him. He was born in 1905 and his family was apparently upper Tanana Athabaskan from the Nabesna area. When he was quite young he moved with his parents to Chitina where he lived most of his life (Saleeby 2000:88).

> looking at his wheel and he says, how much you want? He walks in and stops the fish wheel, and threw me over some fish.

Wiese said that when he first got to Salmon Point he found dip nets made from chicken wire. According to Wiese,

> …the only place you fished was on what they call Salmon Point, and there was a trail out to there. And you used wire nets, and there were wire nets lying there. You didn't have to bring your nets. And you had to pack your fish back out of that trail along the side of the mountain. And of course we didn't have pack boards, so we had to carry them. I don't remember all of it, [we carried the fish] in nets and in our hands, and on strings and so forth. And I don't remember, we may have seen one other person fishing that first year we were down there.

From Salmon Point the fishery eventually spread down the Copper River toward Fox and O'Brien creeks. Weise remembered that early on one could drive along the old railroad bed to Fox Creek but in order to get to O'Brien Creek one had to walk. Later the Alaska Road Commission bulldozed a trail providing better access to O'Brien Creek and Walter Eberhard remembered people driving to O'Brien Creek in the 1950s.[6] Sam Scott, another long time Fairbanks resident began fishing at Chitina in 1955. He said that by 1955 one could drive right up to the old railroad trestle that spanned O'Brien Creek and then walk down the hill to the creek. Scott said that to get his catch up the hill he placed the fish in a duffel bag hooked to a winch cable and attached to his vehicle.

According to Weise opening the trail to O'Brien Creek changed everything and more people began to show up to fish. Weise remembered that,

> the trail was fixed to go south out of Chitina toward O'Brien Creek, and the first way you could get down, you could get as far as Fox Creek and then you had to hike from there on down [to O'Brien Creek]. And a lot of them then were going down to the cable crossing, where there was a big eddy, and they were doing just fantastic [fishing] down there. But we had good luck above O'Brien Creek all the way up to Fox Creek, and even going down from Fox Creek. But that's when the people started to really

[6] The first official mention of the new dip net fishery at Chitina appears in a National Marine Fisheries Service report for 1958 (NMFS 1958) which notes dip netting by "tourists" as well as local residents of Chitina, harvesting about 1,000 salmon.

> show up, and there were lots of them, and there were no limits or anything else. You could fish whenever you wanted to, and for the most part, people just took what they could use.

Charles Crawley began fishing at Chitina in 1963 and learned about the fishery from a neighbor in Fairbanks who lived across the street. Crawley remembered that when he and his family first drove to Chitina it was "it was kind of lonely." He said that

> the first year they didn't have that 8 mile extension [leading from Richardson Highway to the Edgerton Highway]….. And we came on a dirt road, on the old [Edgerton Highway], what do they call that, they called it an old road, I can't remember the name of the road but it was dirt and very dusty. The kids caught a lot of dust in the back of the truck. [Laughter] So, and they gradually started paving it of course and now they got that byway….

Crawley remembered that in 1963 one could drive down to O'Brien Creek but he did not, and for several years he and his family camped at the top of the hill above the creek. At first the family packed fish up to their camp at the top of the hill. Crawley later obtained a Honda 90 motorcycle and drove down to the creek. One year Crawley met Fred John at O'Brien Creek. Fred and Katie John were from the village of Mentasta. Before the State of Alaska closed all tributaries of the Copper River to subsistence fishing in 1964, they had fished for salmon in the Slana River, a tributary close to their home in Mentasta. When Crawley met the Johns they had a fish camp "on the North side of O'Brien Creek in that wooded area, he and his wife, and he was telling us how his wife really enjoyed the fish, one a day, and I think we met him a couple of years down there. He was smoking the salmon."

Stan Bloom made his first trip to Chitina in 1964 but it was not until 1976 that he began to dip net on a regular basis. Bloom remembered that in the 1960s there were two major areas where people fished: O'Brien Creek and Fox Creek. A bridge spanned O'Brien Creek so people could walk down river following the old railroad bed. After the bridge was improved sometime in the 1970s, Bloom said that he drove a motorcycle along the

railroad bed, almost as far as the first railroad tunnel, to an old railroad shack. That was as far as people went in the 1970s.[7]

All of those interviewed remembered that people camped at O'Brien Creek and canned their fish right there. According to Sam Scott

> for several years we'd do our canning right down there. We'd clean them in O'Brien Creek, cut them, and can them. At that time we were using tin cans…. but we'd have our fish all canned and we put them in O'Brien Creek to cool them off and we'd put them in the duffel bag and drag them up the hill. Then we got back home, you didn't have such a mess to, ooh what a mess. I can remember coming in here with about maybe close to two hundred fish. I mean, you could have all you wanted, you know, and none of them went to waste. We had a lot of old timers who couldn't do it anymore. We'd give everybody fish. And that's about what happens to my moose, you know, there's all of the old guys who can't hunt or don't hunt, or whatever, they all end up with a lot of it.

When asked what year he noticed the fishery changing, Charles Crawley responded "I suppose it was in the seventies, I think so, I think it was in the seventies" after they improved the road to Chitina. He added that

> and of course the last few years it's been, what is it about the eighties when the boats started and, late seventies-early eighties when it really got crowded. And of course you don't want to go down there on the fourth of July. [Laughter] We used to fish at night, when you're younger I guess you could do that, stay up all time hours. [Laughter]

In 1972 the State of Alaska improved the Copper River Highway so that people could drive some 20 miles down the Copper River from Chitina (Gray 1990:8).

With the passage of the Alaska Native Claims Settlement Act (ANCSA) in 1971 the situation in Chitina changed. Under ANCSA the Chitina Village Corporation claimed land between the mouths of Fox and O'Brien creeks that was used by dip netters. In

[7] Oral testimony presented during a US Department of Interior hearing that took place in 1984 indicated that a bridge over O'Brien Creek was in existence in 1973-74 and a photograph taken in 1976 of O'Brien Creek shows over 40 vehicles parked on both sides of the creek. Sometime after that the bridge became impassable for cars but continued to be used by motorcycles (BLM vs Chitina 1984:14-15).

1985 the corporation received conveyance to that land, blocked the road to O'Brien Creek, and began to charge an access fee. Once Chitina Corporation began charging a fee fishermen started to gain access to the fishery by using private and chartered boats launched near the Chitina-McCarthy Bridge (Gray 1990:7). At this point the Chitina Dipnetters Association became active (ibid:6). According to Stan Bloom trespass became an "issue after ANCSA because the Native people owned the land…." Bloom also said, "the first time I noticed boats, was after the trespass thing, people actually started using more and more boats." Sam Scott also noticed the fishery change in the 1980s:

> Well it was about in the 80's…. I mean it got so bad down there at O'Brien Creek, if you were up there by the O'Brien Creek there was so much traffic, cars parked there along the bank, couldn't get out. You just stayed until it was over, you know. I went down there in '83 and I couldn't turn around.

Today probably half of the participants of the dip net fishery use boats to either dip net from or as ferries to reach less accessible fishing sites on either side of the river. In 2000-2001 several charter boat companies operated in the Chitina Subdistrict and at least two of these companies operated from the mouth of O'Brien Creek. Fishermen also launched private boats from O'Brien Creek, and before a landslide closed the road in 2001, launched boats from Haley Creek. There is also a public boat launch at the Chitina-McCarthy Bridge.

In 1984 the Alaska Board of Fisheries determined that the dip net fishery was a personal use fishery and despite changes in state law it remained a personal use fishery until December of 1999 when the BOF reclassified the fishery as a subsistence fishery. Throughout this period participation in the fishery grew steadily (see below). A record number of personal use dip net permits, about 10,000, were issued in 1998 and 1999. During the 2000 season the number of permits issued to Chitina dipnetters declined to 8,145, but increased again in 2001 to 9,458. For the 2002 season the number of permits issued declined. A large majority of participants in the Chitina fishery have been non-local residents either from Fairbanks, Anchorage or the Matanuska-Susitina Valley (see below for further discussion). In summary, the trend toward increased participation in

the dip net fishery, first noted in the 1960s and intensifying in the late early 1980s, continued into the late 1990s, due to improvements in access, communication between fishery participants, and the opportunity to harvest a high quality product for personal use.

The Subsistence Fishery Since 1960: Regulatory Overview

Since statehood, subsistence-fishing regulations for the Cooper River have defined salmon fishing seasons, open areas, seasonal harvest limits, legal gear types, and provided rules on who may participate in the fishery. Many of these regulations were implemented in response to the dramatic increases in the number of participants in the fishery, most of whom came from outside the Copper Basin. For example, between 1960 and 1961 the number of subsistence fishing permits issued by ADF&G increased from 58 to 366 and by 1970 over 3,400 subsistence permits were being issued. Most of these went to participants in the developing dip net fishery at Chitina.

Highlights of the regulatory history are provided in Table 2-6. As illustrated, permits were required for the first time in 1960. At that time, subsistence regulations stipulated that fish wheels could not be rented or leased and that they must be removed from the water at the end of the permit period. Subsistence fishing was also restricted to the main Copper River, as no fishing was allowed on the spawning grounds. In 1963, the Alaska Board of Fisheries and Game adopted a proposal to limit subsistence salmon fishing to the main stem of the Copper River downstream from the confluence of the Slana and Copper rivers. This restriction, which became effective in 1964, closed all tributary streams of the Copper River and the main river above Slana to subsistence fishing and eliminated fish wheel sites on the Tonsina, Klutina, and Slana rivers. These waters remained open to sport fishing with hook and line gear.

In response to the increased regulation the Native community asked for a voice in the decision making process. In June of 1964, Markle F. Ewan Sr. of the Alaska Native Brotherhood (ANB) requested a meeting with Ralph Pirtle, the ADF&G area

Table 2-6. Key Changes to State Regulations and other Actions, Upper Copper River Subsistence and Personal Use Salmon Fisheries

1960	Subsistence permit required
1964	All tributaries of the Copper River, and the Copper River above Slana, closed to subsistence fishing
Mid 1960s	Seasonal limits based on income and household size.
1968	Upper river fishery limited to the main Copper River from the confluence of the Slana River downstream to the cable crossing one and a quarter miles below O'Brien Creek.
1975	The lower limit of the subsistence fishery extended to Haley Creek below Wood Canyon.
1977	BOF creates the Chitina and Glennallen subsistence subdistricts.
1978	First state subsistence law adopted.
1979	BOF eliminates fish wheels from the Chitina Subdistrict for biological reasons. No dipnets allowed in Glennallen Subdistrict.
1980	"Classes" of subsistence permits created in the Copper River Management Plan, based on age, income, residency, household size, wage employment, and history of participation in the fishery.
1981	Fishwheel seasonal limits increased to 30 salmon for 1 person, 60 for 2, and 10 for each additional member; households with incomes under $12,000 eligible for 500 salmon seasonal limit.
1984	Copper River Salmon Management Plan revised, as follows: • Personal use fishery separated from subsistence fishery • Positive "customary and traditional use" determination for the Glennallen Subdistrict; negative finding for the Chitina Subdistrict • Subsistence permit eligibility limited to Copper Basin/Upper Tanana residents • Low income requirement dropped as part of qualification for higher seasonal limit • Dipnets and fishwheels allowed in Glennallen Subdistrict • 25,000 salmon set aside for subsistence fishery in the up-river goal (this has since been increased several times)
1985	Madison Decision: all Alaskans eligible to participate in subsistence fishery
1986	New state subsistence statute; regulations adopted for 1984 back in place
1990	Non-local residents again eligible for subsistence permits following the McDowell decision of 12/1989
1993	Board of Fisheries found Upper Copper River subsistence regulations consistent with 1992 Subsistence Statute; affirmed positive "c&t" finding for Glennallen Subdistrict; 35,000 allocation for subsistence fishery
1996	Board affirmed negative c&t finding for Chitina Subdistrict salmon
1999	Board makes positive c&t determination for Chitina Subdistrict salmon, dip net fishery again becomes a subsistence fishery.

management biologist. In a letter, Ewan wrote to Pirtle that he did not agree with the regulations that placed seasonal limits on subsistence harvests. He stated that:

> the majority of our Indian people don't have deep freezers, therefore our main dependable storage food is dried, smoked, salted and canned fish. Believe it or not - one person can eat as much as two fish a day whether fresh or otherwise. So please permit us to get as much fish as we need. As you know, we don't take or waste any fish or game like so many sport fishermen and hunters do. We are God abiding citizen people. I don't believe the whole Copper River tribe will get as much fish in a whole season in Copper River area as the commercial fishermen would get in one day (Ewan 1964).

In the same latter Ewan invited Pirtle to a meeting of the ANB "so that we can better understand each other and our problems and become better acquainted." Although Pirtle accepted the invitation, there is no record of the outcome of the meeting.

Continued expansion of the fishery during the trans-Alaska oil pipeline boom of the mid 1970s prompted the Board of Fisheries to create new regulations. Prior to 1977, subsistence harvests, for households with annual incomes of over $5,000, were limited to 20 salmon for a one-person household and 40 salmon for households with two or more members. After 1977, these limits were reduced so that households with incomes of $5,000 or more could harvest 15 or 30 salmon. Until 1981, harvest limits for the fish wheel fishery were the same as the dip net fishery. However, households with incomes under a certain level ($4,000 in 1960, later raised to $6,000 in 1978) could qualify for an allocation of up to 500 salmon. Beginning in 1981, fish wheel limits were 30 salmon for one person, 60 for a household of two, and 10 for each additional household member. The income limit for a higher allocation of 200 or 500 salmon was raised to $12,000. At the same time, a management plan for the fishery that provided a preference in times of low run strength to local residents with low incomes was adopted.

In 1977 the BOF created the Chitina and Glennallen subdistricts and in 1980 the Copper River Management Plan was instituted. Under this plan, subsistence permits were issued to those who showed "the greatest level of need on the basis of customary and direct dependence and as a mainstay of one's livelihood, local residency, and availability of

alternative resources" (5 ACC 01.647 c *in* ADF&G 1980:36). Several classes of subsistence permits were issued. To obtain a class A permit, a person had to be 55 years or older, have an annual income of $6,000 or less, reside within the Copper River Basin, and have previously fished in the Copper River with a fish wheel in ten of the past 12 years. Such individuals were allowed to fish seven days a week. Class C permits were given to any Alaska resident who lived in a household of three or more persons, or in a household having one or more persons 55 years of age or older, or a household having no more than one full-time employed person. In addition they had to have participated in the Copper River subsistence fishery during eight of the last ten years and an annual household income of $10,000 or less. Those with class C permits could fish Saturday and Sunday when escapement had reached 150,000 to 200,000 fish (ibid.).

In 1984 the Copper River Management Plan was revised. Using customary and traditional use criteria,[8] the Board of Fisheries determined that the Chitina dip net fishery was not a subsistence fishery and redefined it as a "personal use fishery," thus separating it from the subsistence fishery in the Glennallen Subdistrict. With this change, only residents of the Copper Basin and Upper Tanana communities were eligible for subsistence permits.

Subsequent regulatory changes in the fishery included the establishment of the Batzulnetas fishery in 1988. This change was in response to suit filed against the State of Alaska by Doris Charles and Katie John, two Ahtna women from the village of Batzulnetas. Besides allowing Mrs. Charles and Mrs. John to fish at Batzulnetas, their lawsuit, coupled with the *McDowell* decision,[9] forced the federal government to assume management of subsistence fishing on navigable waters, including the Copper River (see below).

[8] There are eight criteria that the Board of Fisheries, and Board of Game, use to determine if a particular fish stock or game population has been customarily and traditionally (C&T) taken for subsistence purposes. See Chapter three of this report for a list of all eight criteria.

[9] In the *McDowell* decision the Alaska Supreme Court ruled that state's 1986 subsistence law was unconstitutional because its rural preference provision illegally discriminated against Alaska residents living in urban areas. As a result all Alaska residents became eligible for subsistence fishing in the Glennallen Subdistrict of the upper Copper River.

In 1996 the Board of Fisheries established regulations allowing village fish wheels. Regulations stipulated that a permit could be issued to a village council so that it could operate a fish wheel for subsistence purposes in the Upper Copper River District on behalf of its members. Then, in 1999 the Alaska Board of Fisheries reclassified the personal use dip net fishery as a subsistence fishery.

The Subsistence Fishery in the 1960s

As illustrated in Figure 2-1 and Table 2-7, from 1960 through 2001 there has been a trend of increasing participation in the Upper Copper River subsistence fishery. This gradual but pronounced increase from 1960 through 1969 was due largely to a growth in the state's population[10] along the road system and improved access to the Copper River fisheries. The number of permits issued for dip netting increased from 32 in 1960 to 1,415 in 1969. Although the number of permits issued for fish wheels also grew, from 26 in 1960 to 167 in 1969, this increase was much smaller than that for dip nets, and was, by comparison, fairly negligible after 1964.

In 1960, 17 fish wheels operated on the Copper River. The following year 19 wheels were on the river, most operating in the vicinity of Copper Center and Gulkana. According to an inter-departmental memo by sport fish biologist George Van Whye (1961), both Natives and non-Natives used salmon for human and canine consumption, but the majority of fish was used for food. Determining the number of fish required by local families was deemed "next to impossible" by state fisheries managers, since, in their view, the "the amount required depends to a large extent on the amount of employment that can be obtained" (ibid)

During the 1960/61 season free subsistence fishing permits were issued to persons earning less than $4,000 (ibid.). For the 1961/62 season this restriction was dropped and any resident was eligible for a subsistence permit. When the $4,000 income

[10] From 1960 to 1970 the state population grew by just over 76,416 people.

Figure 2-1. Number of Subsistence and Personal Use Fishing Permits Issued, Upper Copper River, 1960 - 2001

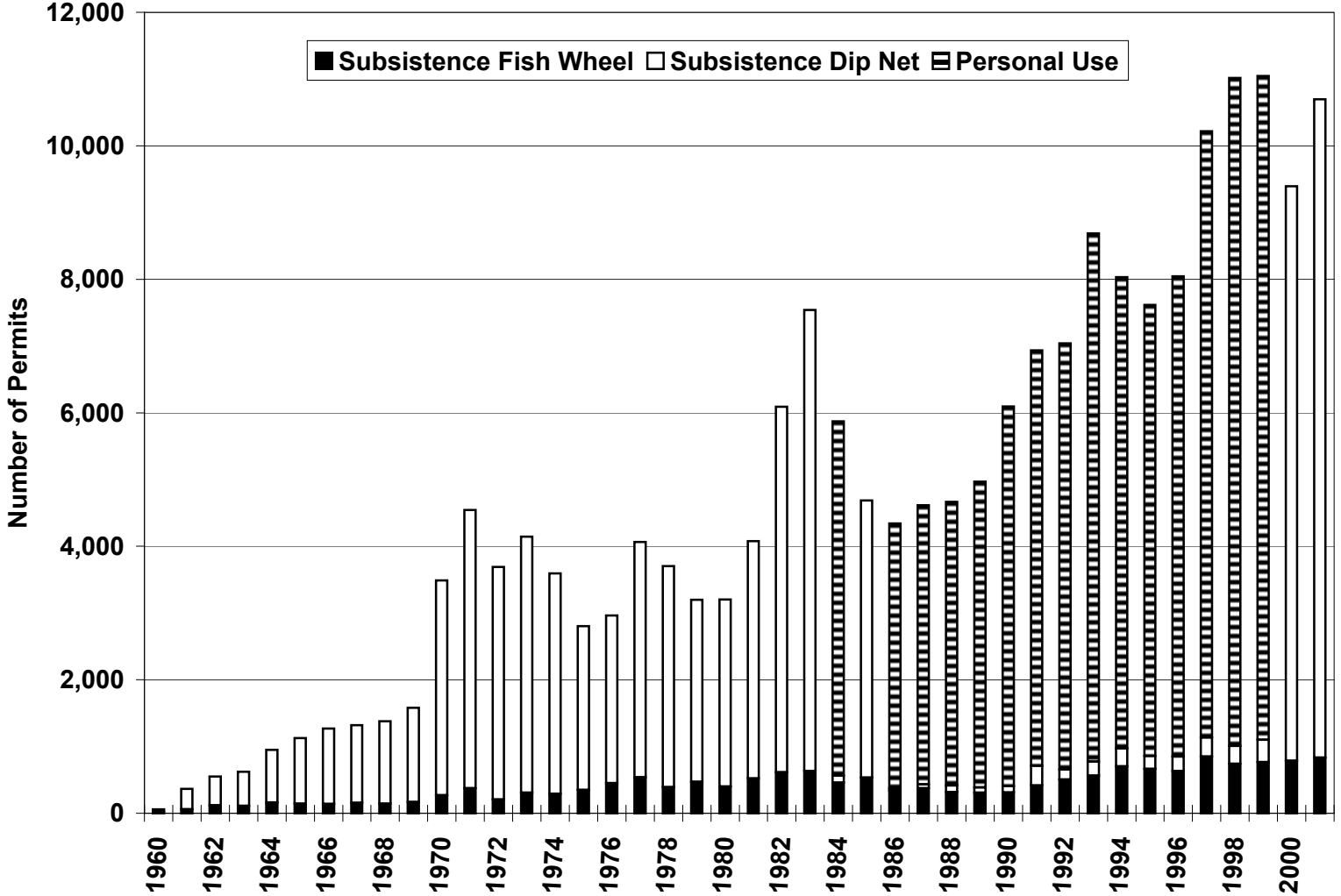


Table2-7. Number of Permits Issued and Estimated Harvests, Copper River Subsistence Salmon Fishery, 1960-2001

	Subsistence Permits Issued			Reported Harvests		Estimated Total Harvests			Catch per Permit		Personal Use		Catch
	Fish			Fish		Fish							
Year	Wheel	Dipnet	Total	Wheel	Dipnet	Wheel	Dipnet	Total	FW	DN	Permits	Harvest	Per/Per
1960	26	32	58	5,660	1,179	7,285	1,518	8,803	280.2	47.4			
1961	59	307	366	12,419	1,777	15,927	2,279	18,206	269.9	7.4			
1962	117	435	552	11,101	3,203	14,347	4,139	18,486	122.6	9.5			
1963	110	514	624	12,395	2,124	15,612	2,675	18,287	141.9	5.2			
1964	158	794	952	7,749	4,133	10,656	5,684	16,340	67.4	7.2			
1965	143	982	1,125	5,813	7,215	7,504	9,314	16,818	52.5	9.5			
1966	138	1,132	1,270	9,188	7,452	12,090	9,806	21,896	87.6	8.7			
1967	154	1,166	1,320	8,360	6,146	10,954	8,053	19,007	71.1	6.9			
1968	143	1,235	1,378	6,071	8,040	8,769	11,614	20,383	61.3	9.4			
1969	167	1,415	1,582	6,220	18,054	7,499	21,767	29,266	44.9	15.4			
1970	267	3,220	3,487	9,886	22,700	12,972	29,785	42,757	48.6	9.3			
1971	374	4,168	4,542	9,370	28,115	12,111	36,338	48,449	32.4	8.7			
1972	205	3,485	3,690	7,854	18,996	9,497	22,971	32,468	46.3	6.6			
1973	305	3,840	4,145	10,943	16,407	11,702	17,546	29,248	38.4	4.6			
1974	288	3,305	3,593	7,657	15,143	8,732	17,269	26,001	30.3	5.2			
1975	350	2,452	2,802	5,626	7,694	6,486	8,871	15,357	18.5	3.6			
1976	451	2,512	2,963	8,321	12,130	9,612	14,011	23,623	21.3	5.6			
1977	540	3,526	4,066	12,751	22,612	15,077	26,738	41,815	27.9	7.6			
1978	392	3,313	3,705	6,638	12,569	7,613	14,416	22,029	19.4	4.4			
1979	470	2,730	3,200	10,251	11,887	14,337	16,626	30,963	30.5	6.1			
1980	399	2,804	3,203	9,716	14,661	13,982	21,099	35,081	35.0	7.5			
1981	523	3,555	4,078	26,924	28,872	33,173	35,573	68,746	63.4	10.0			
1982	615	5,475	6,090	38,120	62,614	41,629	68,377	110,006	67.7	12.5			
1983	630	6,911	7,541	35,971	72,257	39,461	79,267	118,728	62.6	11.5			
1984	458	104	562	20,374	1,288	26,915	1,702	28,617	58.8	16.4	5311	50714	9.5
1985	533	4,153	4,686	22,877	29,856	27,836	36,328	64,164	52.2	8.7			
1986	336	39	375	25,136	645	27,706	711	28,417	82.5	18.2	3966	43959	11.1
1987	372	59	431	24,157	1,114	32,578	1,502	34,080	87.6	25.5	4186	46884	11.2
1988	315	101	416			28,980	4,489	33,469	92.0	44.4	4251	45895	10.8
1989	308	78	386			27,488	2,413	29,901	89.2	30.9	4583	58858	12.8
1990	311	95	406			30,545	2,974	33,519	98.2	31.3	5689	70317	12.4
1991	418	294	712			35,248	6,827	42,075	84.3	23.2	6222	84622	13.6
1992	504	151	655			43,234	4,571	47,805	85.8	30.3	6385	91440	14.3
1993	565	208	773			50,204	5,860	56,064	88.9	28.2	7914	97500	12.3
1994	703	267	970			65,004	6,838	71,842	92.5	25.6	7061	99430	14.1
1995	665	193	858			52,089	4,219	56,308	78.3	21.9	6760	88625	13.1
1996	629	218	847			48,167	6,757	54,924	76.6	31.0	7199	103343	14.4
1997	847	286	1,133	72,166	7,964	77,696	8,574	86,270	91.7	30.0	9086	154467	17.0
1998	738	272	1,010	55,769	7,973	58,676	8,389	67,065	79.5	30.8	10006	145316	14.5
1999	764	337	1,101			53,491	7,014	60,505	70.0	20.8	9944	142469	14.3
2000	787	8,609	9,396			56,356	126,020	182,376	71.6	14.6	8145	116345	14.3
2001	832	9,865	10,697			76,753	152,754	229,507	92.3	15.5	9458	142905	15.1
											Chitina Subdistrict 2000&01		

Sources: Randall et al. 1983 for 1948 - 1980; Morstad et al. 1995 for 1981 - 84, 1986-87; Morstad et al. 1996 for 1985;
ADF&G Upper Copper River Permit Database for 1988 - 1996

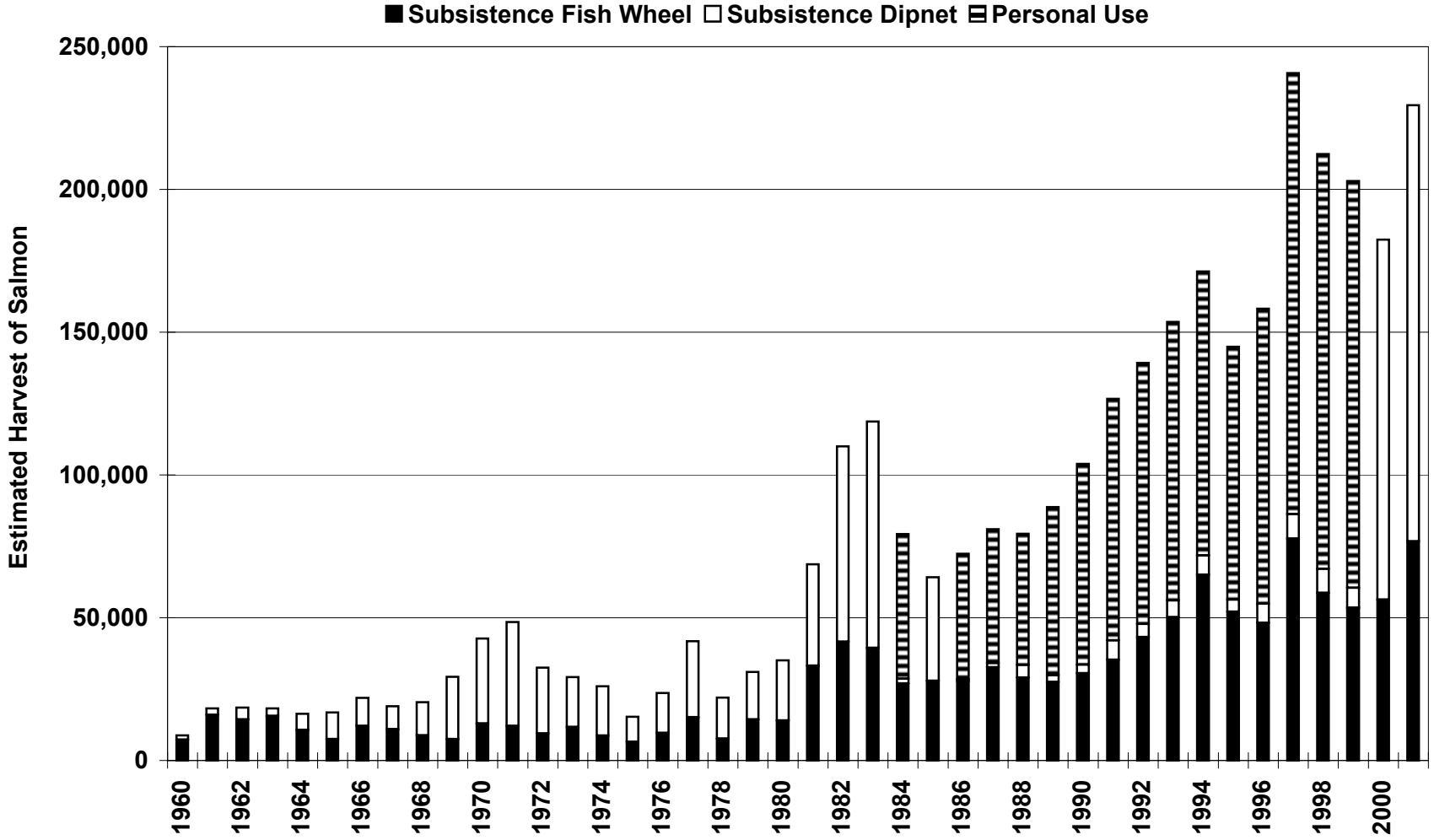
restriction was dropped the number of permits issued increased from 58 in 1960 to 366 in 1961 while the total subsistence harvest increased from 8,803 fish in 1960 to 18,206 fish in 1961. Fish wheels accounted for the greatest portion of fish taken on subsistence permits. While the harvest increased, the number of fish harvested per permit dropped from 152 in 1960 to 50 in 1961. Local fisheries managers believed that this reduction was due to the large number of permits issued to persons not living in the immediate area (Van Whye 1961; Table 2-7, Figure 2-2.).

In the 1960s, estimated subsistence harvests of salmon in the Upper Copper River reflected the growth of the fishery. Dip net harvests rose from 1,518 salmon in 1960 to 21,767 in 1969. In the early 1960s, fish wheels accounted for most of the Copper River subsistence harvest (as they had since the early 1910s), but by the late 1960s, dip nets dominated (57 percent of total harvest in 1968, 74 percent in 1969), a pattern that would persist until 1984 (Table 2-7, Figure 2-2). In response to an increasing number of subsistence fishermen and concern over low escapements, the department, in 1966, moved to reduce fishing time and ordered the subsistence fishery to open on June 15th instead of June 1st.

In a letter, to Amos Wallace, president of Alaska Native Brotherhood, Camp 20, Governor William Egan outlined the problem from the State's perspective. Egan stressed a need to develop controls over a fishery that was easily accessible by road. He wrote that the number of subsistence fishermen had increased from about 200 to 1200 and of that 1200 only 126 were actually from the Copper River Basin, and most of the Basin residents qualified for the larger quotas based on income (an individual or family with $4,000 or less income could harvest 200 or 500 fish.). Egan also pointed out that most of the other subsistence fishermen came great distances - mainly from Fairbanks (Egan 1966a).

The Ahtna did not accept the State's assessment of the problem nor the method by which the new restriction was imposed. Harry Johns, president of ANB Camp No. 31, wrote to

Figure 2-2. Estimated Harvests of Salmon by Subsistence and Personal Use Fishers, Upper Copper River District, 1960 - 2001



the Department on May 24, 1966 stating his people's concern over the late opening and the lack of communication between the department and local people (Johns 1966). Johns wrote:

> We the following citizens of the Copper Center and Gulkana area, are greatly concerned and upset by the fact that the State Fish and Game Department has seen fit to stop our people from fishing by fishwheel for subsistence fish.
>
> Not only have we been cut down in the numbers of fish we can catch, but over the years the people of this area are not even contacted or asked their opinions. This leads all of us to believe the state does not care what we think, or how the people of the Copper River Basin are to live if they are not allowed to catch these fish for their livelihood (sic) have in the past.
>
> This is our means of protesting this stopping of our fishing rights, and to notify your office we the native people of this area hope you will change this before it's too late.
>
> This is also to notify your office that we the citizens of Copper River Area will be putting our fishwheels in on the first of June as we have in the past**.**

The Ahtna also appealed for statewide support. In an article dated May 27, 1966, the Anchorage Times reported that the "Copper River Indian Council" issued a call for support from Native people from Ketchikan to Barrow "to back their rights to fish for salmon in the Copper River as of June 1." According to the newspaper article, Governor Egan had "failed to grant the Indian's request to rescind a new State Department of Fish and Game regulation prohibiting the use of fish wheels and dip nets for subsistence fishing until June 15." In response, Markel Ewan, of the Alaska Native Brotherhood, said that the Ahtna will fish as of June 1 "as they have done for centuries" and he threatened that "if necessary, each Indian will catch a fish and turn it in to the Department of Fish and Game, demanding to be arrested" (The Anchorage Times 1966).

Facing organized protest, the State retreated and opened the subsistence fishery on June 1st. In a letter to Harry Johns, Governor Egan wrote that the order for the June 15th opening had been rescinded "because the good catches of salmon by commercial fishermen on the flats indicated an adequate escapement of spawners up the river." The

Governor went on to assure Mr. Johns that the "Department will be in closer contact with you in the future" and that the State does care about the welfare of the Indian people (Egan 1966b).

The 1970s and Early 1980s

In a 1969 memorandum (Larson 1969), the department outlined the extent of the fish wheel, dip net, and sport fisheries then operating on the Copper River. The observations and concerns expressed in this memorandum, pertaining to the growth of non-local participation in these fisheries and the corresponding increase in harvests, foreshadow regulatory actions taken by the Board of Fisheries in the late 1970s and early 1980s. From the department's perspective the fish wheel fishery had two components, "subsistence" and "personal use." The former was said to account for approximately "60 to 70 percent" of participation and harvest in the fish wheel fishery, with the remainder being "personal use." Most fish wheels were concentrated at sites near Chitina, Copper Center, Gulkana, and Chistochina. Ahtna residing in the above locations took a majority of the fish, and approximately 80 to 90 percent of the fish wheel participants lived within 10 miles of the Copper River. The memo noted that fish wheels were "popular with most residents of the [Copper River] area, native and non-native. Several families will generally get together to operate one wheel throughout the season."

In the department's view, the dip net fishery was "50 percent recreational." This fishery was localized near Chitina and most participants were "non-resident" (i.e. non-basin residents) who lived more than 50 miles from the Copper River, the majority coming from Anchorage and Fairbanks. According to the department, "for all practical purposes, this can be considered a personal use - recreational fishery", with the distance traveled, equipment used, and expense incurred by dip net fishermen precluding "considering this a subsistence fishery except for a few isolated cases." This fishery was increasing but the increase was being slowed in 1969 because of the poor condition of the road leading to Chitina (Larson 1969). However, improvements were completed by 1970 and a bridge over the Copper River was constructed in 1971 (Stratton and Georgette 1984:118) allowing better access to the popular fishery.

According to the memo (Larson 1969) sport fishermen targeted three areas: Haley Creek, the outlet of Klutina Lake, and the Gulkana River. The memo noted that at the time Haley Creek was difficult to reach, but chinook and sockeye salmon schooled in the clear water of Haley Creek before their ascent of the river, so the fish were especially vulnerable. The Gulkana River was "discovered' in 1969 and the bridge became a popular sport fishing area. The department had to close the chinook fishery on the Gulkana River because people were catching so many fish and there was concern over snagging of sockeye salmon.

In a memo dated January 26, 1971, Alaska Department of Fish and Game area biologist Ken Roberson noted a number of issues related to the subsistence fishery. These included the cost of management, rapidly increasing catches and effort, difficulties in enforcing harvest limits, problems with the sale of fish, problems with the barter of fish wheel usage, problems with the spoilage of fish, and the lack of an index of the catch until the season was over. To address these problems, Roberson suggested restricting participation in the fishery and reducing seasonal limits. His suggestions included: 1) only those eligible for a 25 cent sport fishing license be allowed to obtain fish wheel permits (eligibility was based on income), (2) seasonal limits be lowered for most permittees from the 20 and 40 salmon to 10 and 25 salmon, (3) low income permittees be restricted to 100 and 300 salmon (down from 200 and 500), and (4) the subsistence fishing season be reduced from June 1 to August 31 (Roberson 1971). Although these suggestions were not implemented at the time, regulatory changes adopted in the early 1980s incorporated some of these ideas (see below).

Permit data generally bear out the department's assessments of trends in the Copper River subsistence fishery from the early 1970s. With the completion of improvements to the road to Chitina, participation in the dip net fishery more than doubled between 1969 and 1970 (Figure 1-2 and Table 7-2). The number of dip net permits issued then leveled off until 1982, but the average for the period 1970 through 1981 of 3,243 dip net permits was four times higher than that of the previous 10 years (801 permits), and indeed far exceeded the highest number of permits issued in any single year prior to 1970 (1,415 in

1969). The department continued to issue dip net permits primarily to non-Basin residents (Roberson 1979).

In addition, there was a notable increase in the number of permits issued for fish wheel use, from 167 in 1969 to 267 in 1970 (Figure 2-3, Table 2-7). The average number of fish wheel permits issued for the period 1970 through 1981 was 380, compared to a single year high of 167 (in 1969) for the previous 10 years. An important factor in this increase was the development of portable fish wheels.[11]

Despite increasing participation by non-Copper Basin residents, through the 1960s the subsistence fish wheel fishery had remained primarily local in character, as it had been since the 1910s when this gear type first appeared on the Copper River. This began to change with the introduction of portable wheels (Figure 2-4, Table 2-8). For example, in 1969 (the first year for which data are available), 77.4 percent of all subsistence fish wheel permit holders were Basin residents; by 1976 this had declined to 50.4 percent. The number of fish wheels operated in the Copper River increased from 27 in 1969 to 64 in 1976 and 102 in 1982 (Figure 2-4). Much of this growth occurred just upriver of the bridge at Chitina along the east bank and was the result of non-locals joining the fishery. In 1982, for example, 32 wheels operated along this short stretch of river. Of the 191 fish wheel permittees fishing there, only 27.7 percent were Copper Basin residents (Table 2-9; Stratton 1982:31; Fall and Stratton 1984:35). This trend continued into 1996, when local residents operated only one fish wheel.

In the early 1970s, subsistence harvests (both gear types combined) increased to a record of 48,449 salmon in 1971. The dip net harvest in 1971 (36,338 fish) accounted for a majority of the harvest. Although harvests fluctuated, the average annual salmon harvest for the period 1970 though 1980 was 31,617, compared to 18,749 fish for the previous decade (Table 2-7, Figure 2-5).

[11] Urban fishermen developed portable fish wheels. These wheels were often made out of metal, such as aluminum, and trucked to the fishing site, sometimes as component parts, and then assembled. After the fishing season some of these wheels are disassembled and transported back to the urban areas, but the majority are simply hauled out of the water and left on the bank.

Figure 2-3. Number of Subsistence Permits Issued, Glennallen Subdistrict, 1960 - 2001

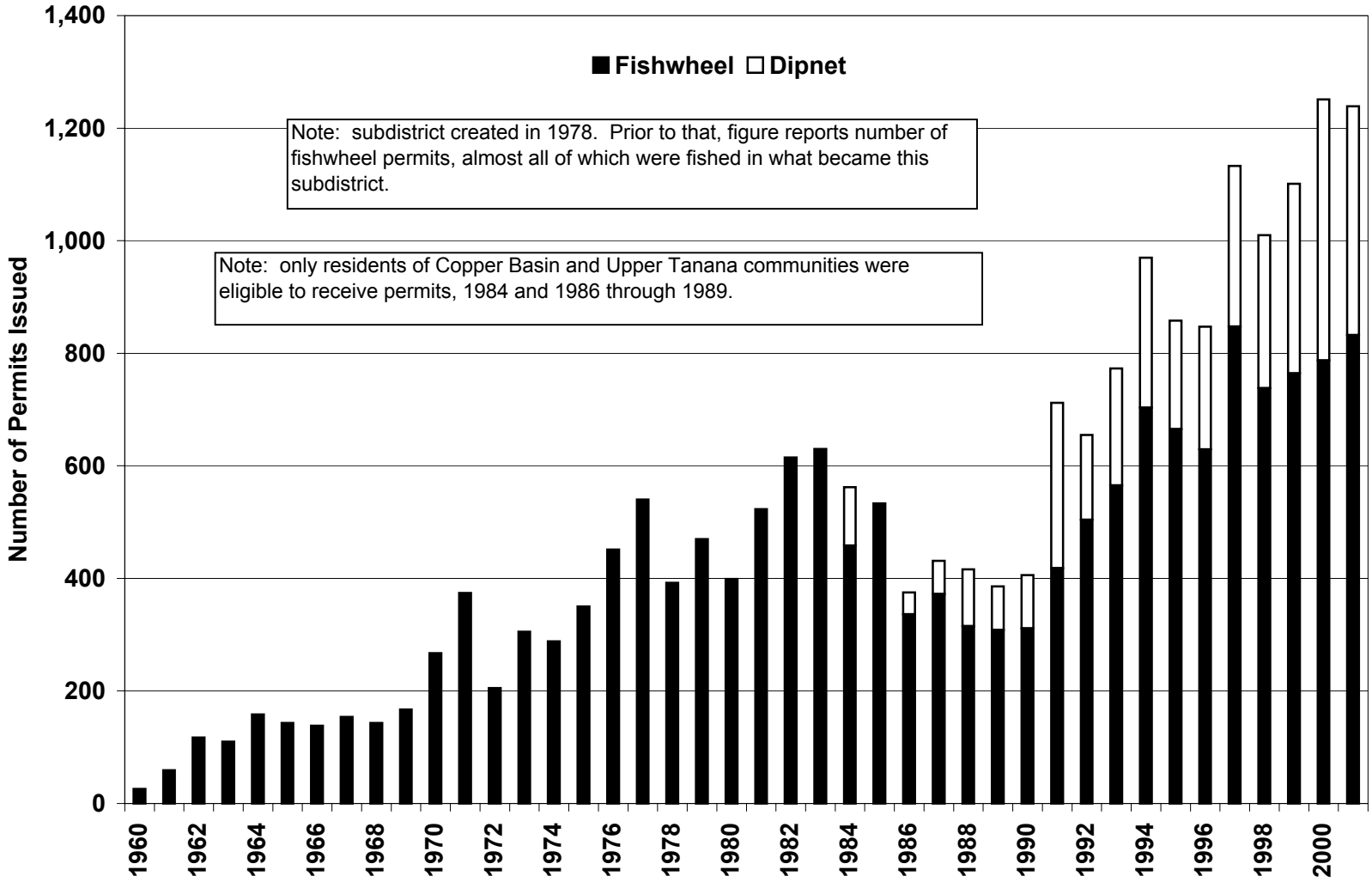


Figure 2-4. Number of Upper Copper River Fish Wheel Subsistence Permits Issued by Area of Residence, 1969 - 2001

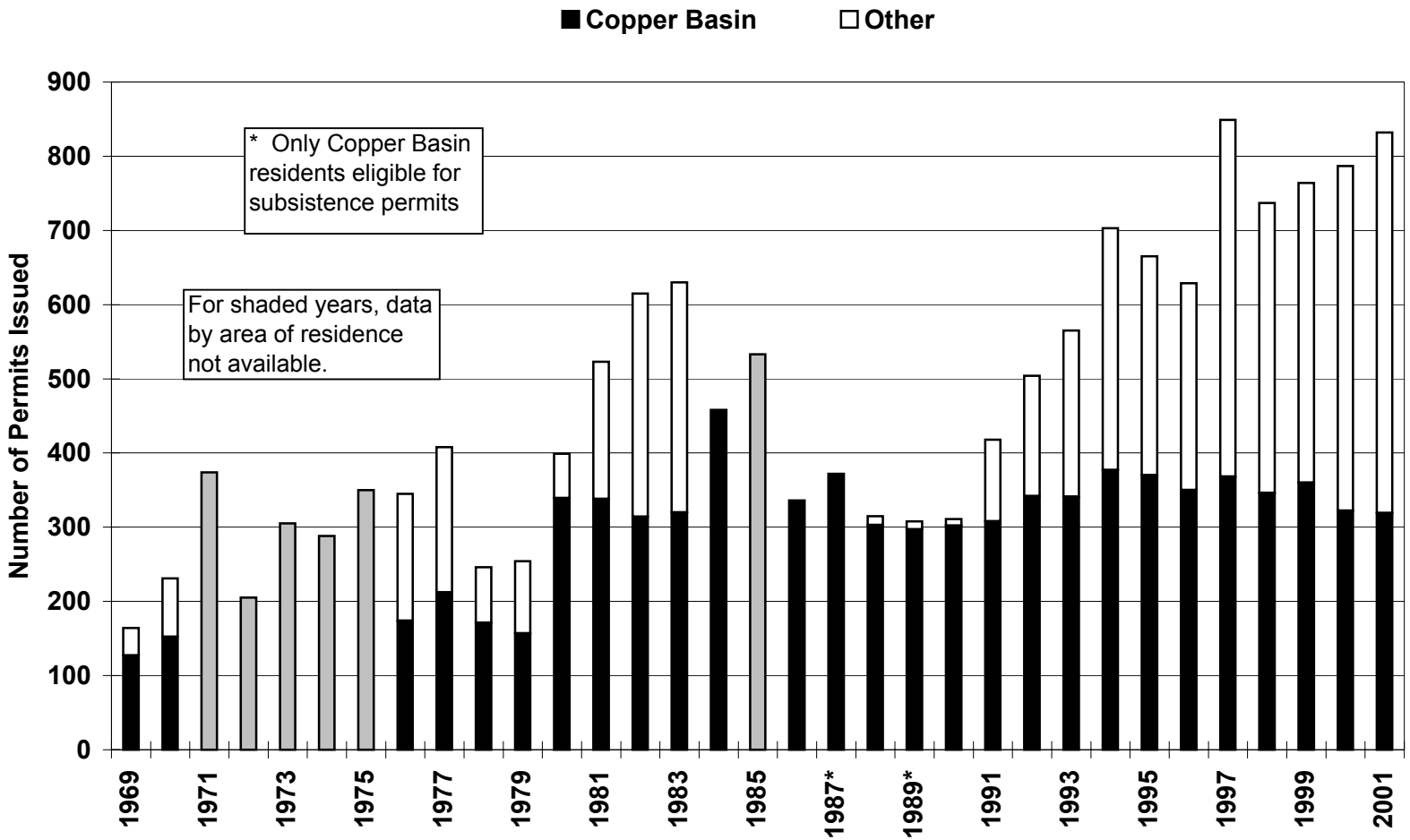


Table 2-8. Residence of Upper Copper River Subsistence Permittees, 1969 - 2001 **

	Fish Wheels									Dip Nets								
	Copper River Basin		Anch.	Frbnks	Mat-Su	Other	Total, Non-Basin		Total, Fish Wheel	Copper River Basin		Anch.	Frbnks	Mat-Su	Other	Total, Non-Basin		Total, Dip Net
1969	127	(77.4%)	24	13			37	(22.6%)	164									
1970	152	(65.8%)	50	29			79	(34.2%)	231									
1971									374									
1972									205									
1973									305									
1974									288									
1975									350									
1976	174	(50.4%)	100	26		45	171	(49.6%)	345									
1977	212	(52.0%)	112	25		59	196	(48.0%)	408									
1978	171	(69.5%)	46	29			75	(30.5%)	246									
1979	157	(61.8%)	42	15		40	97	(38.2%)	254									
1980	339	(85.0%)					60	(15.0%)	399									
1981	338	(64.6%)					185	(35.4%)	523	71	(2.0%)					3484	(98.0%)	3,555
1982	314	(51.1%)					301	(48.9%)	615	85	(1.5%)					5411	(98.5%)	5,496
1983	320	(50.8%)					310	(49.2%)	630	69	(1.0%)	2431	2470	449	1492	6842	(99.0%)	6,911
1984*	458	(100.0%)					0	(0.0%)	458	104	(100.0%)	0	0	0	0	0	(0.0%)	104
1985									533									
1986*	336	(100.0%)	0	0	0	0	0	(0.0%)	336	39	(100.0%)	0	0	0	0	0	(0.0%)	39
1987*	372	(100.0%)	0	0	0	0	0	(0.0%)	372	59	(100.0%)	0	0	0	0	0	(0.0%)	59
1988*	303	(96.2%)	0	1	9	2	12	(3.8%)	315	99	(98.0%)	0	0	2	0	2	(2.0%)	101
1989*	297	(96.4%)	1	0	10	0	11	(3.6%)	308	73	(93.6%)	1	0	3	1	5	(6.4%)	78
1990	302	(97.1%)	0	0	8	1	9	(2.9%)	311	87	(91.6%)	1	1	4	2	8	(8.4%)	95
1991	308	(73.7%)	54	12	33	11	110	(26.3%)	418	83	(28.2%)	77	39	46	49	211	(71.8%)	294
1992	342	(67.9%)	83	19	40	20	162	(32.1%)	504	49	(32.5%)	43	10	27	22	102	(67.5%)	151
1993	341	(60.4%)	115	34	50	25	224	(39.6%)	565	63	(30.3%)	63	8	46	28	145	(69.7%)	208
1994	377	(53.6%)	150	55	66	55	326	(46.4%)	703	56	(21.0%)	121	31	30	29	211	(79.0%)	267
1995	370	(55.6%)	125	38	63	69	295	(44.4%)	665	49	(25.4%)	85	23	17	19	144	(74.6%)	193
1996	350	(55.6%)	128	26	78	47	279	(44.4%)	629	49	(22.5%)	100	27	16	26	169	(77.5%)	218
1997	368	(43.3%)	183	54	95	149	481	(56.7%)	849	49	(17.1%)	124	40	36	38	238	(82.9%)	287
1998	346	(46.9%)	170	36	81	104	391	(53.1%)	737	44	(16.1%)	91	60	22	56	229	(83.9%)	273
1999	360	(47.1%)	172	49	74	109	404	(52.9%)	764	49	(14.5%)	158	63	27	40	288	(85.5%)	337
2000	322	(40.9%)	183	57	99	126	465	(59.1%)	787	76	(0.9%)	2949	3375	1439	770	8533	(99.1%)	8,609
2001	319	38.3%	215	51	113	134	513	(61.7%)	832	103	0.01044	3499	3701	1602	960	9762	(99.0%)	9,865

* Only Copper Basin residents eligible for subsistence permits

** Data unavailable for blank cells. Precise residency for non-Basin permittees not available for all years.

Between 1973 and 1977, the construction of the trans-Alaska oil pipeline again brought opportunities for wage employment, and more newcomers arrived in the Copper Basin. While this initial growth spurt was temporary, many people who had moved to the Basin during the pipeline's construction chose to remain, and the Basin's population jumped 68 percent to 3,213 in 1980 (Table 1-1, Figure 1-2).

In 1975, there were a total of of 55 fish wheels on the Copper River from Chitina to Slana (Table 2-9). On June 26, 1975 the department ordered an emergency closure of the fish wheel fishery due to extremely poor returns. The department also proposed cutting the seasonal limits for the subsistence fishery by 50 percent. The emergency closure was protested by the Copper River Native Association, which asked that an exception be made for the elderly (Roberson 1975).

During the 1978 season, the department closed the seven-day a week subsistence fishery. In June, the fishery was closed during the week and opened during the weekends because of low escapement. The department reasoned that more fish were actually caught during the week (on Tuesdays and Thursdays) than on weekends and it was better for the fishery if the closure occurred during the week (Roberson et al. 1978). Four elderly Ahtna men were arrested for attempting to fish during the closed period and their fish wheels locked up.

The Copper River Native Association objected to the new closed periods saying that it favored non- Basin residents over Basin residents and made it hard for Native people to dry fish properly. The Copper River Advisory Committee met on July 5, 1978 to address this issue. Those attending the meeting had different views on the weekday closures. Some thought it was the correct thing to do, while others thought the department had not handled it well. An Ahtna representative, Bacille Jackson, wrote a paper presented to the meeting about "the usurping of natural resources by other than native people." Some other people thought fish wheels should be better monitored, and there were allegations of wanton waste. Another Ahtna, Walter Charlie, presented a photograph to the meeting of 50 fish in the Glenn-Rich dump. A third, Pete Ewan, complained that the commercial

Table 2-9. Fish Wheel Locations, Copper River Subsistence Fishery 1955 - 1996

Location Of Wheels	1955	1958	1963	1967	1968	1969	1974	1975	1976	1977	1978	1982	1988	1989	1993	1994	1995	1996
Batzulnetas													1		1	1	1	1
Slana								2	2	1	2	8	8	5	13	11	9	7
Chistochina (Old, New Village))		3		2	4	1	5	4	4	7	6	3	6	4	5	3	2	1
Sanford River Mouth				2							1	1						
Gakona (1 - 5 mile Tok Cutoff)		2		9	5	6	6	4	5	8	8	7	10	8	12	11	6	9
Gulkana		3		3	4	3	5	4	4	6	5	8	2	5	3	5	6	7
Gulkana Airport (Richardson Highway mp 119-123)															3		3	1
Copperville (Mile 111.7)								3			12	8	14	10	19	16	18	14
Tazlina (Mile 110-111)		2	3	4	2	2	5	4	8	9		5	7	9	6	9	10	11
Silver Springs								6				4	4	3	9	9	12	13
Copper Center Area (general area total)	8	13	12	17	18	10	11	9	15	20	28	19	17	11	18	20	18	16
Copper Center Village	7	13		13	17		8	5				8		7		11	9	8
Copper Center Loop to below Klutina mouth				4	1		3	4			1	11		4		9	9	8
Klutina River, 500 yds up stream from bridge	1																	
Edgerton Cutoff								2				1	1	1		1	1	
Lower Tonsina		2					2		3		1	2						
Tonsina River, 500 yrds downstream from bridge	1																	
Horse Creek															3			
Chitina Airport, 5 mile and Hooper's	1	2		4	2	3	5	5	6	6	6	6	6	5	8	8	9	11
Chitina Bridge-above or below the bridge	2			3	3		4	9	11	10	13	32	16	16	19	14	11	18
Salmon Point						1		2	4									
O'Brien Creek		2				1		1	2	5	4							
Mendeltna ck. 500 yds. downstream from bridge	1	1																
No Location Given														1				
Totals	13	30	15	44	38	27	43	55	64	72	86	104	92	78	119	108	106	109

1 Data derived from agency sources only. For the earlier years especially, the estimates represent minimum numbers, and some fishing locations might not be documented.
In some years, fish wheels registered for a particular site might not have actually been placed in the water and fished.

Sources: From Agency Data Sources

fishery took many more fish than the fish wheels and that the closure during the week affected Indians more than non-Natives. Robert Marshal, speaking for the majority of Ahtna, said that he did not like the way the new closures was implemented, in that "people 79 to 94 years of age wheels were locked up." He further noted that,

> Indians need fish to survive, the older people cannot survive without fish through the winter! Indian people (Older) did not come right out and say but they are actually begging to be able to catch fish (Minutes of meeting on file, ADF&G, Glennallen).

The advisory board moved that the department open subsistence fishing on the Copper River weekly from Saturday night to Wednesday night inclusive. On July 11, 1978 the Department of Fish and Game modified the original emergency order and by August 8 the restrictions for all fishermen were lifted.

In 1978, the Alaska Legislature passed Alaska's first subsistence statute, providing a preference for subsistence over other uses of fish and wildlife. This statute also directed that in times of shortage, a preference be given to subsistence users based on customary and direct dependence, availability of alternative resources, and local residency.

Beginning in the 1980 season, regulations for the upper Copper River subsistence fishery reflected the new statute by stating that "subsistence permits may be issued to persons who show the greatest level of need for subsistence salmon on the basis of customary and direct dependence upon the resource as the mainstay of one's livelihood, local residency, and availability of alternative resources" (5 AAC 01.647[c], *in* ADF&G 1980:36). The regulations defined four "classes" of permits, with eligibility based on age, income, history of use of the fishery, residency, household size, and employment. Seasonal limits were linked to eligibility for certain permit classes, and allocations above 30 salmon for household were limited to those with incomes under $6,000. A new Copper River management plan adopted for 1980 also linked weekly fishing opportunities to run strength and permit class.

In the early 1980s, another large increase in participation in the Chitina dip net fishery was underway. The number of dip net permits issued rose from 2,804 in 1980 to 6,911 in 1983, a 146 percent increase in just four years (Table 2-7, Figure 2-1). In 1983, 99.0 percent of the dip net permittees were non-Basin residents.

Participation in the fish wheel fishery also continued to grow, although at a slower pace. A record 630 fish wheel permits were issued in 1983, 47.9 percent to non-local residents (Table 2-7). A number of explanations can be offered for this growth, including abundant salmon and consequent increases in fishing time, publicity about the fishery (especially word of mouth among participants), and new restrictions on subsistence fisheries in the Cook Inlet Area. Continued growth of Alaska's urban areas was undoubtedly another factor in the increasing popularity of the Chitina dip net fishery.

As with permits, there was a tremendous increase in subsistence salmon harvests beginning in 1981. In that year, the estimated harvest was 68,746 salmon, almost double the year before and included notable increases in both the dip net and fish wheel harvests. This rapid growth continued, mostly in the dip net fishery, with a record harvest of 118,728 salmon reached in 1983 (79,267 caught with dip nets) (Table 2-7, Figure 2-2).

During this period of increasing participation and increasing harvests, there was a decrease in the average number of salmon harvested per permit (Table 2-7). This most likely reflects the increase in non-local participation in the fishery, who generally harvested fewer salmon than Copper Basin residents.

The Separation of the Personal Use Fishery from the Subsistence Fishery, 1984

Alaska's first subsistence statute, passed in 1978, defined subsistence as "customary and traditional uses" and eight criteria (listed below) were developed to measure those uses.

1. A long-term consistent pattern of non-commercial taking, use, and reliance on the fish stock or game population that has been established over a reasonable period of time of not less than one generation, excluding interruption by circumstances beyond the user's control, such as unavailability of the fish and game caused by migratory patterns.

2. A pattern of taking or use recurring in specific seasons of each year.
3. A pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost.
4. The area in which the non-commercial, long term, and consistent patterns of taking, use, and reliance upon the fish stock and game population has been established.
5. A means of handling, preparing, and storing fish or game that has been traditionally used by past generations, but not excluding recent technological advances where appropriate.
6. A pattern of taking or use that includes handing down of knowledge of fishing or hunting skills, values, and lore from generation to generation.
7. A pattern of taking, use, and reliance where the harvest effort or products of that harvest are distributed or shared, including customary trade, barter, and gift giving.
8. A pattern that includes taking, use, and reliance for subsistence purposes upon a wide diversity of fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life.

In 1984, the BOF, for the first time, applied these criteria to the fish wheel and dipnet fisheries of the upper Copper River, and concluded that the uses of the Copper River salmon stocks in the Glennallen Subdistrict supported customary and traditional use but that the dipnet fishery in the Chitina Subdistrict did not. As a result the BOF closed the Chitina Subdistrict to subsistence salmon fishing, but authorized a personal use fishery with dipnets and fish wheels to provide a continuing opportunity for Alaskans to harvest salmon for home use there. When making their decision in 1984, the BOF was presented with information contrasting the uses of salmon in the Glennallen fish wheel fishery with those of the Chitina dipnet fishery (Table 2-10).

In 1992, following the *McDowell* decision, the state passed a new subsistence statute in retaining the requirement that subsistence uses be "customary and traditional." Meeting in January 1993, the Board of Fisheries affirmed its 1984 decision that uses of salmon in the Glennallen Subdistrict met the criteria for customary and traditional use, but those of the Chitina Subdistrict did not. The information presented to the Board at that meeting was virtually the same as that used in 1984 (ADF&G 1993). Subsequently, several

Table 2-10. Summary of Information Presented to the Board of Fisheries about Characteristics of Upper Copper River Subsistence Salmon Fisheries, February 1984

1. A Long Term, Consistent Pattern of Use

Glennallen Subdistrict	Chitina Subdistrict
In the early 1980s, most participants in the fish wheel fishery of the Glennallen Subdistrict were residents of the Copper River basin (52 percent in 1983). The indigenous Ahtna Athabaskans had used the salmon of the Copper River for subsistence for centuries, adopting the fish wheel in the second decade of the 20th century. In 1982, over 50 percent of a sample of Basin-resident fish wheel users had used fish wheels for more than 20 years. As many as 75 percent of the households of communities near the Copper River regularly engaged in fish wheel use (Fall and Stratton 1984	The vast majority of participants in the dip net fishery at Chitina in the early 1980s (and back to the 1960s) were non-Copper River Basin residents. In 1982, 98 percent of dip net permittees were non-Basin residents, with most traveling from Fairbanks (35 percent), Anchorage (26 percent), military bases (13 percent), and the Mat-Su area (6 percent). A survey conducted in 1982 found that 41 percent were participating in the fishery for the first time; 72 percent had participated for 5 years or less; and 2 percent had participated more than 20 years (Stratton 1982:55). Many of those interviewed indicated that since they first dipnetted at Chitina, there had been intervening years when they had not participated due to employment, being out of state, involvement in another salmon fishery, or having enough salmon from the previous year (Stratton 1982:54).

2. A Use Pattern Recurring in Specific Seasons

Glennallen Subdistrict	Chitina Subdistrict
Most chinook and sockeye salmon taken beginning in June through early July; coho harvested later in the year, mostly in late August and September.	Chinook and sockeye salmon taken beginning in June and continuing into August; coho harvested later in the year, late August and September.

3. Efficient and Economical Methods and Means of Harvest

Glennallen Subdistrict	Chitina Subdistrict
Due to their efficiency, fish wheels had long been the gear of choice among Basin residents, most of whom fished in the Glennallen Subdistrict at sites near their homes.	Dip nets were used exclusively in this subdistrict by regulation in the early 1980s and had predominated in this area since statehood. Most participants traveled from from Fairbanks (630 miles by road, round trip), the Mat-Su area (414 miles from Palmer, round trip), and Anchorage (500 miles, round trip). Of those dip netters interviewed in 1982, 20 percent planned to fish one day at Chitina; a third planned to spend a weekend; a third planned to stay until theycaught their limit; and the remainder planned to make more than one trip (Stratton 1982:56).

4. The Area in which the Use has been established

Glennallen Subdistrict
In the early 1980s, there were about 10 "clusters" of fish wheels along the Copper River. Owners normally paced their wheels in the same general area each year. Among long-term Basin residents, wheels are placed from sties that are recognized as "belonging" to certain families. This right to sue a particular site appears to be inherited through lines of kinship. Long-term Basin residents tended to operate their fish wheels from camps with permanent facilities for processing the salmon. Other basin residents transported their catch to their permanent residents, where processing and storage occurred (Stratton 1982:14; Fall and Stratton 1984:34).

Chitina Subdistrict
Fishing takes place downstream from the bridge over the Copper River at Chitina to the subdistrict boundary at. There is no use of privately-owned or traditional fish camps, with many participants arriving in campers (Stratton 1982:56).

5. Means of handling, preparing, preserving and storing which have been traditionally used by past generations

Glennallen Subdistrict
Most Basin fish wheel operators used a combination of methods to preserve their salmon catch, including canning (63 percent), freezing(59 percent), smoking (52 percent), drying (45 percent), kippering (13 percent), and salting (11 percent).

Chitina Subdistrict
Interviews conducted in 1982 found that freezing was used most frequently by dip netters. About 46 percent smoked at least a portion of their catch; only 2 percent dried salmon (Stratton 1982:57-58).

6. Handing down of knowledge of fishing from generation to generation

Glennallen Subdistrict
Among Basin fish wheel operators, fishing groups tended to be composed of relatives (73 percent in 1982). Knowledge of fish wheel operation and salmon preservation methods was passed down within extended families (Stratton 1982:40).

Chitina Subdistrict
As noted under Criterion 1, most dipnetters were relatively new to the fishery in the early 1980s. Frequently, their initial involvement stemmed from word-of-mouth reports in their home towns and on military bases (Stratton 1982:54)

7. Sharing of products of the harvest

Glennallen Subdistrict
Sharing of salmon was found to be common among Copper Basin families; salmon is an important food served at potlatches (Stickney and Cunningham 1979:13; Stratton and Georgette 1984).

Chitina Subdistrict
A minority (44 percent) of non-local residents who participated in the Copper River fishery (most of whom fish with dip nets at Chitina) shared salmon with relatives or friends outside their household. This is likely related in part to relatively low harvests (Stickney and Cunningham 1979:13-14).

8. Use upon a wide variety of fish and game resources

Glennallen Subdistrict
Salmon comprised a large portion of many Basin households' supplies of food. Most fishing and hunting by Basin households took place within the Basin. Few Basin households participated in salmon fisheries in other parts of the state (Fall and Stratton 1984:39,51).

In Copper Basin communities, the monetary sector of the local economy is largely confined to government services, tourism, and construction. Wage employment is predominately seasonal, and mean household incomes are low (Fall and Stratton 1984:48).

Chitina Subdistrict
Non-Basin participants in the Copper River subsistence fishery largely harvested other resources outside the Basin; in 1982, 37 percent of dipnetters interviewed also used salmon fisheries outside the Basin (Fall and Stratton 1984:51).

In 1979, non-local participants in the Copper River subsistence fishery (most of whom fished with dip nets at Chitina) reported more full-time wage employment, more employed household members and higher monetary incomes that did Basin residents (Stickney and Cunningham 1979:10-11).

Sources: Fall and Stratton 1984; Stickney and Cunningham 1979; Stratton 1984

attempts were made by users to have the BOF reclassify the dipnet fishery as a subsistence fishery. At its December 1996 meeting, the BOF unanimously rejected a proposal to make a positive customary and traditional use finding that would have opened the Chitina Subdistrict to subsistence fishing. Finally, in 1999 the BOF, using the eight criteria, determined that the salmon stocks of the Chitina subdistrict did meet the standard for customary and traditional use. A key element in making this determination was whether continuity existed between the post-statehood urban-based dipnet fishery and the use patterns established by Ahtna Athabaskans and other Copper River Basin residents in an earlier time. Through testimony offered mostly by representatives of the Chitina Dipnetters Association (CDA) the BOF decided there was continuity.

However, in creating a Chitina Subdistrict subsistence fishery the BOF did not substantially change the regulations but retained, for the most part, the regulations pertaining to the former Copper River personal use fishery (except that they reduced the seasonal limit of chinook salmon from four to one). In addition the BOF set the amount necessary for the Chitina Subdistrict fishery for wild stock salmon at 85,000 to 130,000 salmon and said that permit holders no longer needed to obtain a sport fishing license. As in the past, fishing periods for the Chitina Subdistrict were to be determined based on the numbers of salmon passing the Miles Lake sonar (ADF&G 2000). Regulations regarding the Glennallen Subdistrict subsistence fishery were unchanged so the BOF, in effect, maintained the separation between the Chitina and Glennallen subdistricts that had been in place since the two subdistricts were created in 1977.

Almost immediately the Ahtna protested the BOF's action. Darryl Jordan, CEO of Ahtna Incorporated, wrote that the shareholders of the corporation were "vehemently opposed" to the action taken by the BOF and they request that the Board appoint a review committee to reconsider their actions (Ahtna 2000). In response, the Board created a review committee to conduct a public hearing to determine whether "expedited consideration is required." The BOF took this action because the petitions received from the Copper River Native Association and Ahtna Incorporated did not contain "any new information relative to the Board's action" and as a result accepting the petitions at this

time would be "premature" (BOF n.d.). On March 28, 2000 a three person subcommittee of the Board held a public meeting in Anchorage that was attended by a number of Ahtna, other residents of the Copper River Basin, representatives from the Chitina Dipnetters Association, the Fairbanks Advisory Committee, and the Alaska Department of Fish and Game. The committee was specifically looking for new information that might warrant immediate reconsideration by the BOF, but did not hear any, and reconsideration was denied.

The McDowell Decision, Federal Fisheries Management, and Participation and Harvest Trends since 1989

In 1971 Congress passed the Alaska Native Claims Settlement Act (ANCSA) thereby extinguishing aboriginal hunting and fishing rights. Congress moved to protect those rights in the Alaska National Interest Lands Conservation Act (ANILCA). Under ANILCA, rural Alaska residents were granted a subsistence priority and the State of Alaska was allowed to manage fish and game resources on federal lands as long as it maintained that priority. To comply with ANILCA the state legislature passed a subsistence law to include a rural priority but in December 1989, the Alaska Supreme Court in the *McDowell* case found the provisions of the state statute limiting participation in subsistence hunting and fishing to rural residents to be unconstitutional. This portion of the statute was overturned and the state was no longer in compliance with ANILCA. As a result, in 1990, the federal government assumed management of subsistence hunting on federal lands in Alaska. Initially federal authorities took a narrow view of their role in fisheries management because they limited their jurisdiction to non-navigable waters. Since most fishing takes place in navigable waters, federal managers had minimal management or oversight of the state's fisheries (Norris 2002:242). The *Katie John* case changed this situation.

In November 1983, Doris Charles asked the State of Alaska if she could put a fish wheel in the Copper River just below its confluence with Tanada Creek, near her natal home of Batzulentas. She was told that the Copper River was closed to subsistence fishing above the mouth of the Slana River but that she could propose to the Alaska Board of Fisheries

(BOF) that they reopen the area to subsistence fishing (Kahklen 1983). Charles, along with Katie John, who had also been born in Batzulentas, and the Mentasta Village Council, petitioned the BOF to consider opening a subsistence fishery at Batzulnetas. Their petition was denied. Both women filed suit against the State of Alaska claiming that allowing commercial fishing at the mouth of the Copper River, while at the same time restricting subsistence fishing at Batzulnetas, violated the priority requirement of Section 804 of the Alaska National Interest Lands Conservation Act ANILCA (Peel 2001:4). After years of negotiations the State agreed to open a fishery and in 1988 the BOF adopted the agreement. But Charles and John considered the regulations passed by the Board too narrow and they petitioned the court for redress. As a result they were granted a preliminary injunction allowing full-time fishing rights at Batzulnetas. The court then declared the State's 1988 regulations invalid and ordered the BOF to pass new regulations that provided a subsistence priority at Batzulnetas. However, at this point the Alaska State Supreme Court had just declared the State's subsistence law unconstitutional in the *McDowell Case* so the state was no longer in compliance with ANILCA.

With the state no longer managing wildlife on federal lands the Federal Subsistence Board (FSB) stepped in and passed temporary fishing regulations that mirrored state regulations. John petitioned the FSB to undo these regulations, but in a surprise move the FSB declared that Tanada Creek and the Copper River were navigable waters and therefore not under federal jurisdiction and not subject to ANILCA (Nockels 1996:699). John and Charles challenged this decision, maintaining that by not taking over management of subsistence on navigable waters the federal government was not fulfilling its obligation to manage subsistence on federal lands. In March 1994 a federal court ruled that the federal government did indeed have the authority to manage subsistence on navigable waters. The State appealed the decision but in April 1995 the ruling was upheld and a subsequent attempt by the State to have the decision revisited failed. In August 2001 the Governor of Alaska decided not to appeal the ruling to the Supreme Court.

As result of *McDowell* and *Katie John* there is now a dual system of fisheries management on the upper Copper River, as well as the rest of the state. While eligibility differs under state and federal regulations, as of 2002, federal and state regulations are nearly identical in terms of fishing seasons and harvest limits. Beginning in 2002, federally qualified users were allowed to put fish wheels in the Chitina Subdistrict.

While federal management did not significantly alter the fishery, the *McDowell* decision, in opening the fishery to all Alaska residents, invited greatly expanded participation in the fishery and increased harvests over those of the late 1980s. Not surprisingly, most of the increase in participation during this period came from non-local residents. In 1990 just 17 fish wheel subsistence permits were issued to non-basin residents, compared to 311 in 1991, 537 in 1994, and 692 in 1999. With the addition of the Chitina dip net fishery in 2000, the proportion of non-basin resident participation increased to 96 percent (Figure 2-3, Table 2-7).

Non-local fishers now dominate both the fish wheel and dip net fisheries. Between 1999 and 2001 non-local participation in the fish wheel fishery expanded from 52.9 to 61.7 percent of all permit holders, while local participation decreased from 47.1 to 38.3 percent. In all three years a majority of the non-basin residents who received fish wheel permits came from Anchorage and the Matanuska-Sustina Valley (Figure 2-3, Table 2-8). Non-local participation in the dip net fishery has also increased, so that in 2001, 99 percent of the dip net permits were issued to non-basin residents. Just over 50 percent of these permits went to residents from Anchorage and the Matanuska-Sustina Valley (Table 2-8).

Although non-local fishermen obtain fish wheel permits, a much larger percentage obtain dip net subsistence permits than do Copper Basin residents (Table 2-8). For the period 1991 through 1996, 41.3 percent of subsistence permits issued to non-Basin residents were for dip nets, compared to 14.3 percent for Basin residents. This difference in gear type preference is even more pronounced for the period 1999-2001, when the Chitina Subdistrict was included as a subsistence fishery. In that period, 93 percent of the

subsistence permits issued to non-Basin residents were for dip nets compared to 18.5 percent for Basin residents.

Estimated total harvests in the Upper Copper River subsistence fishery steadily increased from 1990, when 33,518 fish were harvested (almost all by Basin residents) to 71,843 in 1994 (41.7 percent by nonlocal residents), an increase of 114 percent in five years (Figure 2-5, Figure 2-6, Table 2-11). Most of this harvest was with fish wheels (89.5 percent for the period 1990 through 1996). As with participation, harvests dropped from the 1994 peak of 71,843 fish, to about 56,308 fish in 1995 and 54,923 fish in 1996. In those years, participation by Basin residents remained fairly stable accounting for about 60.2 percent of the total (Table 2-12). In 1999 the total subsistence harvest was 60,505 and Basin residents accounted for 45.7 percent of the total. With the reclassification of the Chitina dip net fishery in 1999 from personal use to subsistence, harvests classified as subsistence tripled to 182, 376 in 2000 and rose to 229,507 in 2001. In both years Basin residents accounted for about 15 percent of the total harvest.

Figure 2-5. Estimated Salmon Harvests in the Subsistence Fishery of the Glennallen Subdistrict, 1960 - 2001

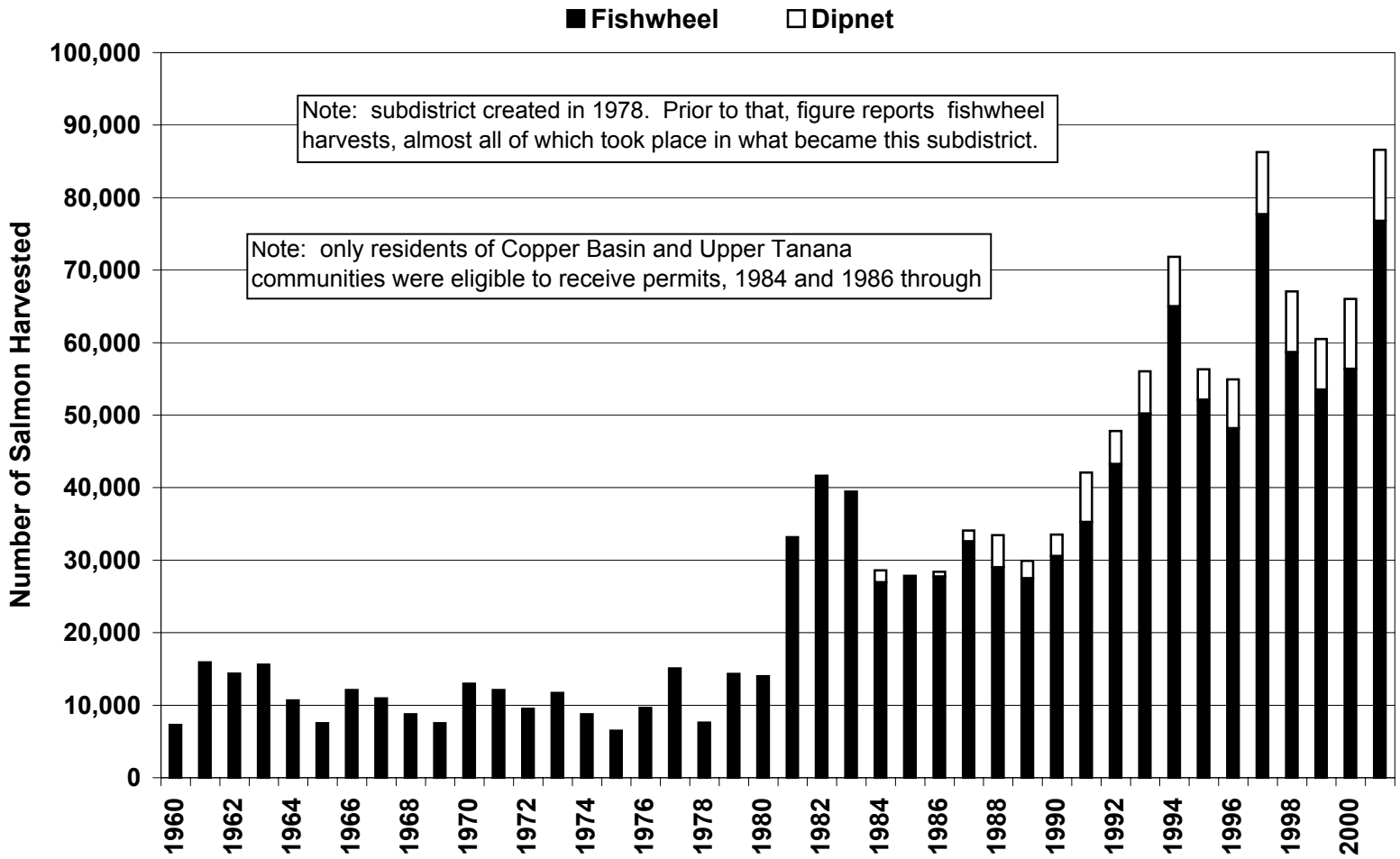


Table 2-11. Estimated Subsistence Salmon Harvests by Area of Residence, Upper Copper River, 1984 to 2001 **

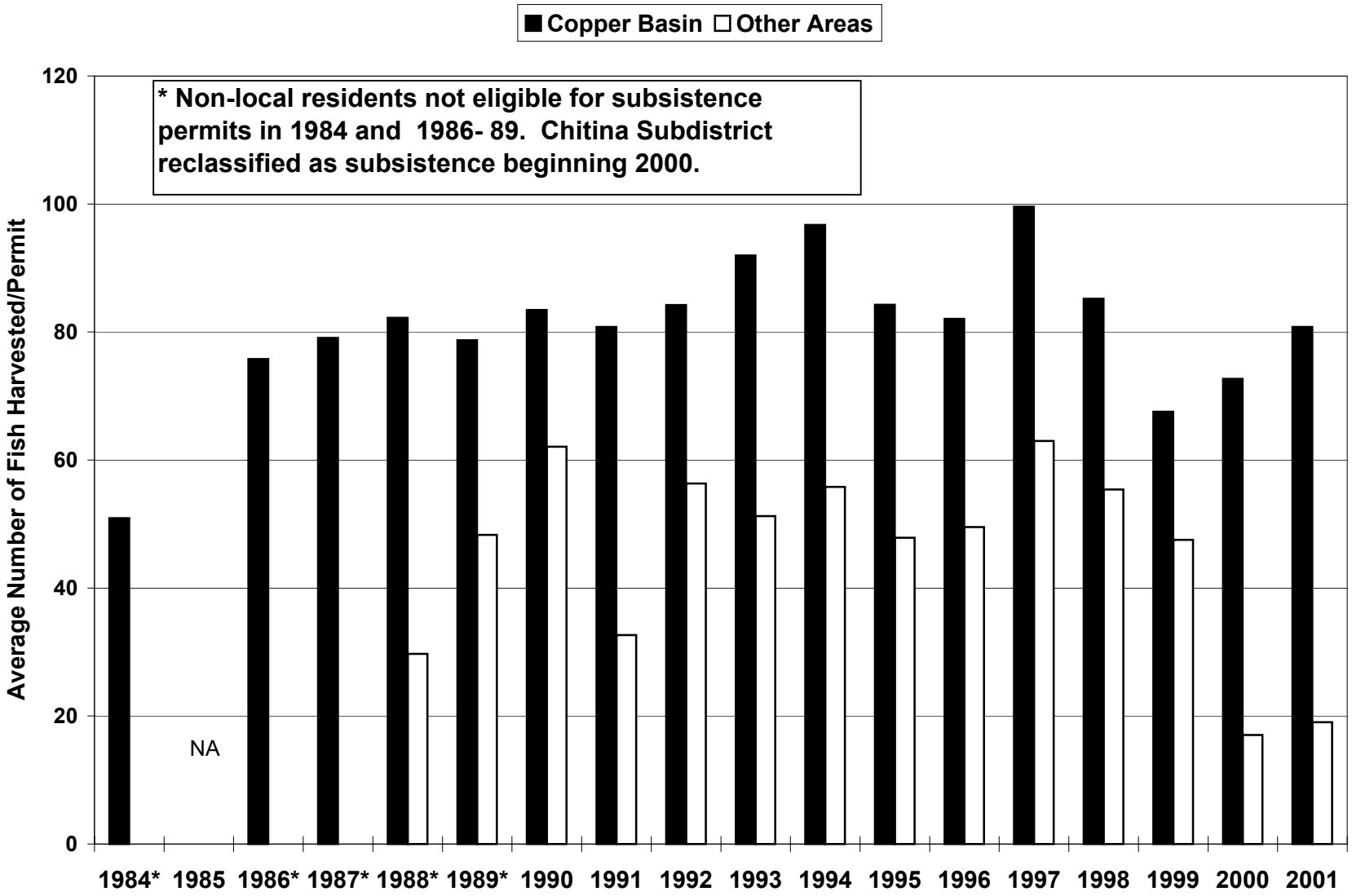
	Fish Wheel Harvests				Dip Net Harvests				Total Harvests			
	Copper Basin		Other Areas		Copper Basin		Other Areas		Copper Basin		Other Areas	
Year	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1984*	26,915	100.0%	0	0.0%	1,702	100.0%	0	0.0%	28,617	100.0%	0	0.0%
1985												
1986*	27,706	100.0%	0	0.0%	711	100.0%	0	0.0%	28,417	100.0%	0	0.0%
1987*	32,578	100.0%	0	0.0%	1,502	100.0%	0	0.0%	34,080	100.0%	0	0.0%
1988*	28,564	98.6%	416	1.4%	4,489	100.0%	0	0.0%	33,053	98.8%	416	1.2%
1989*	26,843	97.7%	645	2.3%	2,285	94.7%	128	5.3%	29,128	97.4%	773	2.6%
1990	29,699	97.2%	845	2.8%	2,764	92.9%	210	7.1%	32,463	96.9%	1,055	3.1%
1991	28,209	80.0%	7,039	20.0%	3,387	49.6%	3,440	50.4%	31,596	75.1%	10,479	24.9%
1992	31,163	72.1%	12,072	27.9%	1,770	38.7%	2,801	61.3%	32,933	68.9%	14,873	31.1%
1993	34,754	69.2%	15,450	30.8%	2,399	40.9%	3,462	59.1%	37,153	66.3%	18,912	33.7%
1994	40,298	62.0%	24,707	38.0%	1,587	23.2%	5,251	76.8%	41,885	58.3%	29,958	41.7%
1995	34,236	65.7%	17,853	34.3%	1,068	25.3%	3,151	74.7%	35,304	62.7%	21,004	37.3%
1996	31,448	65.3%	16,719	34.7%	1,297	19.2%	5,459	80.8%	32,745	59.6%	22,178	40.4%
1997	40,122	51.5%	37,721	48.5%	1,402	15.7%	7,545	84.3%	41,524	47.8%	45,266	52.2%
1998	32,121	54.3%	26,992	45.7%	1,097	13.0%	7,358	87.0%	33,218	49.2%	34,350	50.8%
1999	26,826	50.2%	26,665	49.8%	802	11.4%	6,212	88.6%	27,628	45.7%	32,877	54.3%
2000	27,811	49.3%	28,545	50.7%	1,113	0.9%	124,907	99.1%	28,924	15.9%	153,452	84.1%
2001	32,531	42.4%	44,222	57.6%	1,559	1.0%	151,195	99.0%	34,090	14.9%	195,417	85.1%
Totals	531,824		259,891		30,934		321,119		562,758		581,010	

* Only Copper Basin residents eligible for subsistence permits in these years.

** Database available for 1988 to present only; 1984, and 1986 - 1987 all permitees assumed to be all Basin residents; no residency data for 1985.

Source: Alaska Department of fish and Game, Upper Copper River Subsistence Permit Database

Figure 2-6. Average Salmon Harvest per Subsistence Permit (Both Gear Types) by Area of Residence, Upper Copper River, 1984 - 2001



Trends in the subsistence fish wheel harvest for the period 1986 through 1996 reflected those of the subsistence fishery overall (Figure 2-5). Most of the increase in fish wheel harvests since 1989 was due to the reintroduction of non-local residents into the fishery. Basin residents continued to account for most of the fish wheel harvest until 2000 and 2001, at which point non-Basin fish wheel users began to account for 50 percent or more of the harvest. This pattern is even more pronounced for the dip net fishery. By 2001, 85.1 percent of the dip net harvest was taken by non-Basin residents.

Trends in average catches per permit for 1984 through 2001 are summarized in Table 2-12. Compared to participation and harvest, the average catch per permit has been relatively stable over this time period, at about 80 to 90 salmon per permit (Table 2-7). Dip net permittees tended to harvest less salmon on average than fish wheel users. Copper Basin subsistence fishers, on average, harvest more salmon than non-Basin permittees (Figure 2-7).

Composition of the Subsistence Harvest

Subsistence harvests reflect the general abundance of salmon species in the Copper River. As shown in Figure 2-8, for the period 1984 through 1996, sockeye salmon dominated the subsistence harvest, ranging between 95 percent and 98 percent of the total harvest. For the period 1984 through 1996 (excluding 1985), sockeye made up, on average, 96.4 percent of the total subsistence salmon catch in the Upper Copper River District. During this same period, chinook made up 2.8 percent of the total harvest. The average annual harvest in the subsistence fish wheel fishery was 1,198 chinook salmon, with a high of 2,030 in 1994. With an average annual harvest of 294 fish, coho salmon made up 0.7 percent of the total subsistence harvest from 1984 trough 1996. For 1999 the sockeye salmon harvest in the Glennallen Subdistrict was 57, 139 fish or 94.4 percent of the harvest. This was down from the 1997 harvest of 86,790 sockeye, which was the highest on record for the Glennallen subsistence fishery. Chinook salmon was 3.9 percent of the total subsistence harvest in 1999. Combining the subsistence harvests of the Glennallen and Chitina Subdistricts for the years 2000 and 2001, sockeye salmon made up 94.4 percent of the total harvest while chinook comprised 3.5 percent (Table 2-13).

Figure 2-7. Average Salmon Harvest per Subsistence Permit (Both Gear Types) by Area of Residence, Upper Copper River, 1984 - 2001

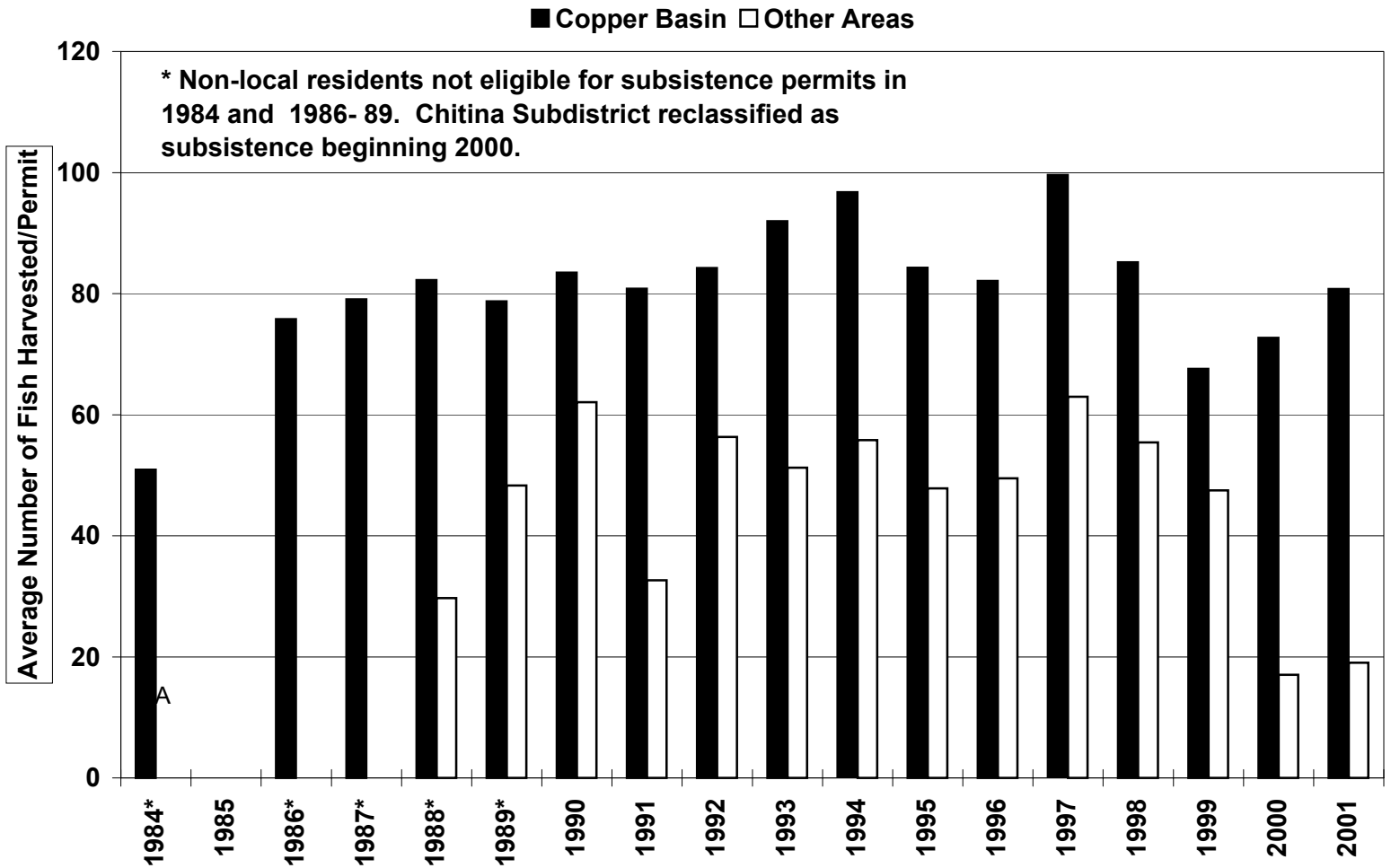


Table 2-12. Average Salmon Catch per Subsistence Permit by Area of Residence and Gear Type, Upper Copper River, 1984 - 2001

	Fishwheels						Dipnets						All Permits					
	Basin			Non-Basin			Basin			Non-Basin			Basin			Non-Basin		
	Permits	Harvest	Mean	Permits	Harvest	Mean	Permits	Harvest	Mean	Permits	Harvest	Mean	Permits	Harvest	Mean	Permits	Harvest	Mean
1984*	458	26,915	58.8	0	0	0.0	104	1,702	16.4	0	0	0.0	562	28,617	50.9	0	0	0.0
1985																		
1986*	336	27,706	82.5	0	0	0.0	39	711	18.2	0	0	0.0	375	28,417	75.8	0	0	0.0
1987*	372	32,578	87.6	0	0	0.0	59	1,502	25.5	0	0	0.0	431	34,080	79.1	0	0	0.0
1988*	303	28,564	94.3	12	416	34.7	99	4,489	45.3	2	0	0.0	402	33,053	82.2	14	416	29.7
1989*	297	26,843	90.4	11	645	58.6	73	2,285	31.3	5	128	25.6	370	29,128	78.7	16	773	48.3
1990	302	29,699	98.3	9	845	93.9	87	2,764	31.8	8	210	26.3	389	32,463	83.5	17	1,055	62.1
1991	308	28,209	91.6	110	7,039	64.0	83	3,387	40.8	211	3,440	16.3	391	31,596	80.8	321	10,479	32.6
1992	342	31,163	91.1	162	12,072	74.5	49	1,770	36.1	102	2,801	27.5	391	32,933	84.2	264	14,873	56.3
1993	341	34,754	101.9	224	15,450	69.0	63	2,399	38.1	145	3,462	23.9	404	37,153	92.0	369	18,912	51.3
1994	377	40,298	106.9	326	24,707	75.8	56	1,587	28.3	211	5,251	24.9	433	41,885	96.7	537	29,958	55.8
1995	370	34,236	92.5	295	17,853	60.5	49	1,068	21.8	144	3,151	21.9	419	35,304	84.3	439	21,004	47.8
1996	350	31,448	89.9	279	16,719	59.9	49	1,297	26.5	169	5,459	32.3	399	32,745	82.1	448	22,178	49.5
1997	368	40,122	109.0	481	37,721	78.4	49	1,402	28.6	238	7,545	31.7	417	41,524	99.6	719	45,266	63.0
1998	346	32,121	92.8	391	26,992	69.0	44	1,097	24.9	229	7,358	32.1	390	33,218	85.2	620	34,350	55.4
1999	360	26,826	74.5	404	26,665	66.0	49	802	16.4	288	6,212	21.6	409	27,628	67.6	692	32,877	47.5
2000	322	27,811	86.4	465	28,545	61.4	76	1,113	14.6	8,533	124,907	14.6	398	28,924	72.7	8,998	153,452	17.1
2001	319	32,531	102.0	513	44,222	86.2	103	1,559	15.1	9,762	151,195	15.5	422	34,090	80.8	10,275	195,417	19.0

* Only Copper Basin residents were eligible for subsistence permits in 1984, and 1987 - 1989. Residency data not available for 1985.

Source: Alaska Department of Fish and Game Upper Copper River Subsistence Permit Database

Table 2-13. Salmon Harvest by Species, Upper Copper River Subsistence Fishery (All Gear Types)

	Estimated Harvest						Percentage of Harvest					
Year	Total	Sockeye	Chinook	Coho	Steelhead	Other*	Sockeye	Chinook	Coho	Steelhead	Other	Nonsalmon
1984	28,617	27,741	548	313		11	96.9%	1.9%	1.1%	0.0%	0.0%	0.0%
1985**												
1986	28,417	27,435	686	291		5	96.5%	2.4%	1.0%	0.0%	0.0%	0.0%
1987	34,080	33,106	813	161		0	97.1%	2.4%	0.5%	0.0%	0.0%	0.0%
1988	33,469	31,770	1,080	405	42	171	94.9%	3.2%	1.2%	0.1%	0.5%	0.6%
1989	29,901	28,934	803	70	3	91	96.8%	2.7%	0.2%	0.0%	0.3%	0.3%
1990	33,519	32,748	657	94	0	20	97.7%	2.0%	0.3%	0.0%	0.1%	0.1%
1991	42,075	40,435	1,356	237	2	45	96.1%	3.2%	0.6%	0.0%	0.1%	0.1%
1992	47,805	45,913	1,471	355	25	41	96.0%	3.1%	0.7%	0.1%	0.1%	0.1%
1993	56,064	54,426	1,465	78	9	85	97.1%	2.6%	0.1%	0.0%	0.2%	0.2%
1994	71,842	69,686	2,030	61	10	56	97.0%	2.8%	0.1%	0.0%	0.1%	0.1%
1995	56,308	53,451	1,926	897	19	15	94.9%	3.4%	1.6%	0.0%	0.0%	0.1%
1996	54,924	52,614	1,542	560	29	179	95.8%	2.8%	1.0%	0.1%	0.3%	0.4%
1997	86,790	83,982	2,617	190	0	0	96.8%	3.0%	0.2%	0.0%	0.0%	0.0%
1998	67,568	65,155	1,860	551	0	0	96.4%	2.8%	0.8%	0.0%	0.0%	0.0%
1999	60,505	57,139	2,338	811	25	192	94.4%	3.9%	1.3%	0.0%	0.3%	0.4%
2000***	182,376	169,920	8,155	4,296	0	5	93.2%	4.5%	2.4%	0.0%	0.0%	0.0%
2001***	229,507	219,006	6,652	3,829	0	20	95.4%	2.9%	1.7%	0.0%	0.0%	0.0%
Average	95,314	91,122	3,000	1,100	14	78	95.6%	3.1%	1.2%	0.0%	0.1%	0.1%

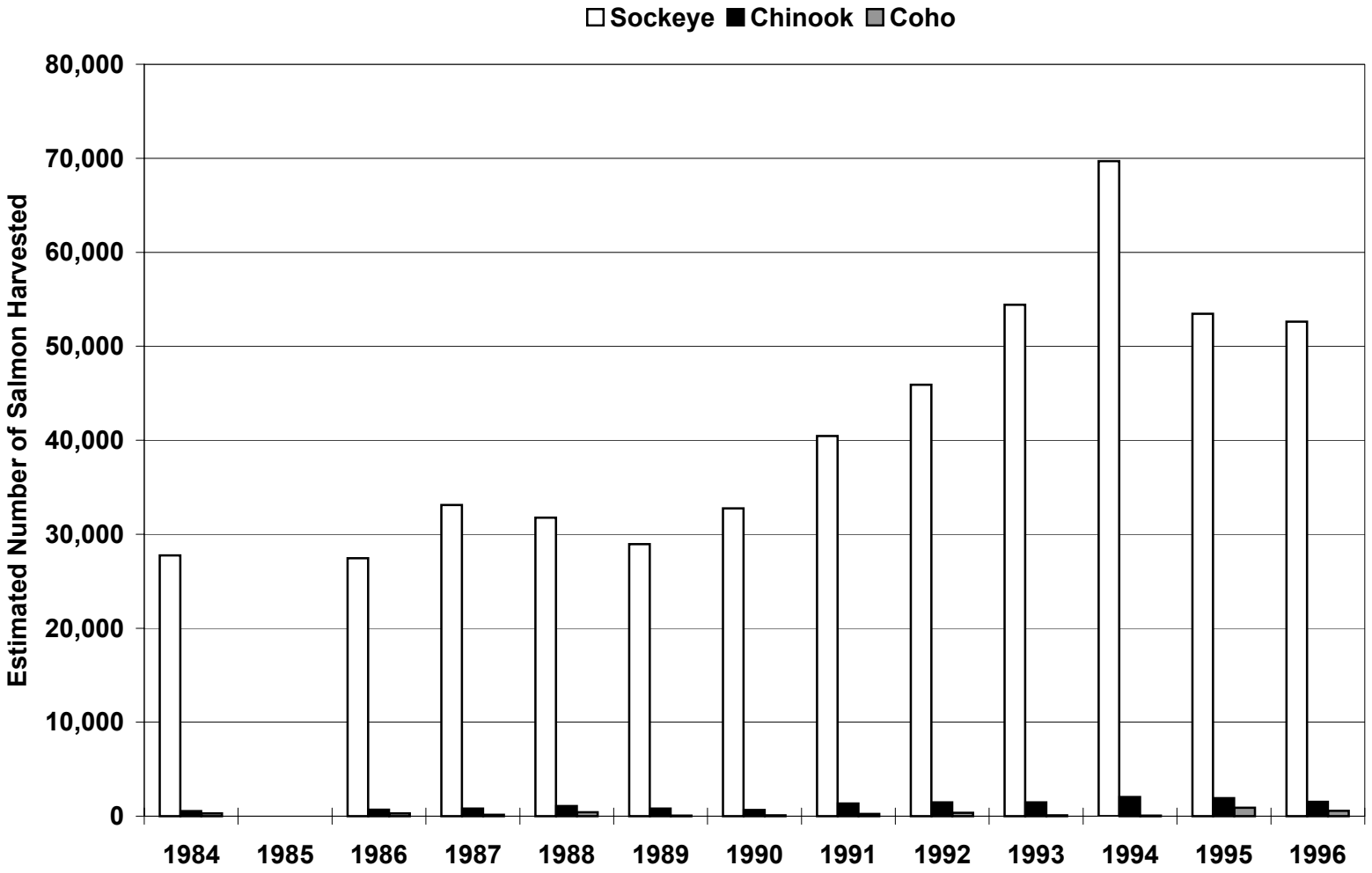
* Includes unknown number of steelhead, 1984, 1986, and 1987

** Available data combine Glennallen and Chitina subdistricts and are not comparable with other years in this table.

*** Includes fisheries in both the Glennallen and Chitina Subdistricts.

Sources: for 1984 through 1987, based on Morstad et al. 1996:120; for 1988 through 2001, Alaska Department of Fish and Game Upper Copper River Subsistence Permit Database.

Figure 2-8. Subsistence Salmon Harvests by Species, Upper Copper River, 1984 - 1996



Subsistence Harvest Locations

In 2000 and 2001 most of the subsistence harvest occurred below the Chitina McCarthy Bridge in the Chitina Subdistrict, a relatively small area extending from the south side of the bridge down river to Haley Creek. In contrast, the Glennallen Subdistrict covers 140 river miles from the Chitina McCarthy Bridge up river to the mouth of the Slana River. As a result fishwheels tend to cluster in widely dispersed locations along this portion of the river. Numbers of fish wheels, permits issued to those wheels and harvest vary considerably between locations. Although a fish wheel may be registered at a particular site, it may never be put in the water. Twenty-two fish wheels were registered at the Chitina Airport in the 2001 season but less than 10 were in the water (Tom Taube personal communication 2002). Table 2-14 and Figure 2-9 illustrate the differences between fish wheel sites in the Glennallen Subdistrict**.** Figures 2-10 and 2-11 present similar data, focusing on the location and percentage of fishing permits at each place**.** Figure 2-12 shows the disposition of property at each place. The largest concentrations of permits and fish wheels are at the Chitina Bridge and Copperville.

Table 2-14. Location, Number of Registered Wheels, Number of Permits and Total Harvest Copper River Fish Wheel Fishery, 2001

Location	Number of Permits	Number of Wheels	Total Harvest
Chitina Bridge	174	25	19,898
Chitina Airport	108	22	10,576
Copper Center	91	15	8,157
Silver Springs	19	9	2,218
Wolf Point	41	8	2,876
Tazlina	11	4	910
Copperville	180	33	14,694
Gulkana Airport	3	2	883
Gulkana Village	21	6	2,807
Gakona	45	13	3,444
Chistochina	5	4	2,525
Slana	103	12	6,469
Totals	801	153	75,457

Figure 2-9. Harvest of Sockeye and Chinook Salmon by Location, Upper Copper River Fish Wheel Fishery, 2001

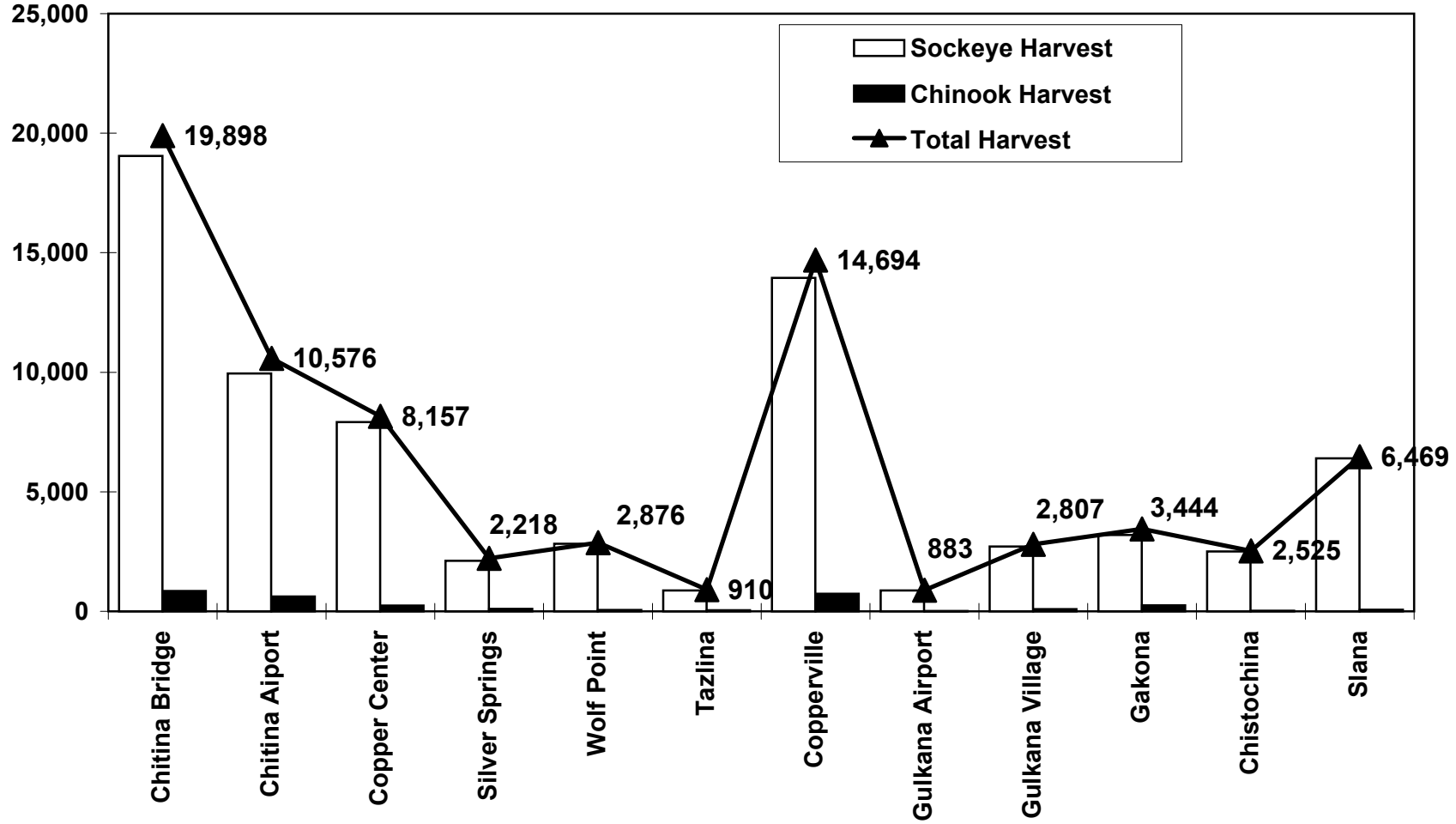


Figure 2-10. Percent of Total Permits and Location of Fish Wheels, Glennallen Subdistrict, Copper River Subsistence fishery 1995, N=665

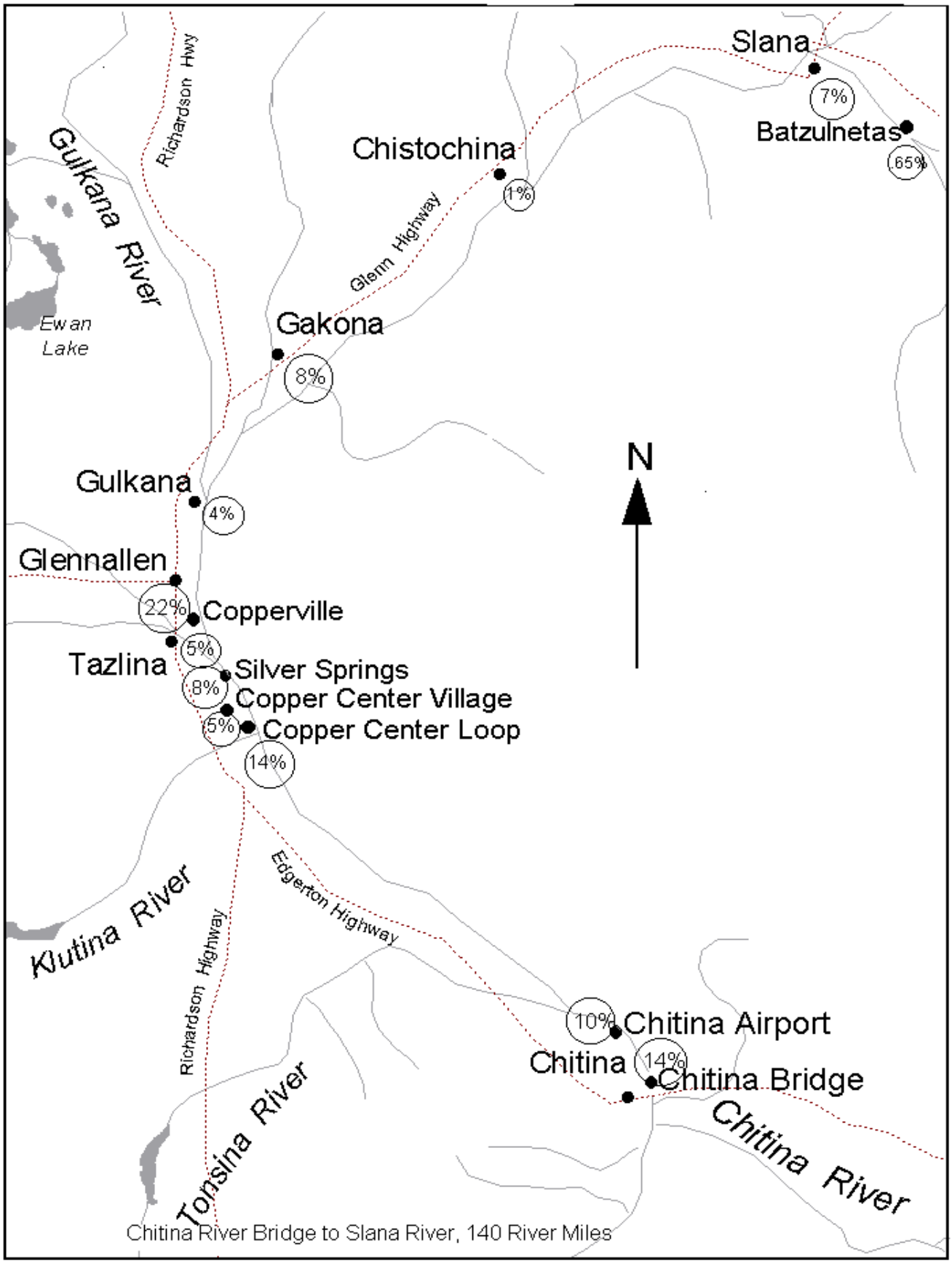


Figure 2-11. Percent of Total Permits and Location of Fish wheels, Glennallen Subdistrict, Copper River Subsistence Salmon Fishery 2001, N=832

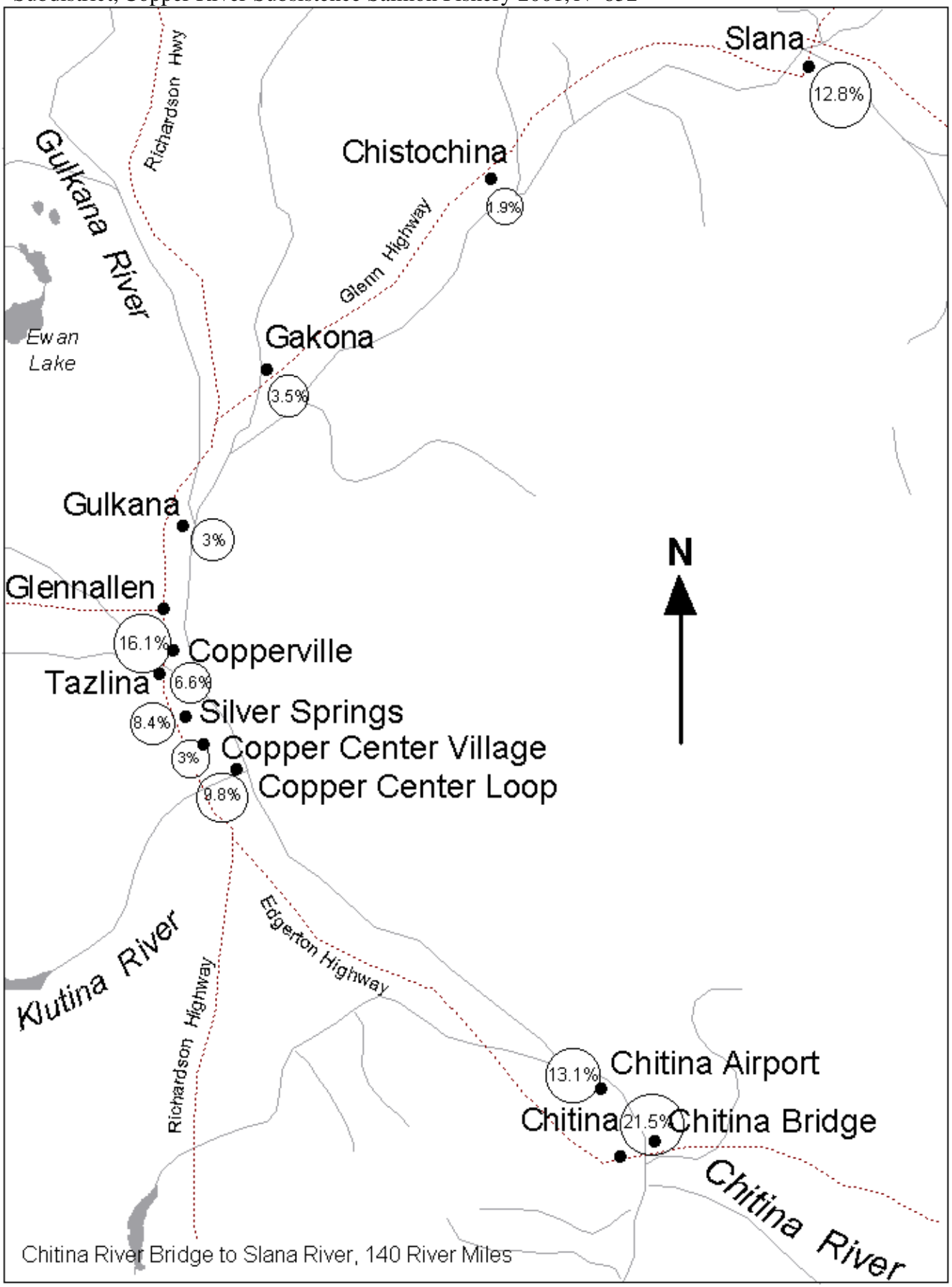
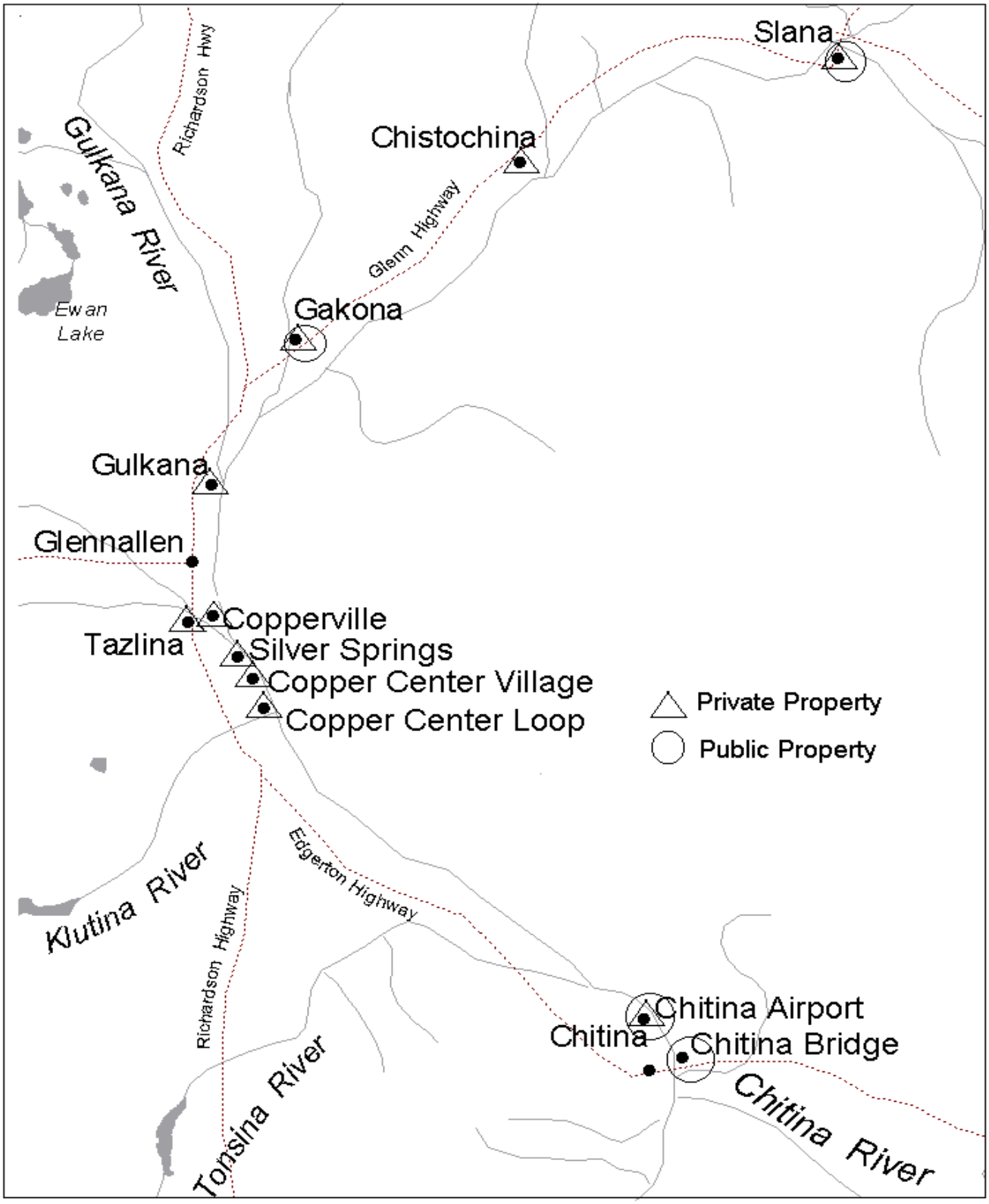


Figure 2-12. Disposition of Property at Fish Wheel Sites, Glennallen Subdistrict, Copper River Subsistence Salmon Fishery, 2001



A brief description of each fish wheel site in the Glennallen subdistrict is provided below. These sites are identical to those recorded by the division in 1982 (Stratton 1982) and 1995 (Simeone and Fall 1996), with the exception that there are now no wheels operating at the mouth of the Tonsina River, as there were in 1982, or on Tanada Creek.

Chitina Bridge (public property) In 1995, 11 fish wheels with an estimated 90 fishing permits operated just above the Chitina-McCarthy Bridge. In 2001 there were 25 fish wheels at the bridge operated by 174 permitted fishers. Salmon fishing sites have been located around the confluence of the Copper and Chitina rivers for centuries. Ahtna fishermen had traditional sites on both the Chitina and Copper rivers. Early in this century Ahtna fish sites were located at Haley and O'Brien Creeks, at Salmon Point, on the Copper River just east of the town of Chitina, at the mouth of the Kotsina River, and at Fivemile, now known as the Chitina airport. Today, because of changes in state regulation and improvements in transportation, all of the "Chitina" fish wheels are located on the east bank of the Copper River just above the bridge. This site is designated as public land and is one of the most accessible locations on the Copper River. Under federal regulation, federally recognized subsistence users may put fish wheels below the Chitina Bridge, and two wheels were operated there in 2002.

Chitina Airport (public and private property) In 1995, nine fish wheels with an estimated 63 permits, operated at the Chitina Airport site. At the time there appeared to be no room for additional fish wheels, but in 2001 there were 22 wheels registered for this site operated by 108 permits.

Copper Center area (including the Copper Center Loop Road, Copper Center village, Silver Springs and Wolf Point) (private property) Three major fish wheel clusters are located in the vicinity of Copper Center along the Richardson Highway between mileposts 100 to 106. These include the Copper Center Loop Road, Copper Center village, and Silver Springs. All the wheels in these locations are on private property. There is no public access in this area. In 1995 about 30 fish wheels, with

approximately 163 permits, were located in the Copper Center area. In 2001 there were 15 fish wheels operated by 91 permits in the area that includes Copper Center Loop and Copper Center Village. A majority of the wheels in the Copper Center loop area are located on land owned by a Copper Center resident. Each of the fish wheel operators has their own arrangement with the property owner.

Between mile posts 104 and 106 on the Richardson Highway is Silver Springs, a small subdivision that houses school teachers and government employees. Four fish wheels, with at least 34 associated permits, were observed in this Silver Springs in 1982 (Stratton 1982:43). There were 11 wheels operating in this area with approximately 50 permits in 1995, but in 2001 the number of fish wheels decreased to 9 operated by 19 permits. Upriver from Silver Springs is Wolf Point. In 2001 there were 8 fish wheels located and 41 permits. All of these fish wheels are on private land.

Tazlina (private property) The next major cluster of fish wheels is located above and below the mouth of the Tazlina River. Eight fish wheel sites with 29 associated permits, were counted in this area in 1995. In 2001 four fish wheels were operated at Tazlina by 11 different permits. All of these wheels are located on private land.

Copperville (1) public property accessed through private property and 2) private property) Up river from Tazlina is Copperville. Historically this area was used by Ahtna fishermen but in the last 20 or 30 years non-Native fish wheels owners have replaced them. In 1995 and again in 2001 Copperville had the largest concentration of fish wheels (18/33) and permits (137/180) on the river.

Gulkana Airport and Gulkana Village (private property) Ahtna fishermen have used the stretch of river between the mouth of Dry Creek and the mouth of the Gulkana River for generations. Several fish camps were located at six-mile near the present Gulkana airport. Today Athna fishermen continue to use this area but the majority of fish camps are located in the vicinity of the modern village of Gulkana. Permit data from 1982 indicated that approximately eight wheels, with 15 associated permits, were operated

near the village of Gulkana. The 1995 data indicate that the same number of wheels, but with 27 associated permits operated there. In 2001 there were six fish wheels at Gulkana operated by 21 permits. An additional two fish wheels were operated near the Gulkana Airport. All these fish wheels are located on private property.

Gakona (public access) In 1995 approximately 10 fish wheels operated in the vicinity of Gakona and 48 fishing permits were issued for this area. There are fish camps located on private property but many people who fish in this area use public land administered by the Bureau of Land Management (BLM). There is some confusion as to the nature of the BLM easement. According to BLM personnel in Glennallen this easement is for over night camping, not for extended use, such as a fish wheel site. Thirteen fish wheels were located on the Copper River in the vicinity of Gakona in 2001, with 45 permits issued for these wheels.

Chistochina (private property) Up river from Gakona is the community of Chistochina. In 1995 two fish wheels, with a total of eight permits operated at Chistochina, some of those permits were issued to people from the upper Tanana community of Tok. Only one fish wheel operated at Chistochina in 1996. The 1982 data collected by the Division of Subsistence indicates 3 fish wheels operating at Chistochina with eight permits (Stratton 1982:8). Data from 2001 indicate that there were four wheels with 5 different associated permits.

Slana area, including Batzulnetas (public and private property). Slana is a small community located about 60 miles from the Gakona Junction of the Richardson Highway and the Tok Cutoff. The community lies near the junction of the Nabesna Road and the Tok Cutoff and near the confluence of the Slana and Copper rivers, the northernmost limit of the fish wheel fishery.

In 1995, nine fish wheels with 47 permits operated at Slana while one wheel with four permits operated at Batzulnetas. Residents of upper Tanana River communities operated five of these wheels. Those wheels are situated on BLM land at the bend of the Copper

River and accessible by a dirt road and a rough, four wheeler track. Three other wheels operated by residents of Slana are located up stream on private property near the mouth of the Slana River. It is common for the fish wheels at Slana to have a large number of permits attached to them. In 2000, 12 fish wheels were located at Slana operated by 103 different permitees.

Summary

Until the end of the 19th century Ahtna Athabaskans were the only group to make regular use of the Copper River salmon fishery. In 1889 a commercial fishery began operating at the mouth of the river, and by 1916 came close to destroying the fishery. A catastrophe was diverted when Congress passed the White Act in 1921, prohibiting commercial fishing within the Copper River. Today a carefully managed commercial fishery at the mouth of the Copper River remains a mainstay of the economy of Cordova.

Since the mid 20th century the Copper River Basin has been accessible by road from the state's main urban population centers of Fairbanks and Anchorage. In the early 1940s people from Fairbanks began to dip net for salmon at Chitina. Initially the Chitina dip net fishery attracted mostly Fairbanks residents, but as transportation improved and the state's population increased the dip net fishery grew. During Alaska's oil boom, the state's population expanded so rapidly that by 1995 approximately 75 percent of the population was situated within a day's drive of the Copper River. As a result the Chitina dip net fishery is now the largest fishery in the Upper Copper River District.

Regulations implemented by the State of Alaska since the 1960s have largely been in response to the growth of the Chitina dip net fishery. In 1977 the Board of Fisheries separated the dip net fishery from the fish wheel fishery by creating the Glennallen and Chitina Subdistricts. In 1978, the Alaska Legislature passed Alaska's first subsistence statute, providing a preference for subsistence over other uses of fish and wildlife. In times of shortage, a preference was to be given to subsistence users based on customary and direct dependence, availability of alternative resources, and local residency. In 1984 the BOF used "rural residency" for the first time as a basis for managing the Copper

River fish wheel and dip net fisheries. The BOF concluded that the use of the Copper River salmon stocks in the Glennallen Subdistrict met the standard for customary and traditional subsistence use. For the growing dip net fishery at Chitina the BOF concluded that the fishery did not meet the same standards so the BOF authorized a personal use fishery for the Chitina Subdistrict with dip nets and fishwheels to provide a continuing opportunity for non-rural Alaskans to harvest salmon for home use, but with lower bag limits than the subsistence fishery.

Under this approach, the fish wheel fishery that the Ahtna participated in was provided special recognition and protection as a rural subsistence fishery open only to rural residents. As a consequence of these regulatory actions, the number of subsistence permits issued in 1984 dropped, with most of these being fish wheel permits, since this continued to be the gear of choice among Basin residents, subsistence harvests leveled off and the problem of uncontrolled growth in the subsistence fishery was temporarily solved.

In December 1989 the rural subsistence solution unraveled when the Alaska Supreme Court in the *McDowell* case found the provisions of the state statute that limited participation in subsistence hunting and fishing to rural residents to be unconstitutional. After 1990, subsistence fishing for salmon on the Copper River was once again open to all Alaska residents. As a consequence, urban participation in the Upper Copper River subsistence fishery and harvests again began to increase. From 1990 through 2001 the number of subsistence fish wheel permits rose from 406 to 1,101, due largely to increased participation by urban residents.

Throughout the 1990s the BOF considered several proposals to reverse the 1984 decision concerning customary and traditional use in the Chitina Subdistrict. These attempts bore fruit in 1999, but in reclassifying the dip net fishery as a subsistence fishery the BOF

retained the existing personal use regulations. As a result, there were two subsistence fisheries on the upper Copper River, each with a different set of regulations. [12]

As a result of the *McDowell* decision, which left the state out of compliance with ANILCA, the federal government assumed management of subsistence fisheries on navigable waters. Today in the Upper Copper River District there is a state and federal subsistence salmon fishery, as well as state-regulated commercial, sport and personal use fisheries. Under federal regulations, all Copper Basin residents are federally qualified subsistence users of the Copper River fisheries and there are federal subsistence salmon fisheries in both the Glennallen and Chitina subdistricts.

[12] In February 2003 the BOF reconsidered its 1999 decision and reclassified the dip net fishery as a personal use fishery.

CHAPTER III
Results of a Survey Conducted in 2000 Among Participants in the Copper River Subsistence Fishery

Introduction

This chapter updates work done by the Division of Subsistence in 1982 (Fall and Stratton 1984), 1996 (Simeone and Fall 1996), and in 1999 (Fall 1999). The purpose of the earlier work was to provide information to the Board of Fisheries on the status of the Copper River Subsistence fishery in order for the BOF to determine, as discussed in Chapter II, whether the Chitina personal use dipnet fishery met the customary and traditional use criteria for a subsistence fishery. In 1984 the BOF made its initial determination that the fish stocks of the Chitina Subdistrict of the Upper Copper River did not support customary and traditional uses, and classified the dipnet fishery as personal use. This decision was reaffirmed on several different occasions. However, in 1999 the Board decided that the fish stocks of the Chitina Subdistrict did support customary and traditional uses, and reclassified the dip net as a subsistence fishery.

When presenting their arguments to reclassify the dipnet fishery as a subsistence fishery in 1999, the Chitina Dipnetters Association (CDA) claimed that the dipnetters were also continuing a pattern of use begun by Ahtna. They argued that they had learned to dip net from Ahtna in the 1940s; that they shared their harvest with families and friends; and that the elders in the fishery had passed their knowledge to succeeding generations. Finally, the CDA noted that under state law all residents of Alaska were considered subsistence users. In other words, it was argued that there was little difference between rural and urban patterns of use. The goal of the survey was to examine to what degree this generalization was true by comparing the contemporary Ahtna pattern of use with the pattern followed by fishermen who lived outside the Copper River Basin. The survey was conducted in the summer of 2000 in collaboration with the Copper River Native Association, CheeshNa' Tribal Council (Chistochina), and the Chitina Tribal Council. Subsistence fishers in the both subdistricts were surveyed. The Office of Subsistence Management of the US Fish Wildlife Service funded the research.

Survey Findings

The following tables and figures summarize data that compares and contrasts the pattern of use of Ahtna fishers with that of non-Basin resident fishers. While Ahtna are a small segment of the basin population, they have the longest history of use and best represent the long-term pattern that defines customary and traditional use on the Copper River. Of the 509 people interviewed, 109 were Ahtna[1], and 382 were non-Basin fishers. Of the non-Basin fishers, 34 four percent came from the Fairbanks-Interior region, and 41 percent from south central Alaska communities (see Figure 3-1). Just over 11 percent of the non-Basin sample used fish wheels and just over 88 percent used dipnets (Table 3-1). Because of the focus on Ahtna fishers, and time and funding constraints, only 18 non-Ahtna Basin residents were interviewed. These have been excluded from the comparison because of the small number interviewed. Appendix C provides additional detail on the interview samples.

The data are provided in two formats. Table 3-1 provides information on responses including percentages and significance, and for some questions, averages. Figures 2 through 17 show the data more graphically and are the basis for discussion of the data. The purpose of Table 3-1 is to provide information on the statistical significance of the responses to each question. Chi-square is used to compare the distribution of responses from Ahtna and non-local households to selected survey questions. In the table the overall table Chi-square and its statistical significance is an indicator whether any distributional differences exist between the two groups. The overall Chi-square is related to the sum of the differences in each table cell between observed response frequency and an estimated frequency assuming that the Ahtna and non-local households are not different in response. At a table row level, Chi-square values and their statistical significance indicate whether there are differences in a particular response between the two groups. T-tests (with an assumption of unequal variance) were used to compare mean values for such measures as the number of years since the first year the household fished in the Copper River. For the purposes of the discussion in this report, Chi-square and T-test values resulting in a probability of less than or equal to 0.05 were deemed significant.

[1] In 2000, Ahtna represented about 13 percent of all local basin residents who registered fish wheels.

Local Communities
Cantwell 2
Chistochina 25
Chitina 12
Copper Center 50
Gakona 10
Glennallen 1
Gulkana 16
Sheep Mountain 2
Kenny Lake 3
Tazlina 4
Copperville 1
Silver Springs 1

Souncentral Alaska
Anchorage 106
Big Lake 3
Chickaloon 1
Homer 2
Palmer 23
Sterling 1
Sutton 2
Valdez 10
Wasilla 36
Willow 1
Whale Pass 1
Eagle River 14
Chugiak 6
Girdwood 2
Eshamy Bay 1

Fairbanks-Interior
Salcha 1
Clear 1
Delta Junction 14
Eielson Air Force Base 2
Fairbanks 133
Nenana 1
North Pole 21

Figure 3-1. Residence of Survey Respondents, Copper River Subsistence Fishery, 2000
N= 509

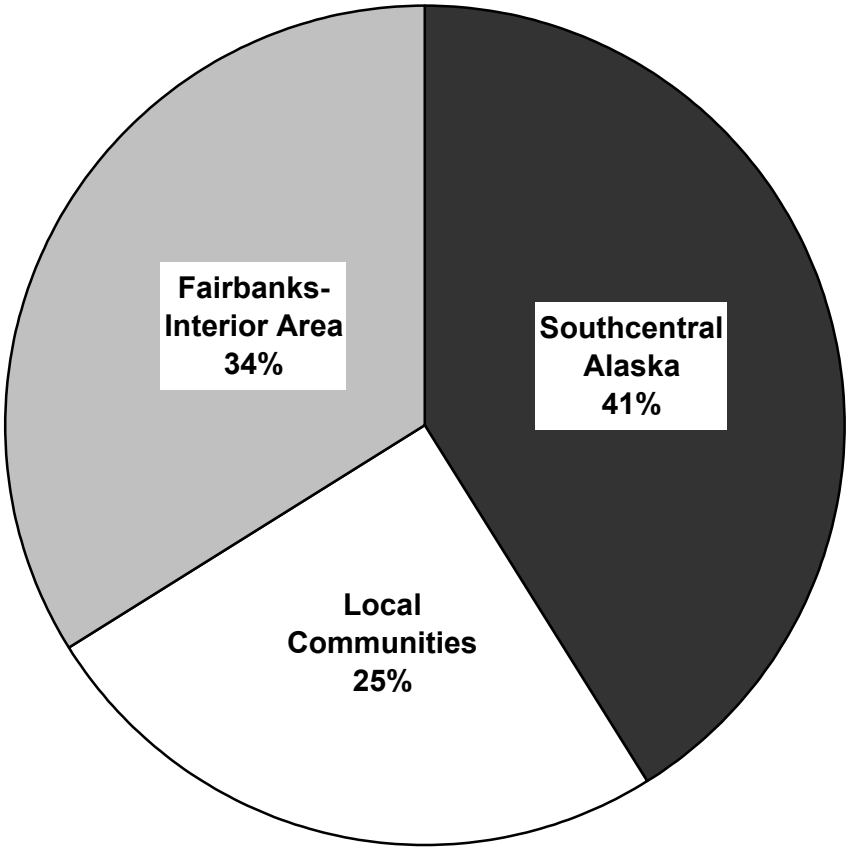


Table 3-1: Comparisons of Survey Results for Ahtna and Non-Local Samples

N=491
Ahtna=109
Nonlocal=382

Number of Years Since First Participated in the Fishery

		AHTNA	NON-LOCAL	Contribution to Chi-Square	Significance
YEARS SINCE FIRST YEAR FISHED IN COPPER RIVER (CAT)	First year in 2000	1.0%	15.2%	13.6	0.0002
	1 - 5	7.7%	25.9%	12.3	0.0005
	6 - 10	8.7%	13.9%	1.8	0.1797
	11 - 20	13.5%	25.9%	5.5	0.0190
	21 - 30	13.5%	13.4%	0.0	1.0000
	31 - 40	20.2%	5.0%	22.8	0.0000
	41 - 50	14.4%		55.3	0.0000
	51+	21.2%	.8%	66.8	0.0000

Chi-Square 177.2, Significance 0.000

		AHTNA	NON-LOCAL
YEARS SINCE FIRST YEAR FISHED IN COPPER RIVER	Average	34.3	11.6

T-test (unequal variances) 10.3, Significance 0.000

How Often Do You Fish in the Copper River?

		AHTNA	NON-LOCAL	Contribution to Chi-Square	Significance
HOW OFTEN FISHED IN COPPER RIVER	FIRST YEAR	.9%	15.2%	14.4	0.0001
	EVERY YEAR	64.2%	46.9%	5.0	0.0253
	MOST YEARS	24.8%	28.3%	0.4	0.5271
	INFREQUENTLY	10.1%	9.7%	0.0	1.0000

Chi-Square 19.8, Significance 0.000

continued

Table 3-1, continued.

Which Months Do You Fish In?

		AHTNA	NON-LOCAL
FISHED JUNE?	Yes	93.6%	56.2%

Chi-Square 51.8, Significance 0.000

		AHTNA	NON-LOCAL
FISHED JULY?	Yes	76.1%	88.2%

Chi-Square 9.919, Significance 0.002

		AHTNA	NON-LOCAL
FISHED AUGUST?	Yes	60.6%	22.0%

Chi-Square 59. 2, Significance 0.000

		AHTNA	NON-LOCAL
FISHED SEPTEMBER?	Yes	27.5%	3.4%

Chi-Square 61.6, Significance 0.000

Which Subdistrict Do You Fish In?

		AHTNA	NON-LOCAL
SUBDISTRICT	CHITINA	1.8%	80.6%
	GLENNALLEN	98.2%	19.4%

Chi-Square 226.2, Significance 0.000

Which Gear Type Do You Use?

		AHTNA	NON-LOCAL
GEAR TYPE	FISHWHEEL	95.4%	11.3%
	DIPNET	4.6%	88.7%

Chi-Square 286.3, Significance 0.000

Do You Use the Same Site Every Year?

		AHTNA	NON-LOCAL
SAME FISH SITE?	Yes	77.1%	57.2%

Chi-Square 14.1, Significance 0.000

How Long Have You Used the Site?

		AHTNA	NON-LOCAL	Contribution to Chi-Square	Significance
YEARS USED SITE	1 - 5	23.4%	58.8%	14.4	0.0001
	6 - 10	15.6%	26.4%	2.8	0.0943
	11 - 20	18.2%	12.5%	1.3	0.2542
	21 - 30	10.4%	1.9%	10.1	0.0015
	31 - 40	11.7%		25.2	0.0000
	41 - 50	9.1%		19.6	0.0000
	51+	11.7%	.5%	21.0	0.0000

Chi-Square 94.5, Significance 0.000

		AHTNA	NON-LOCAL
YEARS USED SITE	Average	24.3	6.8

T-test (unequal variances) 6.9, Significance 0.000

Table 3-1. Continued

How Do You Prepare Salmon?

		AHTNA	NON-LOCAL
DRY SALMON?	YES	79.8%	3.7%

Chi-Square 301., Significance 0.000

		AHTNA	NON-LOCAL
FREEZE SALMON?	YES	86.2%	94.5%

Chi-Square 8.5, Significance 0.004

		AHTNA	NON-LOCAL
SMOKE SALMON?	YES	80.7%	74.6%

Chi-Square 1.7, Significance 0.187

		AHTNA	NON-LOCAL
SALT SALMON?	YES	44.0%	1.3%

Chi-Square 160.8, Significance 0.000

		AHTNA	NON-LOCAL
CAN SALMON?	YES	67.9%	47.6%

Chi-Square 13.9, Significance 0.000

		AHTNA	NON-LOCAL
KIPPER SALMON?	YES	41.3%	.8%

Chi-Square 157.7, Significance 0.000

How Did You Learn About the Fishery?

HOW LEARNED ABOUT COPPER RIVER FISHERY		AHTNA	NON-LOCAL	Contribution to Chi-Square	Significance
	WORD OF MOUTH	12.7%	41.3%	10.4	0.0013
	RELATIVES	67.3%	12.4%	74.1	0.0000
	FRIENDS	20.0%	46.3%	7.7	0.0055

Chi-Square 92.6, Significance 0.000

Table 3-1. Continued

Who Taught You to Fish in the Copper River?

		AHTNA	NON-LOCAL
TAUGHT BY PARENT?	YES	56.9%	6.3%

Chi-Square 150.3, Significance 0.000

		AHTNA	NON-LOCAL
TAUGHT BY SIBLING?	YES	2.8%	1.0%

Chi-Square 1.8, Significance 0.185

		AHTNA	NON-LOCAL
TAUGHT BY OTHER RELATIVE?	YES	40.4%	4.5%

Chi-Square 100.6, Significance 0.000

		AHTNA	NON-LOCAL
TAUGHT BY FRIEND?	YES	11.0%	43.2%

Chi-Square 138.1, Significance 0.000

		AHTNA	NON-LOCAL
SELF TAUGHT?	YES	16.5%	41.4%

Chi-Square 22.8, Significance 0.187

Do You Share Your Catch?

		AHTNA	NON-LOCAL
DO YOU SHARE YOUR CATCH?	YES	95.4%	78.0%

Chi-Square 17.3, Significance 0.000

Do You Share With Family?

		AHTNA	NON-LOCAL
SHARE WITH FAMILY?	YES	93.3%	73.5%

Chi-Square 17.9, Significance 0.000

Do You Share With Friends?

		AHTNA	NON-LOCAL
SHARE WITH FRIENDS?	YES	63.5%	68.8%

Chi-Square 1.0, Significance 0.318

Table 3-1. Continued

Do You Share with Others (other than family & friends)

		AHTNA	NON-LOCAL
SHARE WITH OTHERS?	YES	37.5%	3.4%

Chi-Square 84.0, Significance 0.000

How Much of Your Catch Do You Share?

		AHTNA	NON-LOCAL	Contribution to Chi-Square	Significance
PERCENTAGE OF CATCH SHARED	LESS THAN HALF	33.0%	72.4%	19.1	0.0000
	ABOUT HALF	50.5%	20.5%	24.3	0.0000
	MORE THAN HALF	16.5%	7.1%	7.2	0.0073

Chi-Square 50.5, Significance 0.000

How Important is Salmon in Your Diet?

		AHTNA	NON-LOCAL
IMPORTANCE OF SALMON IN DIET	VERY IMPORTANT	70.6%	65.4%
	MODERATELY IMPORTANT	21.1%	28.3%
	NOT VERY IMPORTANT	8.3%	6.3%

Chi-Square 2.5, Significance 0.291

Are You Employed?

		AHTNA	NON-LOCAL	Contribution to Chi-Square	Significance
EMPLOYED?	NO	30.3%	3.1%	68.0	0.0000
	YES	54.1%	84.3%	10.0	0.0016
	RETIRED	15.6%	12.6%	0.6	0.4386

Chi-Square 78. 7, Significance 0.000

Are You Employed Full Time Year-Round?

		AHTNA	NON-LOCAL	Contribution to Chi-Square	Significance
EMPLOYMENT TYPE	FULL TIME	40.0%	93.9%	3.0	0.0833
	PART TIME	30.0%	1.9%	25.1	0.0000
	SEASONAL	30.0%	4.2%	12.9	0.0003

Chi-Square 42.9, Significance 0.000

Did you Take Time Off From Work to Fish?

		AHTNA	NON-LOCAL
TAKE TIME OFF FROM WORK?	YES	24.1%	49.5%

Chi-Square 22.1, Significance 0.000

Figure 3-2 (Question 1A) provides data on criterion one, the length of time respondents have participated in the fishery.[2] The figure shows the number of years since respondents said they first participated in the fishery. As might be expected, significantly more non-Basin residents (15 percent) said they were participating in the fishery for the first time than Ahtna (1 percent) (sig. = 0.0002). Likewise a higher percentage of non-Basin residents (25 percent) said they had participated in the fishery from one to five years, than Ahtna (7 percent) (sig. = 0.0005). At the other end of the scale, 55 percent of Ahtna said that had participated in the fishery 31years or more. Only 6 percent of non-locals said they had participated in the fishery for that length of time (sig. = 0.0000). The average number of years that Ahtna respondents participated in the fishery was 34.3 years and for non-Basin residents it was 11.6 years (sig. = 0.000) (Table 3-1).

Figure 3-3 (Question 2 A-D) presents data referring to criterion two, showing contrasting patterns of seasonal participation. The traditional Ahtna pattern (Simeone and Kari 2002) is to fish early in the season to take advantage of the dry weather in June and avoid the bees that swarm later in the summer. Figure 3-3 shows that the majority of Ahtna fish in June, with effort decreasing through the rest of the season. Significantly fewer non-local fishers fish in June (56.2%) (sig. = 0.000). Non-local effort peaks in July and then quickly declines. For example, 60.6% of Ahtna fish in August compared to 22.0% of non-local fishers (sig. = 0.000). Note that the non-local pattern is greatly affected by regulation because fishing time in the Chitina Subdistrict is restricted during the month of June by the Alaska Department of Fish and Game.[3] However, one long time dip netter said that he used to fish at Chitina in June but now he goes "later in the year." He said, "Usually I try and go around the 15th of July. It seems there's more fish, the weather is warmer…"

The third criterion for determining c&t use is "a pattern of taking or use consisting of methods and means of harvest that are characterized by efficiency and economy of effort and cost." Figures 3-4 and 3-5 show that the majority of Ahtna interviewed fish within the Glennallen Subdistrict using fish wheels while most non-Basin residents fish in the Chitina Subdistrict and

[2] To calculate this we subtracted the year respondents said they first participated in the fishery from 2000, the year of the survey.
[3] Fishing in the Chitina Subdistrict is regulated based on the strength and timing of the sockeye salmon run.

Figure 3-2, Number of years since first participated in the fishery, Copper River Subsistence Fishery Participants 2000

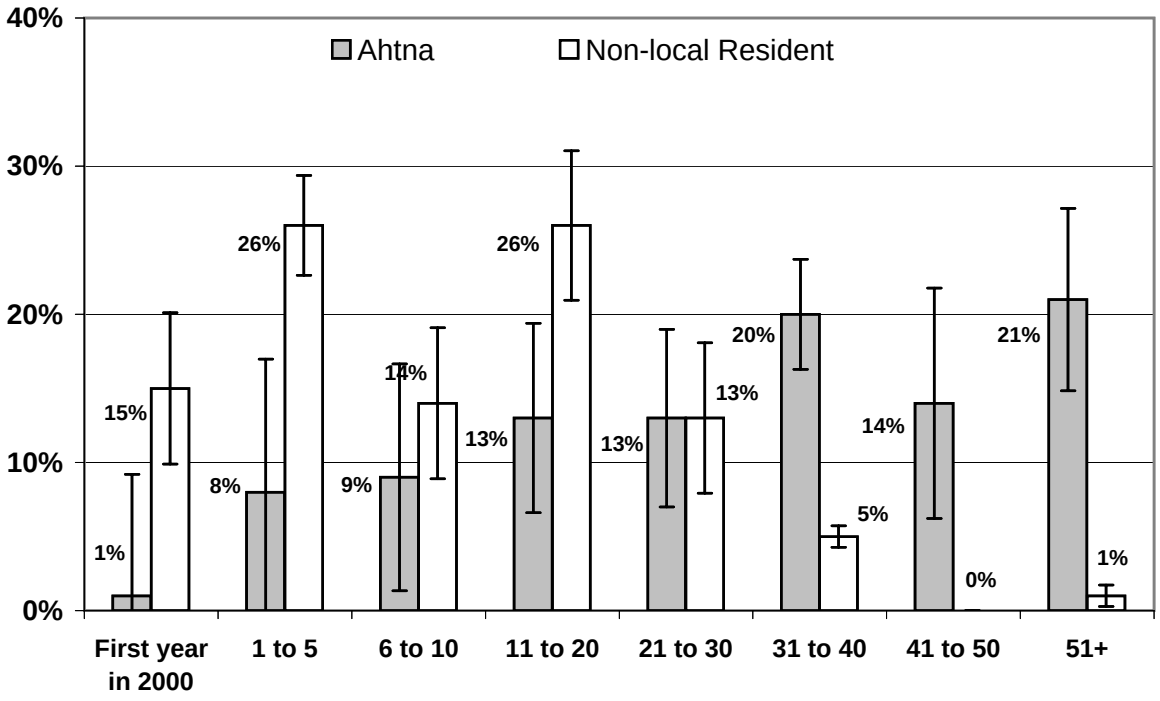
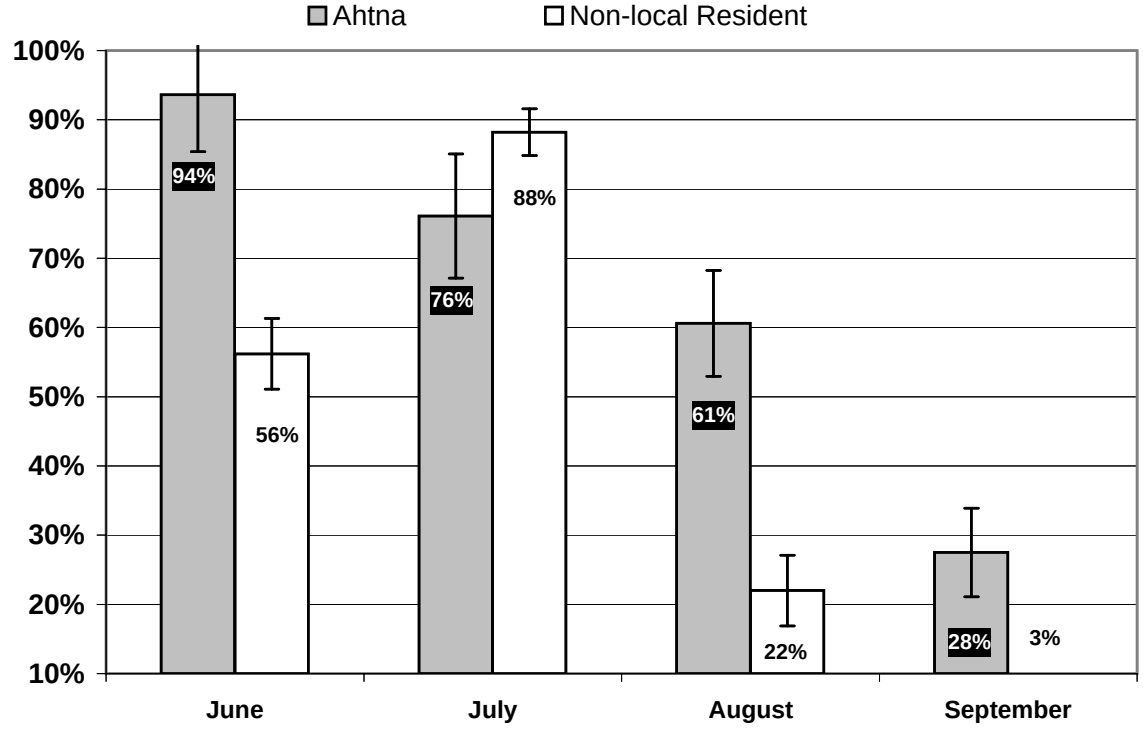


Figure 3-3, Months you fished in the Copper River, Copper River Subsistence Fishery Participants 2000



use dipnets. These results reflect the same pattern noted in 1984 by Fall and Stratton (1984) correlating fishing location with gear choice, and area of residence.

The cost incurred by non-Basin residents in traveling to the Basin has been documented and shows a cost efficiency consistent with personal use fisheries (cf. Larson 1969, Fall 1999:A-34)[4]. Also note that 50 percent of the non-Basin participants interviewed said they took time off from work to go fishing, while only 24 percent of Ahtna said they took time away from work (Figure 3-17) (sig. = 0.000). If measured in time lost from work the Ahtna pattern is more efficient than the non-Basin pattern, which requires participants to either take time off or to fish on weekends.

Fish wheels were introduced into the Copper River in the early 20th century (Simeone and Fall 1996). Most Ahtna gave up the use of the traditional dip net and switched to the fish wheel, which was thought to be more efficient.[5] A well-placed fish wheel is capable of catching hundreds of fish a day with minimum labor. Note that the efficiency of the fish wheel to catch large numbers of fish fits in with the harvest goals of many of the Ahtna interviewed for this survey (see below). However, some dipnetters who have fished at Chitina since the 1950s or 1960s expressed the opinion that, for a number of reasons, fish wheels are not as efficient or practical as dipnets. One said he was always too busy to build a fish wheel: "Oh I was too busy. I could get enough fish [using a dipnet]. I was working six days a week with the airlines and building up the homestead." Another said that he was thinking of using a fish wheel but that he had "such good luck" dipnetting from a boat that he had no need to use a fish wheel, except, he said "when you go down there once a year and you can use as many fish as we can, if you go fishing below the bridge like they had it this year, there really aren't enough fish for what we could like to have." A third said, "I just never had the need to, you know. To me, personally it's more a pain in the rear than it would be worth you know." A fourth pointed out that even though fish wheels are an "easy way" to catch fish he was not "raised up with a fish wheel and, to me it's more dangerous." He went on to say "I really prefer dipnetting. People say that it is

[4] In 1999 the Division estimated the relative cost for the residents of Anchorage, Fairbanks and Palmer in obtaining salmon by dipnetting in Chitina. The cost for Anchorage residents was calculated at $1.38 per pound, for Palmer residents a $1.26 per pound, and for the residents of Fairbanks $1.51 per pound. The average retail cost for salmon in Anchorage and Palmer was $6.11 per pound, and in Fairbanks $6.63 per pound.

[5] One Ahtna elder, who was raised in Chitina, remembers using dipnets made from chicken wire. These were different from the traditional dipnets made from spruce roots.

Figure 3-4, Subdistrict fished, Copper River Subsistence Fishery Participants 2000

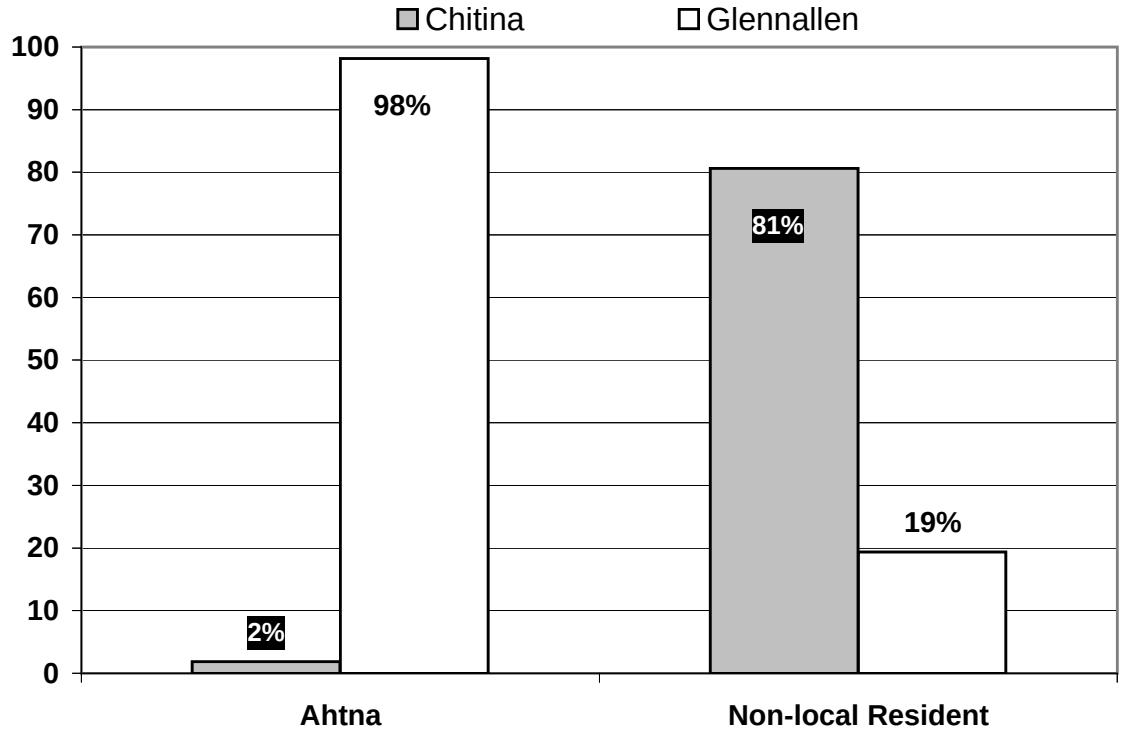
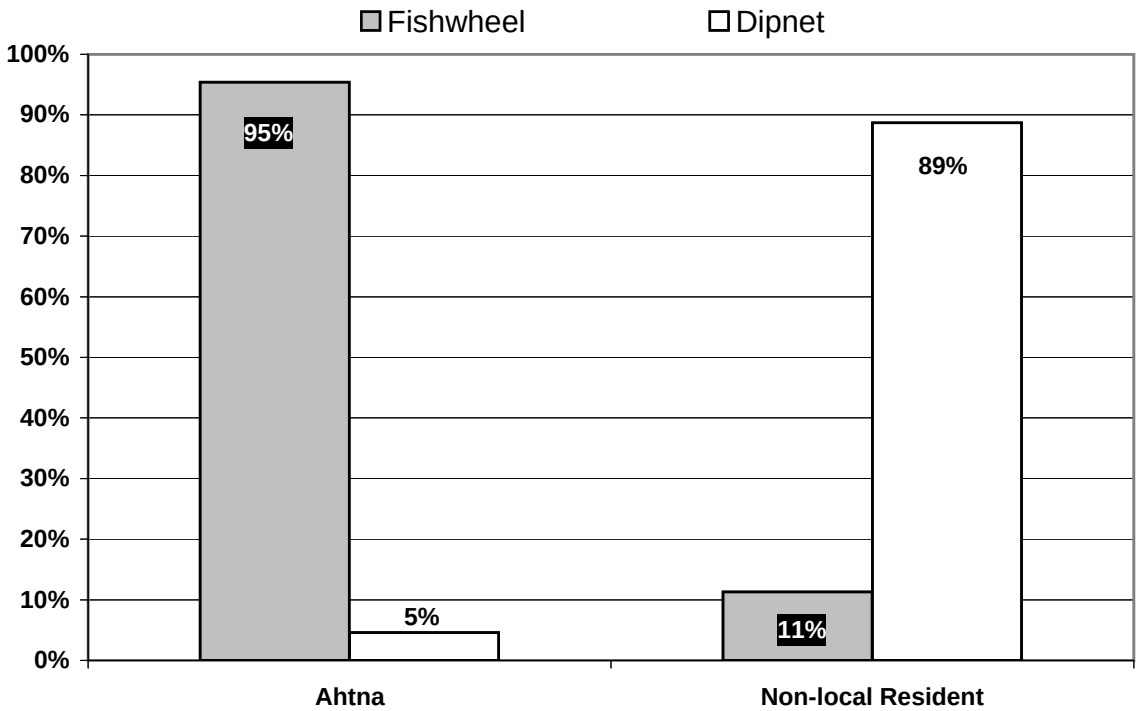


Figure 3-5, Gear type used, Copper River Subsistence Fishery Participants 2000



inefficient, but when the fish are running I've pulled up to four fish out in one dip, and the last two years we hit a spot where if dipnetting is inefficient, I question that because we caught, last year we caught two hundred fish in less than six hours of dipping."[6]

Criterion four looks at the area in which the pattern of use has been established. Asked, "Do you have a fish site that you use every year" 77 percent of Ahtna and 57 percent of non-local residents said they had (sig. = 0.000) (Figure 3-6, Question 4A). Many Ahtna fish wheel sites have been occupied since the 1920s. Today there are fewer traditional fish camps than in the early 1980s and before (most people take their fish home to process rather than leave it at the fish wheel site where it might be stolen), but a few fishing sites are still said to "belong" to certain Ahtna families and are frequently passed on through inheritance. Asked if the site belonged to the family, over half of Ahtna interviewed (51 percent) said their family owns the fishing site (Figure 3-6, Question 4C). In contrast only 2 percent of non-local residents said that their family owned the fish site.

If respondents replied yes to Question 4A they were asked how many years they used the present site. Fifty-nine percent of non-local fishermen said they had been using their site from 1 to 5 years compared to 23 percent of Ahtna respondents (sig. = 0.0001) (Figure 3-7, Question 4B). On the other hand, 33 percent of Ahtna said they had been using their fish site 31 years or more, but just 05% of nonlocal fishers had (sig. = 0.0000). There are two caveats to these results. One, dipnet fishers usually do not have a specific fishing site or location, while those who use a fish wheel often do. On the other hand, the banks along the Copper River erode quickly so that fish wheels often have to be moved. This partially explains why 23 percent of Ahtna said they had used their fish site for just 1 to 5 years.

One factor limiting participation in the fish wheel fishery is access. There are few roads leading to the Copper River and much of the land on the west bank is private property. Most fish wheels are concentrated in six or eight locations (see Chapter II; Simeone and Fall 1996:69-71). As a

[6] While dip nets may be an efficient way to catch a lot of fish in a relatively short period of time one participant in the fishery described the "struggle" to get a thrashing forty pound Chinook salmon up a 20 foot cliff from the river bank to the road. He also noted that after catching 60 sockeye they still had to be "packed up the cliffs" and then carried back to the car on bicycles (Medred 2003).

Figure 3-6, Long term use of fishing site, Copper River Subsistence Fishery Participants 2000

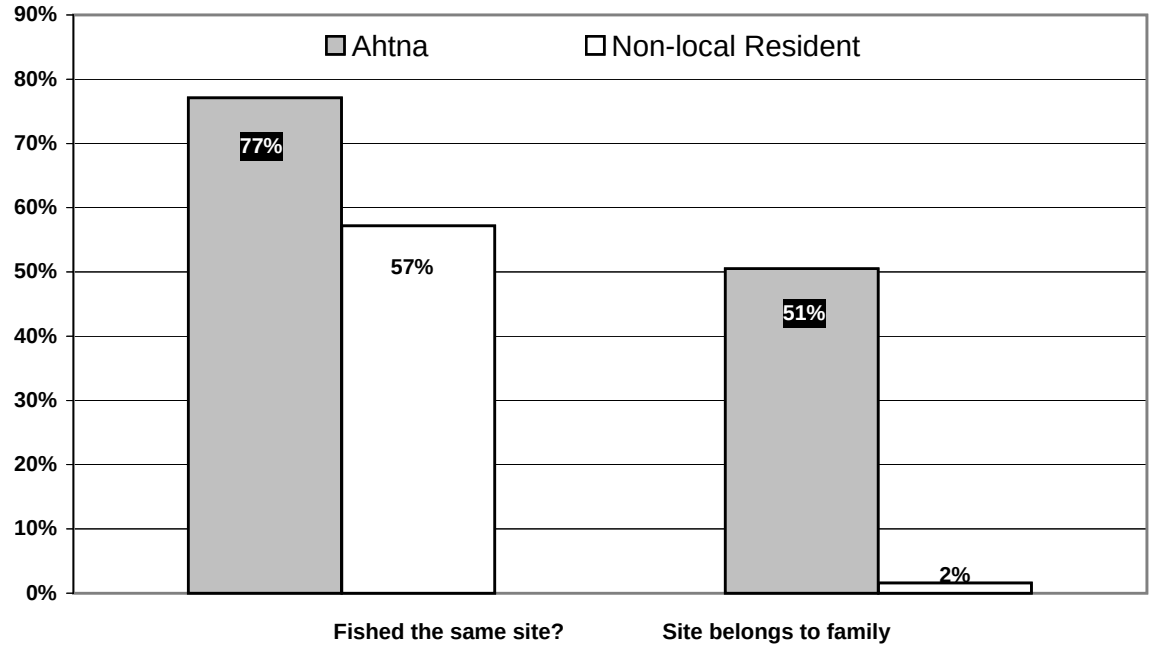
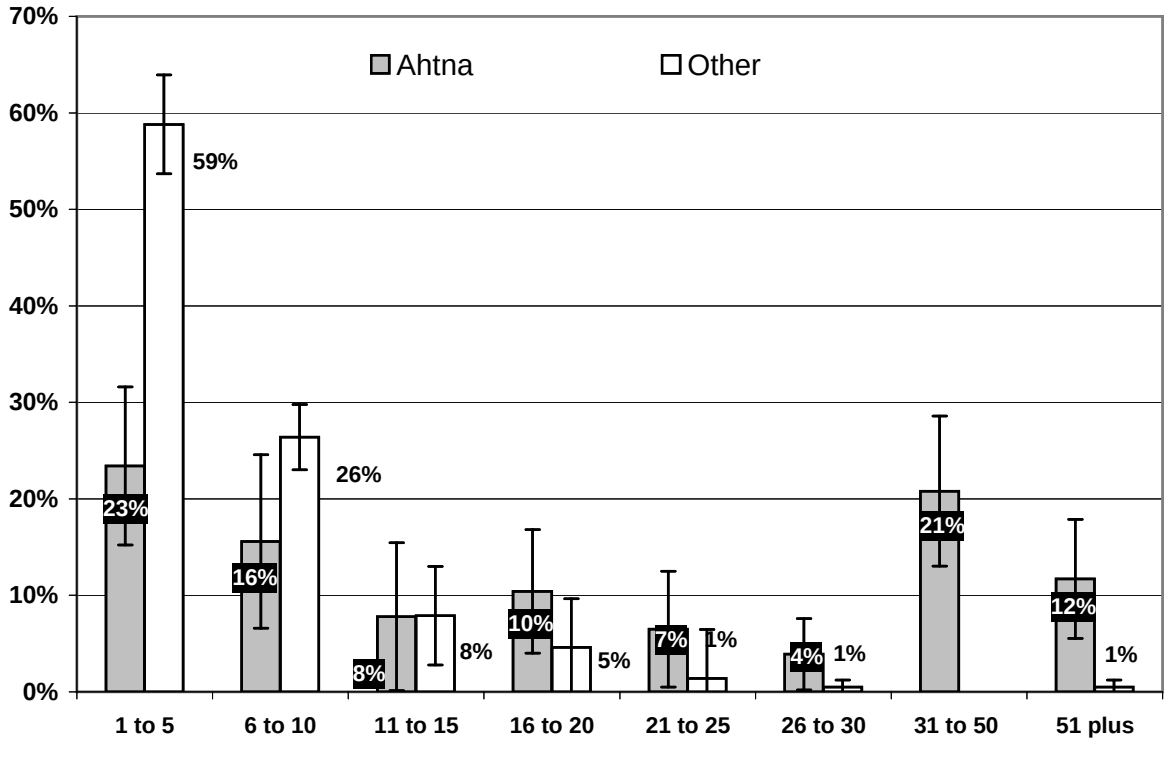


Figure 3-7, Number of years using fishing site, Copper River Subsistence Fishery Participants 2000



result most fish wheel owners try and put their wheels in the same location every year. Furthermore, use of fish wheels is governed by factors such as kinship relations and traditional rules of access. Information gathered from interviews conducted in 1996 indicates that most Ahtna generally do not share their fish wheels with large numbers of people while non-Natives do. For example, in 1996 there were at least 6 fish wheels owned by non-Native fishermen with more than 20 associated permits while only one Ahtna wheel had more than 10 affiliated permits.

The fifth criterion for determining c&t use is a means of preparing fish or game that has been traditionally used by past generations. Ahtna traditionally dried or fermented salmon. In the 20th century they learned to salt, can, and kipper fish and still later, when electricity became widely available, to freeze fish. Figure 3-8 (Questions 5A-G) shows that many Ahtna use all of these methods to prepare and preserve their salmon. In contrast, most non-Basin fishers freeze (95 percent), smoke (75 percent) or can (48 percent) their fish.

According to one long time dipnet fishermen, in the early years of the fishery many participants processed their fish right at the fishing site. A dipnetter who fished at O'Brien Creek in the 1950s remembered canning fish right at the mouth of the creek and then hauling the cans out in a duffel bag. But today, as survey data indicate, freezing has become the most popular method for preserving salmon. One dipnetter described how he used to can fish but now he uses a vacuum packer and freezes them.

> Two hundred fish is a lot of fish. We had, I think, twelve ice chests full of fish and we had some of those great big ice chests that hold lots and lots of fish. It's a major amount of work to go down there and take care of two hundred fish and then bring them home. Then you've got to take them, lately we've been, several years ago I bought one of them vacuum packing things and we go out here and filet fish, vacuum pack them and freeze them. Years before I had a canner. My wife likes them primarily, and she's the main fish eater. I like salmon but she loves it, she's the main fish eater. She likes them canned in jars, in mason jars and so we have done a lot of that. And I learned early to can them in mason jars and some people even take their jars and stuff down to O'Brien Creek and sit there and process there fish right there and do it that way.

Figure 3-8, Preparation of salmon, Copper River Subsistence Fishery Participants 2000

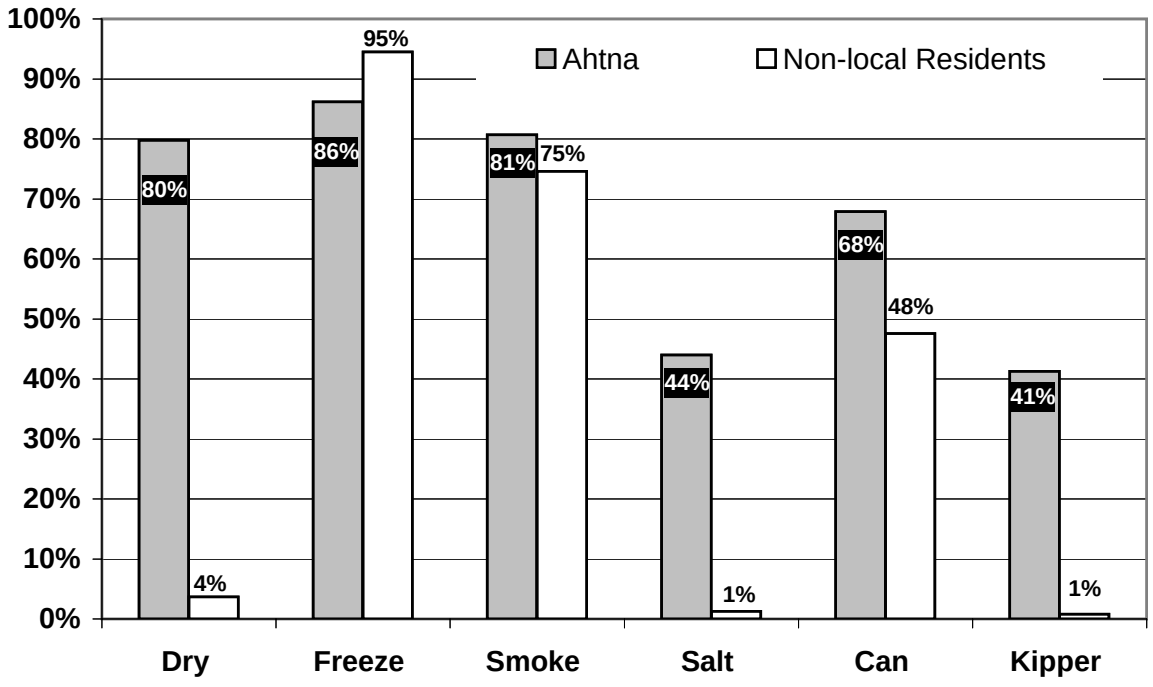
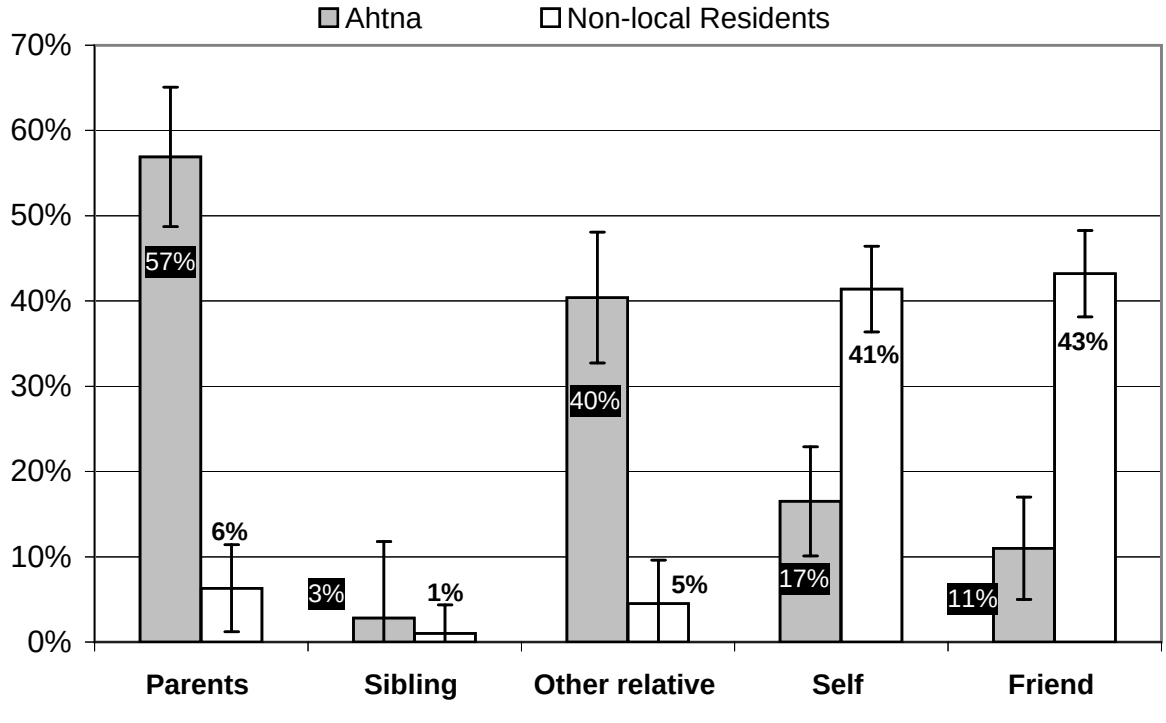


Figure 3-9, Who taught you how to fish? Copper River Subsistence Fishery Participants 2000



Other long time dipnetters said they still preserve some fish by canning and tend to use both the meat and heads. One Fairbanks resident who has been fishing at Chitina since the 1950s said he still cans most of his salmon.

> Like last summer I did most of the canning. I did 123 pints, I did 40 of those 303 cans, and I did 18 10-ounce jars. Those are the ones that oysters come in. What I do is usually when I trim the belly or something that doesn't fit in the can, I stick them in those because I'll just take one of them out and just sit there and eat it. I like those bellies and that front part that's got the fin on it, the cheeks. That's my favorite, you know, and gosh I see people down there cutting off those cheeks and throwing them away. They're throwing the best part of the fish away.

Figures 3-9 (Questions 6A-E) and 10-3 (Questions 6 F-J) relate to criterion six, the handing down of knowledge of the fishery from generation to generation. Survey data show that most Ahtna learned how to fish in the Copper River from a parent (57 percent) or other relative (40 percent). On the other hand, only 6 percent of non-local fishers interviewed learned from a parent (sig. = 0.000) and just 4.5% from another relative (sig. = 0.000). Of all non-local fishers interviewed, 43 percent said they were self-taught and 43 percent said they learned about Copper River fishing from a friend. Similarly, most Ahtna (67 percent) interviewed learned about the fishery from relatives while non-local fishermen learned about it through word of mouth (41 percent) or through friends (46 percent) (Figure 3-10).[7]

Figure 3-11 (Questions 7A through E) compares characteristics of sharing among participants in the Copper River subsistence salmon fisheries. Despite different harvest limits for the dipnet fishery in the Chitina Subdistrict and the fish wheel fishery in the Glennallen Subdistrict[8], a majority of respondents said they shared their catch. It should be noted that almost every Ahtna said they shared (95%) a significant number of non-Basin residents said they did not (78% shared) (sig. = 0.000). Similar percentages in both samples said that they shared with friends. However, more Ahtna shared with family members outside their households (93%) than did non-local fishers (74%) (sig. = 0.000). Also, a much greater percentage of Ahtna said they shared

[7] Word of mouth includes neighbors, casual co-workers, acquaintances, or other persons that the fisherman may know casually. These persons are not people who may have brought the new fishermen into the Copper River Basins personally. It also includes newspapers, television, other means of media, and the Alaska Department of Fish and Game. Friends are defined as persons other than relatives which may include neighbors, or close coworkers. The underlying assumption of friends is they may have introduced the person to the Copper River Basin personally.
[8] For the Chitina Subdistrict the limit is 30 salmon for a family of two or more, of which no more than one may be a chinook salmon. For the Glennallen Subdistrict the limit is 500 salmon for a family of two or more.

Figure 3-10, How did you learn about the fishery? Copper River Subsistence Fishery Participants 2000

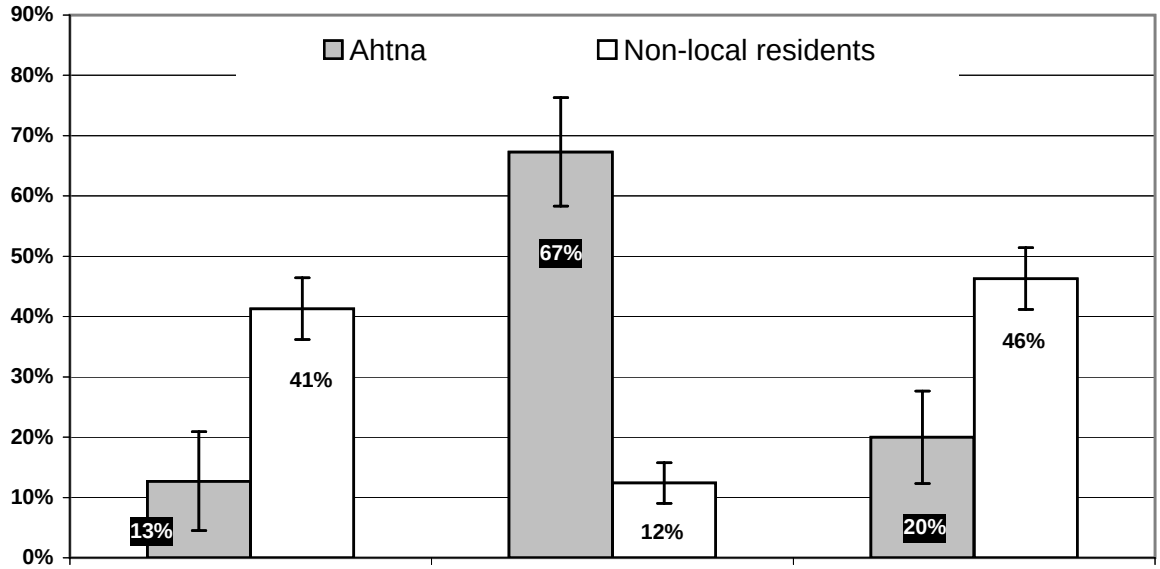
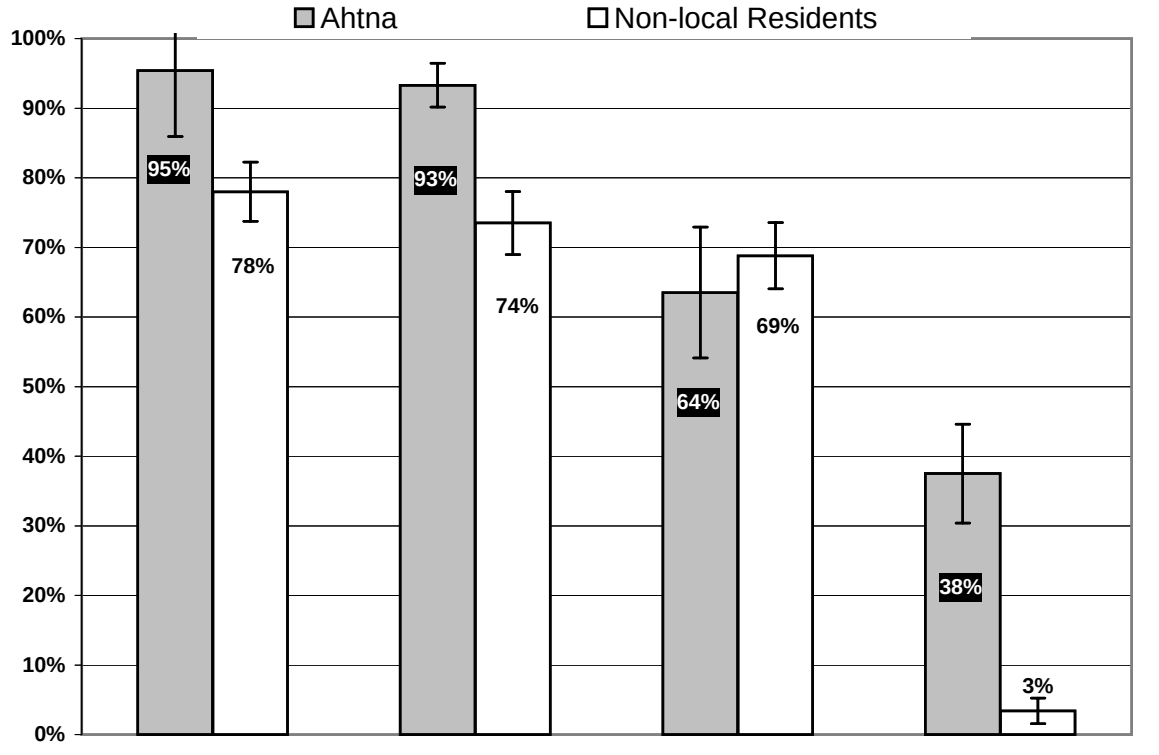


Figure 3-11, Sharing the catch, Copper River Subsistence Fishery Participants 2000



with "others" (for example, elders or people with whom they are not well acquainted) (38%) than non-Basin residents (3%) (sig. = 0.000). When asked how much of their catch they shared, Ahtna tended to share more of their catch than non-local residents (Figure 3-12). Most non-local fishers shared less than half their catch (72%), as did 33% of Ahtna (sig. = 0.000). On the other hand, 51 percent of Ahtna shared half their catch in contrast to 21% of non-local residents (sig. = 0.000) and 17 percent of Ahtna shared more than half, compared to 7% of non-local fishers (sig. = 0.007).

In key respondent interviews conducted for this research, several Fairbanks residents, who participated regularly in the Chitina dipnet fishery said that they commonly share salmon with family and friends. For example, one man said that he shared his fish "with lots and lots of people in Fairbanks." He went on to say that in 1999 some of the fish he shared

> were used in some potlatches and they were used by some searchers: they had a native guy that drowned down here in the Chena River and they spent two weeks looking for him and Harry came over and told me and said he, 'I'm using your fish for to feed those guys that are searching.'"

Another man said that he shared salmon with elderly people who cannot fish or hunt for themselves:

> I can remember coming in here with about maybe close to two hundred fish. I mean, you could have all you wanted, you know, and none of them went to waste. We had a lot of old timers who couldn't do it anymore. We'd give everybody fish.

Figures 3-13 and 3-14 pertain to criterion eight: "A pattern that includes taking, use, and reliance for subsistence purposes upon a wide variety of the fish and game resources and that provides substantial economic, cultural, social, and nutritional elements of the subsistence way of life." A majority of fishermen in both groups said salmon and wild foods were important in their diet.[9]

[9] However, data collected by the Division of Subsistence in 1982/83 and 1987/88 compared with ADF&G harvest ticket and permit records for 1989 to 1991, indicate that Copper Basin households have higher per capita harvests of wild foods than households located in urban areas. Household surveys conducted in the Copper Basin in 1982/83 and in 1987/88 estimated a per capita harvest of wild foods at 111.1 and 140.2 pounds per person respectively (Simeone and Fall 1996:80-81; McMillan and Cuccarese 1988, Stratton and Georgette 1984, Scott et al. 2001). In both study years, about 41 percent of the total harvest was salmon. Based on ADF&G harvest ticket and permit records for the period 1989 to 1991, the estimated per capita harvest of wild foods among Fairbanks/Delta residents was 16 pounds per person, for Mat-Su it was 27 pounds per person, and for Anchorage it was 19 pounds per person (ADF&G 1992). Analysis of updated data for the late 1990s provided the following estimates: Anchorage, 18 pounds per person, Fairbanks North Star Borough, 21 pounds per person; and Matuanuska-Susitna Borough, 25 pounds per person (Wolfe and Fisher 2002:10).

Figure 3-12, How much of your catch do you share? Copper River Subsistence Fishery Participants 2000

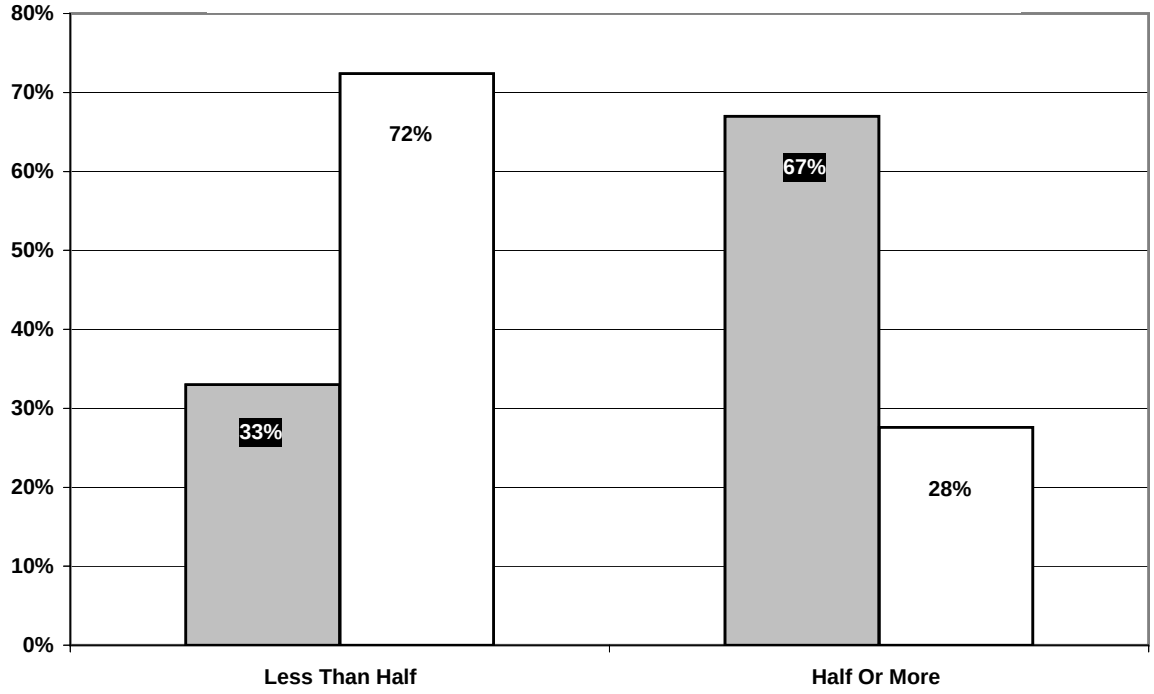


Figure 3-13, Importance of salmon in your diet? Copper River Subsistence Fishery Participants 2000

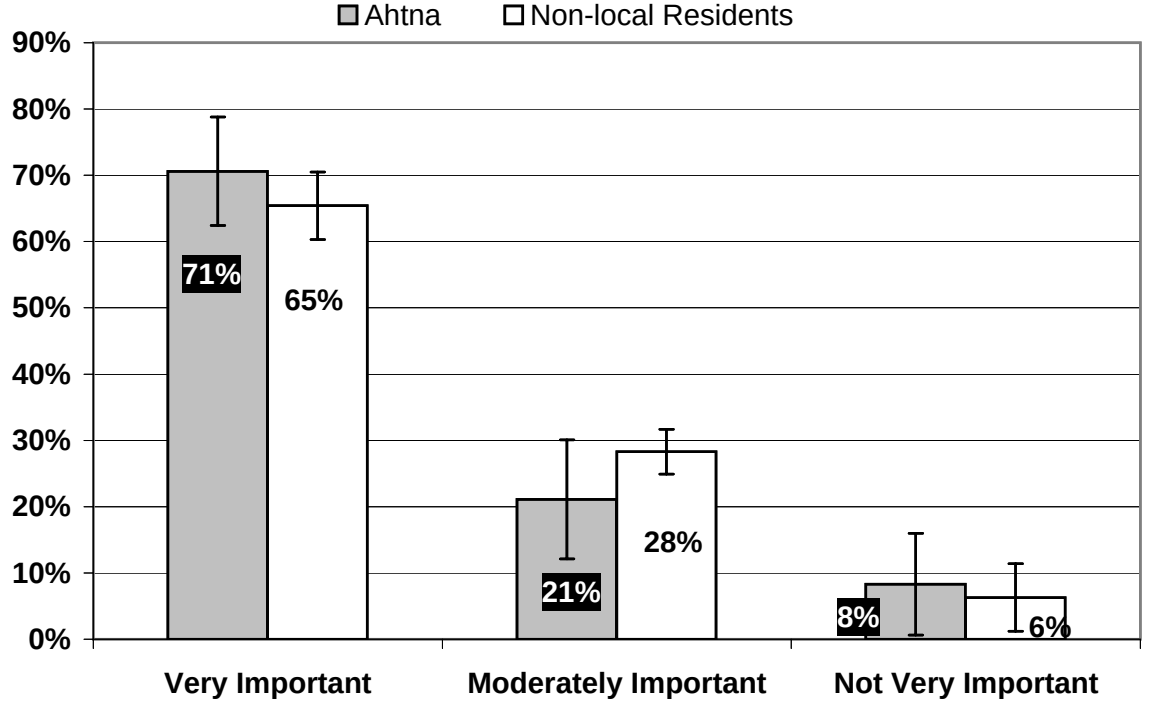


Figure 3-14, Importance of wildfoods in your diet? Copper River Subsistence Fishery Participants 2000

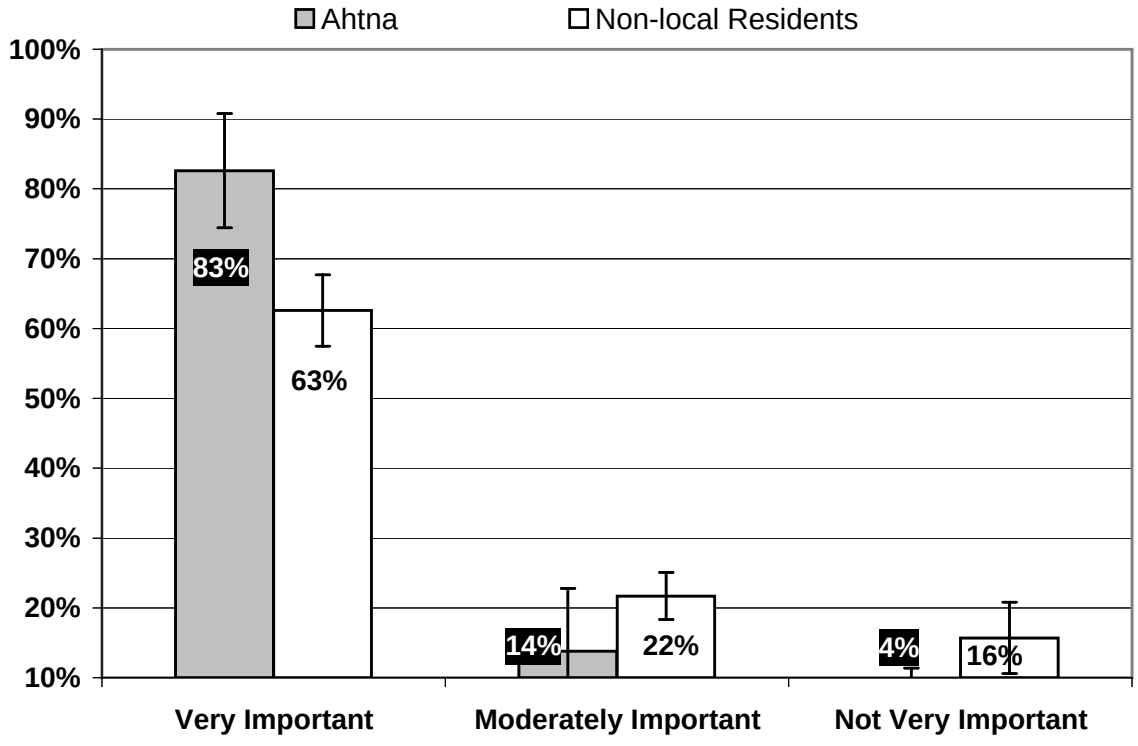


Figure 3-15, Are you employed or retired? Copper River Subsistence Fishery Participants 2000

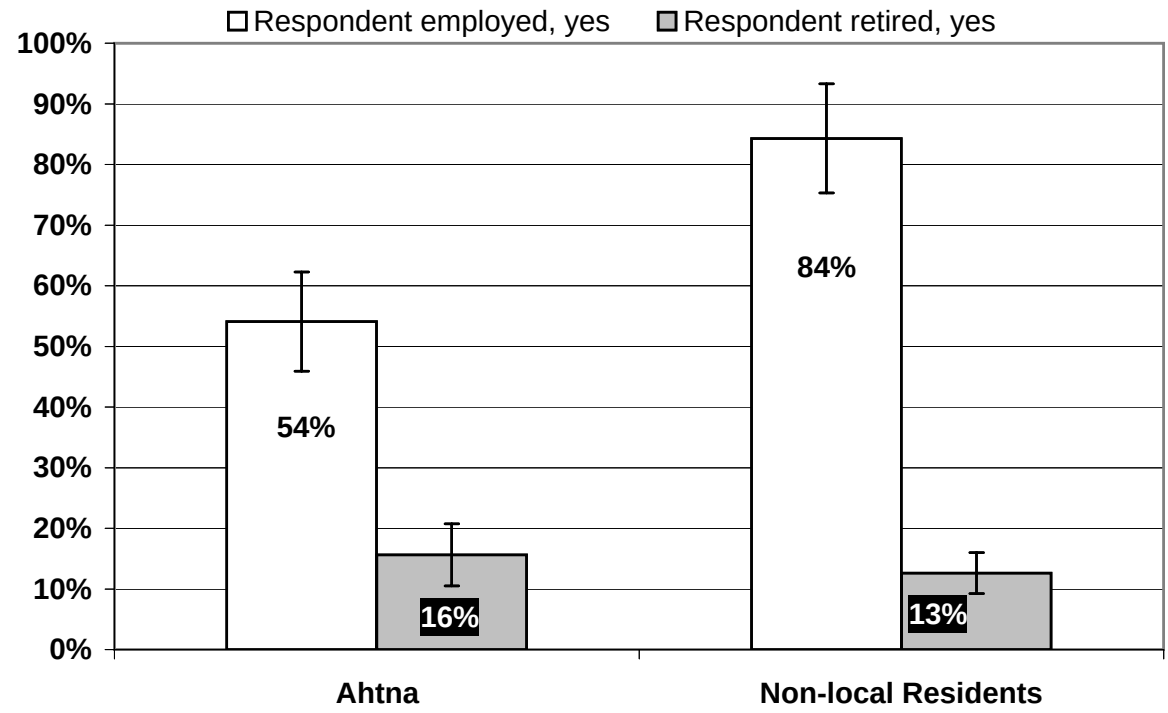


Figure 3-16, Employment type, Copper River Subsistence Fishery Participants 2000

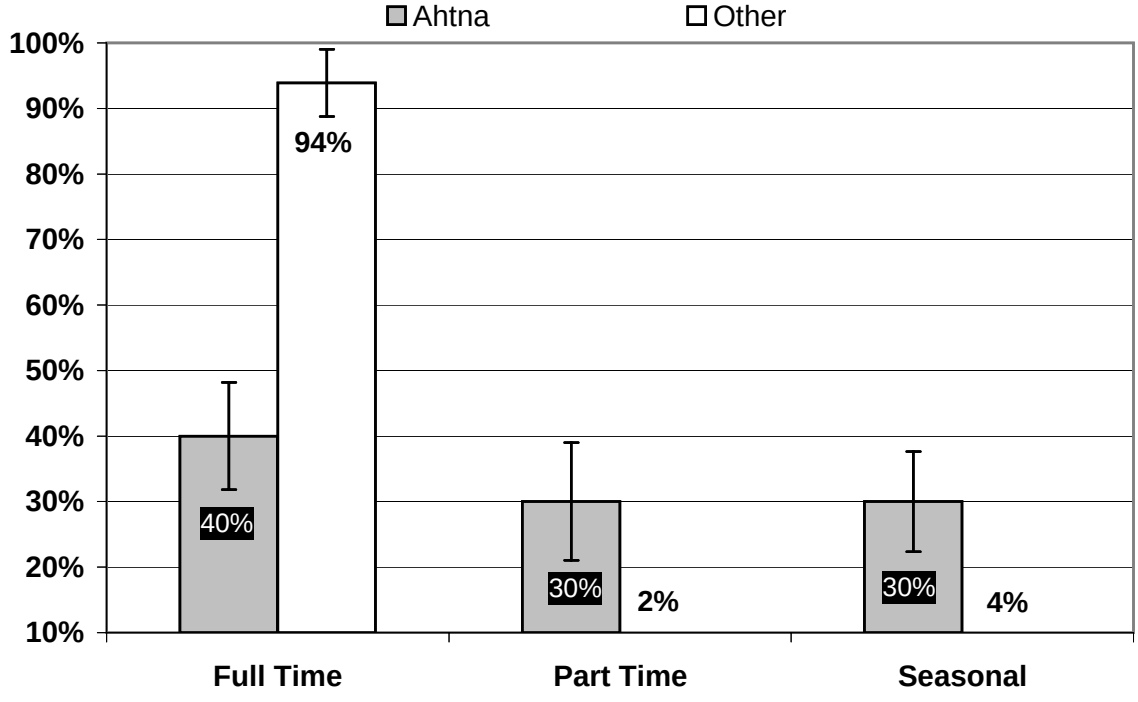
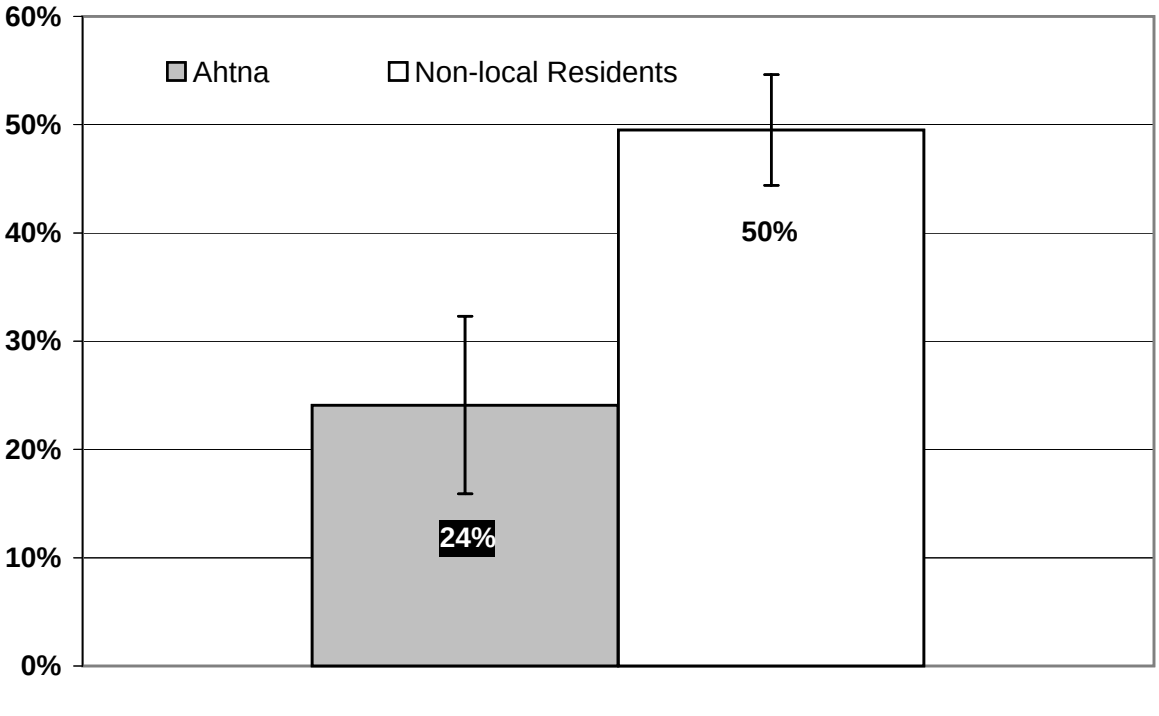


Figure 3-17, Took time off from work, Copper River Subsistence Fishery Participants 2000



Differences in the economies of the Copper River Basin and more urbanized areas of the state were reflected in responses to questions about employment.[10] Of the Ahtna interviewed, 54 percent said they were employed compared to 94 percent of non-Basin residents (Figure 3-15) (sig. = 0.002), and more Ahtna were employed part time (30 percent) and seasonally (30 percent) than non-Basin residents (2 percent and 4 percent respectively) (sig. = 0.0000 and 0.0003) (Figure 3-16).

In addition to questions about traditional and customary use, fishers were also asked about the current harvest regime and their observations about the state of fishery in general. Responses are presented in Table 3-2.

When asked if they were satisfied with the current harvest limits, a majority of Ahtna and non-Basin residents said yes. Of those not satisfied, 65 percent of non-Basin residents said they desired more chinook salmon, reflecting the limit of one king salmon in the dip net fishery. An equal number of Ahtna said they needed more fish or there was a subsistence priority. Comments received during the survey indicate this meant that because of the subsistence priority Ahtna should have no harvest limit (Question 7H).

There was a difference in the number of fish people said they could like to be able to harvest. Over 50 percent of Ahtna said they would like to be able to harvest 500 or more fish while just over 70 percent of non-Basin residents wanted to harvest between 30 and 50 fish (Question 7J). When asked if harvests have gone down, most Ahtna responded yes while most non-Basin residents said no (Question 6R). Comments about the decline varied. One woman said the river had eroded her fish wheel site so her harvest had gone down. Another person said that the last three years had been "light" in terms of the volume of fish in the run and several people said that it now takes more time to catch their limit. Others blamed the commercial fishery for the decline. One person said "I sense that salmon are becoming endangered and we need to find

[10] Within the Copper Basin there are differences in the employment characteristics of different segments of the population. According to data gathered during the 2000 U.S. Census, communities with predominantly Native populations report higher unemployment rates than those with smaller Native populations. Glennallen, which is 12 percent Native, reported an unemployment rate of 5 percent, whereas Mentasta, which is 71 percent Native, reported an unemployment rate of 28 percent and Tazlina, which is 30 percent Native, reported a 12 percent unemployment rate (Alaska Department of Community and Economic Development, Alaska Community Database).

some sort of control mechanism, mainly in regards to the commercial fishery." However, when asked if they were able to harvest enough fish to feed their families, 100 percent of all respondents replied yes (Question 7I). Asked if the quality of fish has changed, 57 percent of Ahtna replied yes, compared to 16 percent of non-local fishers (Question 6S). Some people commented "fish are softer now" and "kings are bigger." On the other hand some people thought kings were smaller and the all the fish were smaller. Another said that the fish "not as fat any more since the oil spill." A majority of Ahtna interviewed said that the timing of the runs

Table 3-2. Survey Results

Questions	Responses	
Are you satisfied with the Harvest Limits? (Q 7G)	**Ahtna**	**Non-local Residents**
Yes	79%	74%
Why not satisfied? (Q 7H)	**Ahtna**	**Non-local Residents**
Desire more chinook?		65%
Government Policy		4%
Need More Fish	44%	17%
Would Like More Fish	11%	14%
Subsistence Priority	44%	
Harvest enough to feed the family? (Q 7I)	**Ahtna**	**Non-local Residents**
Yes	100%	100%
Number of fish would like to harvest (Q 7J)	**Ahtna**	**Non-local Residents**
1 to 29	6%	7%
30	1%	33%
31 to 50	4%	38%
51 to 100	13%	12%
101 - 499	17%	7%
500	48%	2%
500 or more	11%	
Has Your Harvest Gone Down? (Q 6R)	**Ahtna**	**Non-local Residents**
Yes	75%	21%
Quality of Fish Changed? (Q 6S)	**Ahtna**	**Non-local Residents**
Yes	57%	16%
Times of Run Changed? (Q 6T)	**Ahtna**	**Non-local Residents**
Yes	67%	37%
Are there more fish now?(Q 6U)	**Ahtna**	**Non-local Residents**
Yes	11%	25%

had changed. (Question 6T) and a majority of all groups agreed that there are less fish now (Question 6U). Comments to some of the questions are listed in appendix B of this report.

Summary and Discussion

Today the Copper River supports both state and federally managed subsistence fisheries and state managed commercial, sport, and personal use fisheries. This report has focused on the subsistence and personal use fisheries of the Upper Copper River District. The former takes place in the Glennallen Subdistrict and is largely a fish wheel fishery, although state and federal regulation allow for the use of dipnets. Under state law any Alaska resident can obtain a permit to fish in the Glennallen subsistence fishery. Federal law allows only rural residents to obtain a subsistence permit. The state sponsored personal use fishery takes place in the Chitina Subdistrict and is open to any Alaska resident who obtains a sport fishing license. Dipnets are the only type of gear allowed under state regulation. There is also a federal subsistence fishery in the Chitina Subdistrict that is open to all rural residents and allows for the use of either fish wheels or dipnets.

Until the 1970s, the state managed the entire Upper Copper River District as a single entity with no restriction on gear type. The majority of fishers were local residents using fish wheels situated near their homes. Non-locals who wanted to fish for salmon usually went to Chitina where they could use either a dipnet or fish wheel. As the state's urban population grew and access to the Copper River improved, participation in the Chitina fishery increased. Between 1977 and 1984 the state took two steps to manage this growth. First, it created the Chitina and Glennallen Subdistricts and eliminated the use of fish wheels in the Chitina Subdistrict. Second, the Board of Fisheries further separated the two fisheries by classifying the Chitina dipnet fishery as personal use and the Glennallen fishwheel fishery as subsistence.

In 1984, the BOF made the decision to classify the Chitina Subdistrict fishery as personal use by comparing the characteristics of both fisheries. The BOF determined that, in the early 1980s, the distinguishing features of the dipnet fishery had been in existence only a short period of time and the fishery had not developed traditions that had been passed from generation to generation. Furthermore, it was urban based with participants taking time off from work to fish for a day or two. In contrast, the Glennallen fishery had considerable time depth, had developed traditions that were passed on, and was part of a mixed subsistence based economy. On several occasions the BOF rejected proposals to reclassify the dipnet fishery as a subsistence fishery. However, in

1999 it reversed its earlier determination and reclassified the Chitina dip net fishery as a subsistence fishery. What had changed in the intervening years?

The goal of the survey was to update information on customary and traditional use that had not been updated since the BOF made its initial decision in 1984. Information for both the 1984 and 2000 studies was organized around a comparison of use and users in the Glennallen and Chitina subdistricts. Since the pattern in the Glennallen Subdistrict had been established by Ahtna, and subsequently adopted by other local users, this study compared Ahtna with non-basin residents.

The survey findings indicate that significant differences still exist in the fishing patterns of Ahtna and non-basin residents. To be sure, some of these differences have diminished over time, while others are artifacts of regulation. For example, Ahtna fishers have generally participated in the fishery longer than non-locals but there are an increasing number of non-basin residents who have fished in the Copper River for 20 years or more. Most Ahtna adhere to the traditional pattern of fishing early in the season (i.e. June and early July) when the weather is dry and there are not too many insects. However, most non-locals interviewed for this project said they prefer to fish in July. This difference is also, a result of fishing time in the Chitina Subdistrict being closely regulated in June in conformance with the availability of fish.

On the other hand, in contrast to non-Basin residents who drive hundreds of miles to fish, most Ahtna still fish near their homes, many at sites that have been used for generations. Stratton (1982:31) mapped ten clusters of fish wheel locations in 1982 that were still in use in 2000. In the Chitina Subdistrict there are still no family owned fish camps. Stratton (1982:22) also reported that in the early 1980s most non-local fishers canned their salmon while most locals dried their catch. This difference still holds, but because of improvements in technology almost as many Ahtna as non-locals now freeze some of their fish.

Customary and traditional use determinations are grounded in a socio-economic context. The knowledge about how and where to fish is typically transferred across generations. Survey data indicate that most Ahtna learned how to fish from family members, while most non-locals learned on their own or from friends and acquaintances. Despite differences in harvest limits

between the Chitina and Glennallen subdistricts, a majority of both local and non-local fishers said they shared their harvest with family and friends. However, more Ahtna and other local residents said they shared with others outside of their family suggesting a wider distribution network among people who live in the Copper Basin. In addition, Ahtna and other basin residents said they shared a larger portion of their harvest, which indicates that salmon has a greater role in the local economy.

Differences in the economies of the Copper River Basin and more urbanized areas of the state were reflected in responses to the 2000 survey. This is important for evaluating the relative economic importance of the Copper River fisheries. When asked if they were employed full time, part time or seasonal, just 54 percent of Ahtna said they were employed full time compared to 94 percent of nonlocal residents and fewer Ahtna said they took time off from work than non-Basin residents. This means that most local residents did not have full-time jobs from which to take time off, or because of the proximity of their fishing sites to their homes and places of work, taking time off was not necessary. This suggests that subsistence fishing in the Glennallen Subdistrict is integrated into the round of economic activities in the Copper River Basin, in contrast to the predominant pattern in the Chitina Subdistrict where fishing is more likely to be a break from work activities (see Wolfe and Ellanna 1983:256).

REFERENCES CITED

Ahtna Inc.

2000 Letter to Dan Coffey, Chairman of the Alaska Board of Fisheries from Darryl F. Jordan, President and CEO Ahtna Incorporated, dated 16 February 2000.

Alaska Department of Fish and Game

1977 News Release: Regulation Changes Made for Copper River Salmon Subsistence Fishery. March 29, 1977. Juneau.

1980 Subsistence Fishing Regulations 1980. Juneau.

1983 Subsistence Finfish Regulations, 1983

1986 Subsistence Finfish Regulations, 1986

1992 Report on Proposed Non-Subsistence Areas. Submitted to the Alaska Joint Board of fisheries and Game, Anchorage, November 1992.

1993 Customary and Traditional Use Worksheet II-12: Salmon, Prince William Sound Management Area (including the Copper River Basin). Prepared by the Division of Subsistence for the Alaska Board of Fisheries, January 1993.

n.d. Response to Copper River Native Association and Ahtna Inc. Peitions, RC 205, Alaska Board of Fisheries.

Alaska Department of Labor

1991 Alaska Population Overview: 1990 Census and Estimates. Research and Analysis Section. Juneau.

1999 Alaska Population Overview: 1998 Estimates. Research and Analysis Section. Juneau.

Anchorage Times

1966 Article about the proposed closure of the Copper River to subsistence salmon fishing. May 27, 1966.

Baker, Shirley A.

1921 Report to Commissioner, Bureau of Fisheries, Washington DC, 11/10/21. Reports of the Bureau of Fisheries Agents, 1917 to 1935. Records of the Division of Alaska Fisheries. US Fish and Wildlife Service. National Archives. Washington DC

Bourke, Joseph A.

1898 Bourke Papers, Valdez Museum and Historical Archive Association, Valdez, Alaska.

Clemmans, Montgomery H. and Otto Koppen
1958 Report on subsistence fishery in the Copper River, in Annual Report, NMFS-NOAA-Alaska Region. National Archives, Anchorage.

De Laguna, Frederica and Catharine McClellan
1981 Ahtna. *In* Handbook of North American Indians, Volume 6: Subarctic, June Helm, editor, pp. 641 - 663. Washington: Smithsonian Institution.

Egan, William
1966a Letter from Governor Wm. Egan to Amos Wallace, President of the Alaska Native Brotherhood Camp No.20, June 14, 1966. Files, Alaska Department of Fish and Game, Glennallen.

1966b Letter from Governor Wm. Egan to Harry Johns, President of the Alaska Native Brotherhood Camp No. 31, June 1, 1966. Files, Alaska Department of Fish and Game, Glennallen.

Ewan, Markle F. Sr.
1963 Letter to Ralph Pirtle, Alaska Department of Fish and Game, June 1,1964. Files, Alaska Department of Fish and Game, Glennallen.

Fall, James A.
1999 Customary and Traditional Use Worksheets: Prince William Sound Management Area. Division of Subsistence, Anchorage, Alaska.

Fall, James A. and Lee Stratton
1984 The Harvest and Use of Copper River Salmon: A Background Report. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 96. Juneau.

Gilbert, C. H.
1921 Letter to Dr. H.M. Smith, Commissioner of Fisheries, November 19, 1921. Reports and Related Records 1869 - 1937. Records of Division of Alaska Fisheries. U.S. Fish and Wildlife Service. National Archives, Washington, DC

Gray, Glenn T.
1990 Chitina Dip net Fishery: Research Request 90.355. Prepared for Representative Mike Davis. Juneau: Legislative Research Agency.

Hanable, William S.
1982 Alaska's Copper River: the 18th and 19th Centuries. Alaska Historical Commission Studies in History No. 21. Anchorage.

Kahklen, Albert D.
1982 Letter from Albert D. Kahklen, Superintendent, Bureau of Indian Affairs to Steve Behnke, Director Subsistence Division, Alaska Department of Fish and Game, dated November 1, 1983.

Kari, James, compiler and editor
1986 *Tatl'ahwt'aenn Nenn'*: The Headwaters People's Country, Narratives of the Upper Ahtna Athabaskans. Alaska Native Language Center, University of Alaska Fairbanks.

Kari, James and Mildred Buck
1983 Ahtna Place Names List, Preliminary Edition. Copper River Native Association and the Alaska Native Language Center.

Larson, Charles
1969 Memorandum to Ken Middleton, November 14, 1969, about the Copper River subsistence fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries. Files, ADF&G, Glennallen.

Medred, Craig
2003 "Road is closed, but fish still run." *Anchorage Daily News*. June 15, 2003.

McMillan, Patricia O. and Sal V. Cuccarese
1988 Alaska Over-the-Horizon Backscatter Radar System: Characteristics of Contemporary Subsistence Use Patterns in the Copper River Basin and Upper Tanana Area. Two Volumes. University of Alaska Anchorage, Arctic Environmental Information and Data Center.

Miller, Arthur H.
1916 Supplement to Annual Report of Arthur H. Miller, Teacher of the United States Public Schools, Copper Center, Alaska, June 30, 1916. Alaska Salmon Fisheries, 1908 - 1940. Offices of Territories. National Archives, Washington, DC.

Nockels, Joan M.
1996 Redefining Federal Public Lands in Alaska. *Environmental Law*, 26(2):693-727.

Norris, Frank
2002 Alaska Subsistence: A National Park Service Management History. National Park Service, U. S. Department of Interior, Anchorage, Alaska.

Peel, Ryan T.
2001 Katie John V. United States: Balancing Alaskan State Sovereignty with a Native Grandmother's Right to Fish. *Brigham Young University Journal of Public Law*.

Pirtle, Ralph B.
1970 Review of the Copper River Red Salmon Subsistence Fishery – 1970. Alaska Department of Fish and Game, Division of Commercial Fisheries. Cordova.

1973 Memo to Ken Middleton, Division of Commercial Fisheries, ADF&G, regarding "Copper River Subsistence Fishing." Division of Commercial Fisheries, Cordova.

Record, Holly
1983a That's the Way We Live: Subsistence in the Wrangell-St. Elias National Park and Preserve. Occasional Paper No. 34. Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska Fairbanks.

1983b Where Raven Stood: Cultural Resources of the Ahtna Region. Occasional Paper No. 35. Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska Fairbanks.

Redfield, William
1917a Letter to Secretary of Interior, Washington, DC, May 12, 1917. Alaska Salmon Fisheries 1908 - 1940. Office of Territories. National Archives, Washington, DC.

1917b Order Regulating Salmon Fishery of Copper River Drainage, December 19, 1917. Alaska Salmon Fisheries, 1908 - 1940. Office of the Territories. National Archives, Washington, DC.

Roberson, Ken
1976 A Review of the Fisheries of the Copper River, 1976. Alaska Department of Fish and Game, Division of Commercial Fisheries. Glennallen.

1977 A Review of the Fisheries of the Copper River, 1977. Alaska Department of Fish and Game, Division of Commercial Fisheries, Glennallen.

Roberson, Kenneth and Fred Williams
1979 Prince William Sound Area Report of Subsistence Fishery Data and Proposed Management Plan for Dip Net Fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries.

Roberson, Kenneth, Robert G. Zorich, Frank H. Bird, and Peter J. Fridgen
1977 Copper River Prince William Sound Sockeye Salmon Inventory and Assessment. Alaska Department of Fish and Game, Division of Commercial Fisheries.

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

Saleeby, Becky
2000 The Quest for Gold: An Overview of the National Park Service Cultural Resources Mining Inventory and Monitoring Program (CRMIM). National Park Service – Alaska Region. Anchorage.

Scott, Cheryl, Louis Brown, Charles Utermohle, and Gretchen Jennings
2001 Community Profile Database. Alaska Department of Fish and Game, Division of Subsistence. Anchorage.

Simeone, William E. and James A. Fall
1996 Patterns and Trends in the Subsistence Salmon Fishery of the Upper Copper River, Alaska. Alaska Department of Fish and Game, Division of Subsistence. Report to the Alaska Board of Fisheries, Cordova, Alaska, December 1996. Anchorage.

Simeone, William E. and James Kari
2002 Traditional Knowledge and Fishing Practices of the Ahtna of the Copper River, Alaska. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 270. Juneau.

Stratton, Lee
1982 The Dip net and Fish wheel Fisheries of the Copper River, 1982. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 37. Juneau.

Stratton Lee and Susan Georgette
1984 Use of Fish and Game by Communities in the Copper River Basin, Alaska: A Report on a 1983 Household Survey. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 107. Juneau.

Thompson, Seton H.
1964 The Red Salmon (*Oncorhynchus nerka*) of Copper River, Alaska. Manuscript Report 1964. US. Fish and Wildlife Service, Bureau of Commercial Fisheries. Biological Laboratory, Auke Bay, Alaska.

United States Department of Interior
1984 Transcript, Office of Hearings and Appeals, Chitina Native Corporation v. Bureau of Land Management, April 25, 1984.

Van Wyhe, George
1961 Annual Progress Report of the Joint Sport and Commercial Fish Investigation of the Upper Copper River Drainage System, 1961 Segment. Alaska Department of Fish and Game.

Wallace, Richard
1955 Report of Richard Lee Wallace, NOAA enforcement agent, regarding fish wheel harvests. Files. Alaska Department of Fish and Game, Glennallen.

Ward, Henry
1919 Special Investigations of Copper River Salmon. *In* Alaska Fisheries and Fur Industries in Bureau of Fisheries Document No. 891. Ward T. Bower ed. US Government Printing Office, Washington, DC.

Wolfe, Robert J. and Linda J. Ellanna, compilers
1983 Resource Use and Socioeconomic Systems: Case Studies of Fishing and Hunting in Alaska Communities. Alaska Department of Fish and Game, Division of Subsistence Technical Paper No. 61. Juneau.

Wolfe, Robert J. and Victor Fischer
2002 Rural/Non-Rural Determinations for Federal Subsistence Management in Alaska: Task 6, Deliverable 6: Draft Final Analysis Report with Recommended Methodology. Submitted to the US Fish and Wildlife Service, Office of Subsistence Management. Robert J. Wolfe and Associates, San Marcos, CA and Institute of Social and Economic Research, University of Alaska, Anchorage.

APPENDIX A
INTERVIEW PROTOCOL

Interviewer ☐

Copper River Subsistence Fishery
ADF&G Division of Subsistence
Summer 2000

Survey No._____

Gear type: ☐ Fishwheel 1 ☐ Dipnet 2

Length of Residency in Alaska (years) ☐

Residence of Interviewee_____ **Date of Interview**_____/_____/2000

Subdistrict _____

1A What year did you begin fishing in the Copper River?

☐

1B How often have you fished in the Copper River since then?

☐ Every year 1 ☐ Most years 2 ☐ Infrequently 3

1C What kind of gear did you first use when you started fishing in the Copper River? (If its apparent respondent has switched gears ask the next question)

☐ Fishwheel 1 ☐ Dipnet 2 ☐ Rod and Reel 3

1D Why did you switch gear?

☐

2A-D Which months do you usually fish in the Copper River?

☐ June A ☐ July B ☐ August C ☐ Sept. D

2E Do you fish the same months every year?

☐ Yes 1 ☐ No 0

3A (If non-basin resident) How many trips do you plan to make to the Copper River to fish in the <u>subsistence</u> fishery this year?

☐

3B How many days do you plan to fish this trip?

☐

4A Do you have a fish site that you use every year?

☐ Yes 1 ☐ No 0

4B If yes, how many years have used you the present site?

☐

4C Does this site belong to your family?

☐ Yes 1 ☐ No 0

5A-G What methods do you use to preserve your salmon?

☐ drying A ☐ freezing B ☐ smoking C

☐ salting D ☐ canning E ☐ kippering F

☐ G other

6A-E Who taught you how to fish in the Copper River?

☐ Parent A ☐ Sibling B ☐ Other Relative C

☐ Friend D ☐ Self E

6F-J How did you Learn about the Copper River Fishery?

☐

6L-Q What kinds of salmon are available where you fish in the Copper River?

☐ Sockeye L ☐ Coho M ☐ Chinook N

☐ Chum O ☐ Pink P ☐ Don't Know Q

6R Over the years has your harvest has gone down?

☐ Yes 1 ☐ No 0

6S Has the quality of the fish changed?

Yes	No
1	0

6T Has the timing of the runs changed?

Yes	No
1	0

6U Do you think there are more fish now?

Yes	No
1	0

7A Do you share your catch? If no skip to 7 F.

Yes	No
1	0

7B If so, what percentage of your catch do you share?

Less than half 1-45%	About half 46-55%	More than half 56-80%
1	2	3

7C-E Who do you share fish with?

Family	Friends	Others
C	D	E

7F How many people live in your household?

7G Are you satisfied with the current harvest limits?

Yes	No
1	0

7H If not, why aren't you satisfied?

7I Do you harvest enough fish to feed your family?

Yes	No
1	0

7J How many fish would you like to be able to harvest?

8A Are you employed?

Yes	No	Retired
1	0	3

8B Did you take time off to go fishing in the Copper River?

Yes	No
1	0

8C How important is salmon in your diet?

Very	Moderate	Not Very
1	2	3

8D How many times a month do you eat salmon at home throughout the year?

<1	1	2	More than 2

8E How important are other types of wild food to your diet?

Very	Moderate	Not Very
1	2	3

8F The dipnet fishery has been called a recreational, subsistence, and personal use fishery. What do you think it is?

Recreational	Personal Use	Subsistence
1	2	3

8G When thinking about fishing on the Copper River what is <u>most</u> important to you?

Catching fish	Having a good time
1	2

Spend time with friends or family	Experience Nature
3	4

Comments

APPENDIX B
RESPONDENT COMMENTS FROM THE SURVEY

Comments to Question 7H: 'Why aren't you satisfied with current harvest?'

- Not happy with just one king, commercial fish gets as many as they want.
- Some folks aren't following the rules - catch way more than they can use or legally take.
- Would like five kings.
- Three kings per family; five even better.
- Plenty. Would like more kings.
- More kings.
- Need 60. As many as fishwheels.
- Forty fish, plus ten for each additional family member - should be based on family size.
- Accept it if there is good biological reason, but would like more kings.
- Should be no limit for subsistence.
- Alaska Natives never had a limit before. We take only what we need. Should not have a limit. It's not right.
- There shouldn't be a limit for Natives. Only white man should have a limit.
- Should be unlimited.
- Too few numbers of salmon.
- Fish are not that plentiful and one tends to go to extremes to obtain fish, such as buy it.
- I want more fish. I have a big family - seven sons and daughters, with about 35 grandchildren.
- Sometimes the weather is bad, therefore the drying fish goes bad and has to go to the dogs
- We never had limit long time ago - we shouldn't have to now - we don't believe in wasting

Comments to Question 7I: 'Do you harvest enough fish to feed your family?'

- Supplement with fish from other fisheries.
- Has access to Kenai fish, so this is to be with friends and family. Accessibility is a big issue here, with all of the private land issues.
- Strength of run will determine if I harvest enough to feed my family (couldn't answer).
- If I don't come here, I'm not going to have my fish. I can't catch enough sport fishing to get what I need.
- This is a meat run, it saves $1800 in food bills.
- Harvest enough fish to supplement the fish needs of the family.
- Supplement with reds from Kenai or Bristol Bay.
- Supplement with sport fishery.
- Supplements fish with moose to feed family for the year.
- Most of the time harvest enough to feed their family

- Supplements fish needed for family.
- If we could get more than 20-25, we could certainly use them.
- Would like the opportunity to take up to 40 fish.

Comments to Question 6R: 'Over the years has your harvest gone down?'

- Harvest has gone down over the last couple of years.
- The river path changed in Copper Center area and this is why harvests have gone down.
- Has noticed the last three years have been "light" years in terms of the volume of fish in the run.
- Has had to make at least two trips over the past few years to fill permit, whereas prior to that would limit out in one trip.
- Varies from year to year. This year it's gone down.
- Fish runs are getting less and less, mentioned forestry as a result. It takes about two days at present to catch about 100 fish. Not as it used to be. Fish population is down by 2/3 in last 20 years, due to commercial exportation and other controls, methods, as in fish farm/hatchery.
- I sense that salmon are becoming endangered and we need to find some sort of a control mechanism, mainly in regards to commercial fishing. I want to see more surveys like this.

Comments on question 6S: 'Has the quality of the fish changed?'

- Fish is softer now - was more firm. Kings were bigger - 60 lb kings.
- Early reds are small. Kings are a lot smaller than 10 years ago.
- All look like Gulkana kings.
- Kings are smaller.
- In the early run the reds are smaller.
- Fish have more net marks (marks caused from being caught in commercial nets).
- Reds are smaller - little and bitty (itty bitty)
- Fish are smaller.
- Quality of the fish is not as good as it used to be.
- Has noticed that this year there are a lot of worms, first year worms have been a problem.
- This year the salmon look like they've been in the river too long.
- Seems like some of the fish are beat up, scarred up, and pretty red.
- Quality of the fish varies from year to year, 1997 had a lot of small fish.
- Later run is bigger.
- Not as fat any more since oil spill.
- Reds are smaller than they have been in the past. In 85 1/2 to 2/3 were 31 lbs. or less, excellent quality - just real small.

Comments about the Question 6T: Has the Timing of the Run Changed?

- The fish are not running like they used to.
- Wonders if the water level might affect the timing of the run.

- Water is higher than it has been before at this time of year.
- Run is later.
- Run changes every year. High water and the spot you have
- One year didn't catch the fish.
- Runs are later - the type of run they'd normally hit the first weekend of June didn't seem to hit until 4th of July.
- The runs seem later. Normally have better luck in July, rather than June, when I used to catch my limit.
- Runs are spottier now.
- More kings than ever before.
- Usually we are able to catch our limit in the first week of June - not the case this year.
- Timing of the runs varies. Normally at this time (beginning of July) fishing should be hot and heavy.
- More kings earlier in the year.
- The run seems two weeks later, possibly due to the water level (high).
- Restrict earlier commercial run to have a stronger earlier run.
- Timing of the runs depends on commercial fishery.
- Earlier runs aren't as strong as they used to be.
- Don't know - there is no consistency to the runs.
- The runs change with fluctuations in the river.
- Don't know one run from the other.
- Last five years a lot more kings. Has used a boat to fish for the last ten years.
- In the early '80s the runs were earlier. Now they come later.
- There are too many people nowadays that compete for salmon, not the way it used to be. Salmon are smaller, the runs have changed and there isn't enough to go around. Commercial harvesting needs to be regulated to insure abundance for others.
- Late '60s is when noticed runs were getting weaker.
- Last year the fish weren't as good. The color was darker (outside) by the time they fished. This year it has been better.

Comments to Question 6U: 'Do you think there are more fish now?'

- More kings.
- Record runs for the last ten years.
- There are. We have caught more kings than in past years.
- Depends on when you are here.
- There are a little more fish now.
- A lot more kings.
- Hard to tell the timing changes.
- Overall rule: four fish. Sport fish king limit for drainages should be extended to dipnet fishery.
- There have been more kings the last two years.

- Stocks have been depleted.
- There are not more fish this year. It's the slowest that I've ever seen it.
- Run came earlier this year.
- July runs seem bigger.
- Unbelievable amount of kings.
- Depends on when you're here and varies with years.
- People take too much fish from Chitina dipnet fishery.
- No fish on Klutina Lake. All white man take it. Used to be lots there.
- No idea if there are more fish now.
- Thinks there are definitely fewer fish now.
- Same amount of fish. Whether you catch them depends on the water conditions.

APPENDIX C: Notes on 2000 Copper River Survey Sampling

Appendix Table 1 identifies the number of permits issued for the Upper Copper River subsistence salmon fishery in 2000 and the number of households surveyed by subdistrict and residency. Ethnicity data are not recorded on permits, so it is not possible to determine exactly from permit records how many Ahtna participated in 2000. Examination of the permit records identified at least 48 Ahtna households who held fish wheel permits, considerably less than the 109 Ahtna households identified through interviewing as participating in the fishery in 2000. It is very likely that Ahtna families shared permits, gear, and catches. It is also likely that the interview sample of 109 households represents most Ahtna subsistence fishers in 2000.

For non-Ahtna households, the number of interviews reflects a sample 3.8% - 8.6% of the households in the population for that residency group. Assuming that the interviews can be viewed as a random sample of the population, the adequacy of the sample can be evaluated in terms of response types for survey questions.

Where the response results in a proportion (e.g., "x% of households surveyed indicated…"), the standard error of the estimated proportion (a measure of variability) is dependent on the sample size and the proportion itself (see Appendix Table 2 and the given formula). It is independent of the sampling fraction. The variability is greatest near the mid-range (e.g., 50% of respondents), declining in a symmetrical fashion in either direction (Appendix Figure 1). Proportions derived from smaller samples (e.g., Chitina Subdistrict for Ahtna (2 households sampled) and "other local" in the Chitina Subdistrict (3 households sampled)) are more variable at any response that larger samples (e.g., Chitina Subdistrict for non-local (308 households sampled)).

The range of +/- two standard errors from the estimated proportion provides the approximate 95% confidence interval. So, with a 50% response, the 95% confidence interval from the Glennallen Subdistrict, Ahtna sample is 50% +/- 10%. This is the "worse" case scenario in terms of variability.

Where the response results in an estimated total (e.g., "an estimated x fish were harvested"), the standard error of the estimate is dependant on the variability between household responses (i.e., the sample standard deviation), the number of households sampled, and the number of households in the population (Appendix Table 3 and the given formula). Given a fixed sample and population size, the standard error of the estimate increases in a linear fashion as the standard deviation increases (Appendix Figure 2).

For situations where the population size is known (other local and non-local in the Chitina and Glennallen subdistricts), the standard error for the estimate is least in situations with relatively small population sizes (Chitina Subdistrict, other local (total permits issued = 35), and other local (301 permits) and non-local (902 permits) for the Glennallen Subdistrict). Because the exact number of Ahtna participants in the fishery is unknown, a standard error cannot be calculated. However, as stated above, it is likely that the sample of 109 Ahtna households represents virtually all Ahtna participants in the subsistence fishery. A sample achievement of 100% results in no standard error for this population.

The range of +/- two standard errors from the estimated total provides the approximate 95% confidence interval.

Table 1. 2000 Glennallen and Chitina Subdistrict Permit and Sample Information

		Households getting permits	Households interviewed	
Subdistrict	Residence	No.	No.	% of households getting permits
Chitina	Ahtna	0	2	n/a
	other local	35	3	8.6%
	non-local	8110	308	3.8%
	total	8145	313	3.8%
Glennallen	Ahtna	48	107	222.9%
	other local	301	15	5.0%
	non-local	902	74	8.2%
	Missing	0	1	0.0%
	total	1251	197	15.7%
Total	Ahtna	48	109	227.1%
	other local	336	18	5.4%
	non-local	9012	382	4.2%
	Missing	0	1	0.0%
	total	9396	510	5.4%

Table 2. Standard Error for a proportion

Formula = sqrt(p*(1-p)/n) where "p" is the proportion and "n" is the sample size

Proportion (p)	Chitina Subdistrict, Ahtna (n=2)	Chitina Subdistrict, other local (n=3)	Chitina Subdistrict, non-local (n=308)	Glennallen Subdistrict, Ahtna (n=107)	Glennallen Subdistrict, other local (n=15)	Glennallen Subdistrict, non-local (n=74)
0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5%	15.4%	12.6%	1.2%	2.1%	5.6%	2.5%
10%	21.2%	17.3%	1.7%	2.9%	7.7%	3.5%
15%	25.2%	20.6%	2.0%	3.5%	9.2%	4.2%
20%	28.3%	23.1%	2.3%	3.9%	10.3%	4.6%
25%	30.6%	25.0%	2.5%	4.2%	11.2%	5.0%
30%	32.4%	26.5%	2.6%	4.4%	11.8%	5.3%
35%	33.7%	27.5%	2.7%	4.6%	12.3%	5.5%
40%	34.6%	28.3%	2.8%	4.7%	12.6%	5.7%
45%	35.2%	28.7%	2.8%	4.8%	12.8%	5.8%
50%	35.4%	28.9%	2.8%	4.8%	12.9%	5.8%
55%	35.2%	28.7%	2.8%	4.8%	12.8%	5.8%
60%	34.6%	28.3%	2.8%	4.7%	12.6%	5.7%
65%	33.7%	27.5%	2.7%	4.6%	12.3%	5.5%
70%	32.4%	26.5%	2.6%	4.4%	11.8%	5.3%
75%	30.6%	25.0%	2.5%	4.2%	11.2%	5.0%
80%	28.3%	23.1%	2.3%	3.9%	10.3%	4.6%
85%	25.2%	20.6%	2.0%	3.5%	9.2%	4.2%
90%	21.2%	17.3%	1.7%	2.9%	7.7%	3.5%
95%	15.4%	12.6%	1.2%	2.1%	5.6%	2.5%
100%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Figure 1

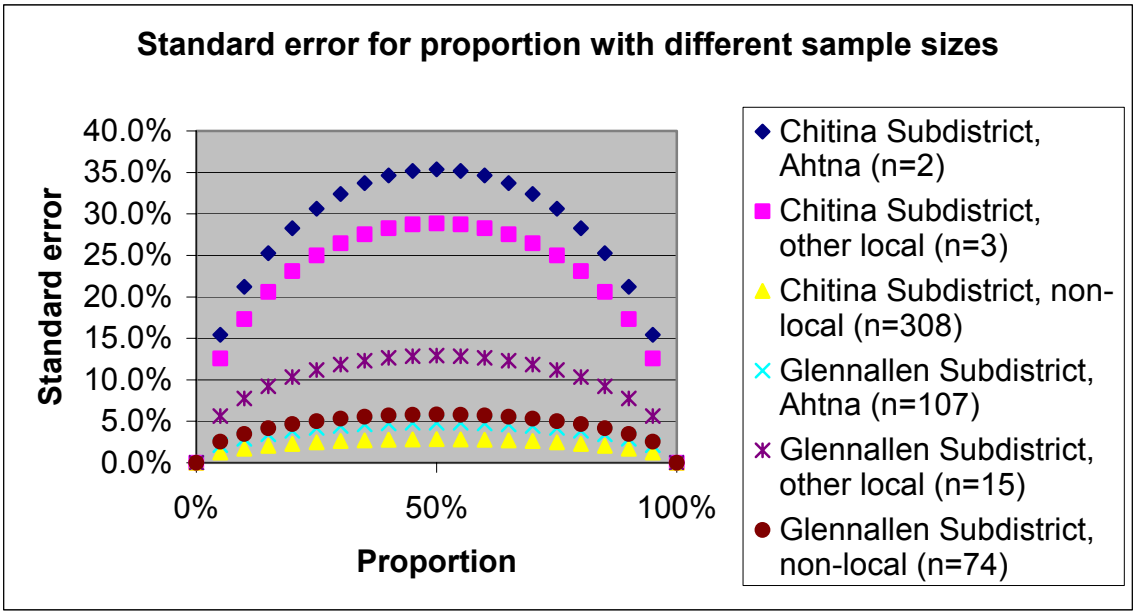
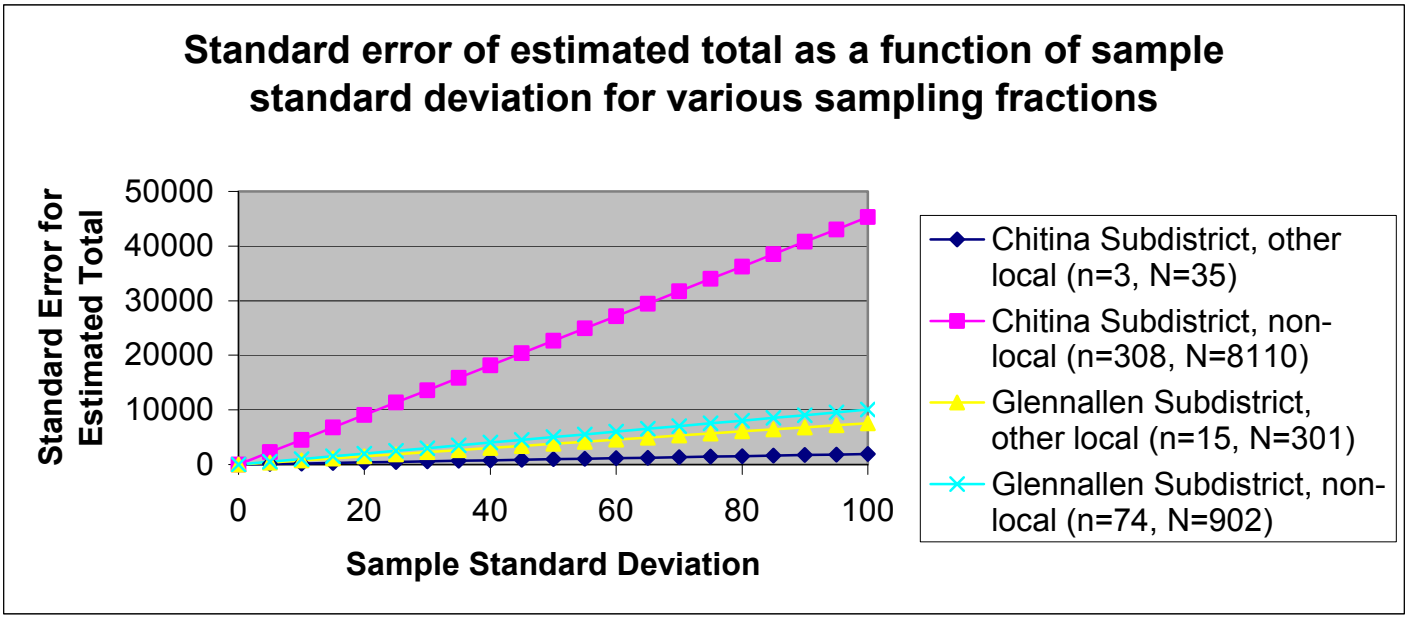

Standard error for proportion with different sample sizes
Standard error
40.0%
35.0%
30.0%
25.0%
20.0%
15.0%
10.0%
5.0%
0.0%
0%
50%
100%
Proportion
Chitina Subdistrict, Ahtna (n=2)
Chitina Subdistrict, other local (n=3)
Chitina Subdistrict, non-local (n=308)
Glennallen Subdistrict, Ahtna (n=107)
Glennallen Subdistrict, other local (n=15)
Glennallen Subdistrict, non-local (n=74)

Table 3. Standard Error for a estimated total with finite population correction factor

Formula = (1-n/N)*(N**2)*(s**2/n) where "n" is the sample size, "N" is the population size, and "s" is the sample standard deviation

Sample standard deviation	Chitina Subdistrict, other local (n=3, N=35)	Chitina Subdistrict, non-local (n=308, N=8110)	Glennallen Subdistrict, other local (n=15, N=301)	Glennallen Subdistrict, non-local (n=74, N=902)
0	0	0	0	0
5	97	2266	379	502
10	193	4533	758	1005
15	290	6799	1136	1507
20	386	9065	1515	2009
25	483	11331	1894	2512
30	580	13598	2273	3014
35	676	15864	2651	3516
40	773	18130	3030	4018
45	869	20396	3409	4521
50	966	22663	3788	5023
55	1063	24929	4167	5525
60	1159	27195	4545	6028
65	1256	29461	4924	6530
70	1353	31728	5303	7032
75	1449	33994	5682	7535
80	1546	36260	6061	8037
85	1642	38526	6439	8539
90	1739	40793	6818	9042
95	1836	43059	7197	9544
100	1932	45325	7576	10046


Standard error of estimated total as a function of sample standard deviation for various sampling fractions
Standard Error for Estimated Total
50000
40000
30000
20000
10000
0
0
20
40
60
80
100
Sample Standard Deviation
Chitina Subdistrict, other local (n=3, N=35)
Chitina Subdistrict, non-local (n=308, N=8110)
Glennallen Subdistrict, other local (n=15, N=301)
Glennallen Subdistrict, non-local (n=74, N=902)