

**KUSKOKWIM RIVER SUBSISTENCE CHINOOK FISHERIES:**

**AN OVERVIEW**

**TECHNICAL PAPER NO. 146**

**Report to the Alaska Board of Fisheries**

**by**

**Elizabeth Andrews and Michael Coffing**

**Alaska Department of Fish and Game  
Division of Subsistence  
Western Region  
December 1986**

TABLE OF CONTENTS

LIST OF TABLES . . . . . iii

LIST OF FIGURES . . . . . iii

INTRODUCTION . . . . . 1

PURPOSE . . . . . 1

THE SUBSISTENCE FISHERIES . . . . . 1

    Communities Using Chinook . . . . . 1

    Seasonality of Harvest . . . . . 2

    Methods and Means . . . . . 3

    Harvest Levels . . . . . 3

TRENDS IN THE FISHERY . . . . . 4

CHINOOK HARVEST PATTERNS IN KWETHLUK: A CASE EXAMPLE . . . . . 5

    Fishcamps and Fishing Areas . . . . . 6

    Methods and Means . . . . . 7

    Harvest Levels and Use . . . . . 8

SUMMARY . . . . . 9

REFERENCES . . . . . 10

LIST OF TABLES

Table 1. Kuskokwim River subsistence chinook salmon harvest, 1960-85 . . . . .11

Table 2. Kwethluk subsistence salmon harvest, 1980-1986 . . . . .12

LIST OF FIGURES

Figure 1. Kuskokwim River fisheries management area . . . . .13

Figure 2. Sampled fishing families: Kuskokwim River subsistence salmon . . . . .14

Figure 3. Total Kuskokwim chinook: subsistence harvest . . . . .15

Figure 4. Kuskokwim chinook by area: subsistence harvest . . . . .16

Figure 5. Commercial chinook catch: Kuskokwim River, 1960-1985 . . . . .17

Figure 6. Average fishing family harvest: Kuskokwim subsistence chinook . . . . .18

Figure 7. Lower Kuskokwim chinook: subsistence harvest . . . . .19

Figure 8. The location of Kwethluk along the lower Kuskokwim River . . . . .20

Figure 9. Distribution of Kwethluk fishcamps, 1986 . . . . .21

Figure 10. Kwethluk subsistence salmon fishing areas, 1986 . . . . .22



## INTRODUCTION

Chinook salmon is one of four major types of salmon caught along the Kuskokwim River for subsistence uses, the others being chum, sockeye, and coho. For most villages in the Kuskokwim River drainage, chinook represents a major salmon species used for subsistence purposes. It is the major eating fish.

## PURPOSE

The purpose of this presentation is to briefly describe the subsistence chinook salmon fisheries along the Kuskokwim River in terms of geographic location, seasonality, means and methods, and harvest trends since 1960. Because declining escapements are evidenced for spawning streams throughout the drainage, data will be presented for the entire area, however, lower and upper river harvest patterns will be described separately as needed. A case example describing chinook fishing patterns for a lower Kuskokwim community is included also.

## THE SUBSISTENCE FISHERIES

### Communities Using Chinook

Families from some 30 communities in the Kuskokwim drainage fish for chinook salmon for subsistence uses (Fig. 1). Collectively, these

30 communities have a total population of about 10,000 people based on 1984 estimates (Alaska Department of Labor 1985). In 1985, there were approximately 600 salmon fishing families in the Kuskokwim drainage (Fig. 2). The number of fishing families was estimated as high as 849 in 1979. The count of fishing families is somewhat variable from year to year because many households flexibly pool labor in cooperative work groups and may choose to report as separate or combined units. Also, reporting is variable certain years; notably it was low in 1983 and 1984, when budgets for subsistence surveys were reduced.

#### Seasonality of Harvest

Along the lower Kuskokwim in District 1, chinook salmon fishing generally begins by June 1 and is concluded by mid-July. In upper river districts, fishing necessarily begins later when salmon arrive. Near McGrath, 507 miles from the mouth of the river, chinook salmon fishing generally begins about the first of July continuing throughout the month.

Fishing activities are based either from a fishcamp or the home village. However, the degree to which one or the other is more prevalent varies from community to community and from year to year for some individual families. Not all fishing camps are located along the main stem of the Kuskokwim, but on tributary streams such as the Kwethluk, Tuluksak, Aniak, Holitna, Stony, and Salmon rivers. On the lower river, many subsistence fishermen also operate as commercial

fishermen primarily in District 1 where commercial fishing is allowed and a significant percentage of families have a member with a CFEC permit.

#### Methods and Means

Drift gill nets, set gill nets, fishwheels, and rod and reel are used for taking chinook in the Kuskokwim drainage for subsistence. In the lower Kuskokwim in District 1, drift fishing for chinook predominates, however, set nets are used by some families. In District 2 between Tuluksak and Chuathbaluk, drift and set gill nets and fishwheels are used owing to the feasibility of using each type of gear under particular river conditions. In the extreme upper portions of the area, fishwheels, set gill nets, and rod and reel are used. In one area of the upper Kuskokwim, fish weirs and traps were used as recently as 1967 for harvesting chinook for subsistence use (Stokes 1985).

#### Harvest Levels

During the previous ten years (1976-85) subsistence chinook harvests have ranged between 36,000 and 60,000 fish with five-year averages of about 53,000 (Fig. 3). The larger proportion of the chinook catch occurs in the lower river (Fig. 4) where the catch averages 80 percent of the total river harvest. Harvest levels on the lower river, however, fluctuate more dramatically from year to year

than upper river catches (Fig. 4). By comparison, commercial chinook harvests have ranged between 20,000 and 38,000 in the past ten years (Fig. 5).

In general, lower Kuskokwim average family harvests have ranged from 50 to 150 chinook per fishing family during the past ten years, while in the upper Kuskokwim, they have ranged from 56 to 105 during the same period (Fig. 6). As shown by these figures, chinook is a major fish species for the lower Kuskokwim area, constituting up to 2,250 pounds of edible product to the family's annual food supply.

The lower Kuskokwim area consists of 16 communities with populations which range from 39 people to 3,681. The average community size is about 300 people, excluding Bethel, the regional center. Lower Kuskokwim fishing families account for roughly 80 percent of the total for the Kuskokwim drainage. The largest community, Bethel, has taken 27 percent of the lower Kuskokwim harvest, on the average, during the past ten years (Fig. 7).

#### TRENDS IN THE FISHERY

Between 1981 and 1985, chinook subsistence harvests have been stable relative to the previous five years (1976 to 1980) both for the drainage as a whole and for the lower and upper river areas (Figs. 3 and 4; Table 1). Five year averages were 52, 831 (1976 to 1980) and 53, 362 (1981 to 1985) (Table 1). Compared to the ten previous years, 1966 to 1975, total river harvests have increased by about 15 percent, with subsistence harvests on the upper river increasing more than on

the lower river (Fig. 4; Table 1). The increases on the upper river may be due to increasing numbers of sampled fishing families (Fig. 2) in the past ten years, from 134 to 162 families. Average fishing family subsistence harvests of chinook have been relatively stable on the lower river when comparing the ten-year period 1976 to 1985 with the 1966 to 1975 period, whereas on the upper river average family harvests have increased somewhat (Fig. 6). The reasons for this modest increase in fishing families and harvests on the upper river are not clear. Similarly, we are uncertain whether these increases are related to possible changes in the chum, sockeye, and coho fisheries.

#### CHINOOK HARVEST PATTERNS IN KWETHLUK: A CASE EXAMPLE

Kwethluk is a community of approximately 540 people in 111 households located 20 miles upriver from Bethel (Fig. 8). Among the communities in the lower Kuskokwim area, Kwethluk is second in population size only to Bethel. Like most communities on the Yukon-Kuskokwim Delta, the community is predominately made up of Yup'ik Eskimos, and serves as a representative case example of fishing practices along the lower river.

Beginning in late May 1986, the Division of Subsistence started a research project in Kwethluk. The first phase of this study was aimed at collecting information on the subsistence salmon fishery. All fishcamps were visited and all fishing families were interviewed about their subsistence salmon harvesting and processing activities, and other socioeconomic information.

The study found that employment opportunities for cash in the community were few. Wage employment was limited to the city government, village corporation, store, health clinic, and school district. Commercial fishing also contributed income to many households. During 1986, 68 permit holders participated in the Kuskokwim commercial fishery. Average gross fish sales per permit holder in Kwethluk in 1986 were \$5,920.

### Fishcamps and Fishing Areas

During summer 1986, nearly 50 percent of Kwethluk households moved to 52 fishcamps. Seventy-six households (68 percent) contributed labor, either as fishermen or processors, to a Kwethluk fishcamp. Eighty-two percent of the Kwethluk fishcamps were operating by June 15th. By mid-July, most chinook salmon fishing was completed and families began to prepare for other subsistence activities.

Most fishcamps used by Kwethluk residents are located within eight river miles of the village (Fig. 9). Generally, the camps consist of permanent structures including summer cabins, fish and net drying racks, and steambaths. Sixty percent of the fishcamps have been used consistently by the same households for more than ten years. At least two Kwethluk households have used their camps for more than 50 years. People sometimes must relocate their camps due to changing river channels and eroding riverbanks.

Areas used for subsistence fishing, like fishcamps, generally are located within eight miles of the village. Set net sites are located

along both the Kuskokwim and Kwethluk rivers as well as Kuskokuak Slough. Subsistence fishing with drift nets occurred only in the Kuskokwim River and in Kuskokuak Slough (Fig. 10). Except for Kuskokuak Slough, where commercial fishing is not permitted, subsistence and commercial fishing by Kwethluk fishermen using drift nets occurs in the same area of the Kuskokwim. Commercial fishermen from Kwethluk, however, also fish in areas upriver and downriver of their subsistence fishing areas.

#### Methods and Means

Both drift and set gill nets are used for harvesting salmon. During 1986, 72 percent of subsistence fishing families used set nets and 90 percent used drift nets. The majority, 62 percent, used both set gill nets and drift gill nets to harvest king salmon.

Set nets vary in length from 10 to 270 feet. The length of set nets is dependent on the specific characteristics of the river channel, sandbar, or riverbank where it is placed. For example, set nets used on the Kuskokwim River average about 90 feet in length, whereas set nets used on the Kwethluk River and similar tributaries average 50 feet in length. In contrast, virtually all drift nets are 300 feet in length, the maximum aggregate length allowed by state regulation (Alaska Department of Fish and Game 1986). Many of the commercial fishermen in the community are also subsistence fishermen and often use their commercial gear for subsistence fishing.

Two mesh sizes are used for subsistence chinook fishing with set and drift gill nets: "large mesh gear," greater than six inches, and "small mesh gear," less than six inches. Eighty percent of the fishing families used large mesh gear to some extent. For those families that used large mesh gear for chinook fishing, 73 percent operated set nets and 55 percent operated drift nets, many using both. Of families using small mesh gear, 38 percent used set nets and 85 percent used drift nets. Set nets tend to be large mesh gear whereas drift gill nets are both, but primarily small mesh.

#### Harvest Levels and Use

During the 1986 season the subsistence chinook salmon harvest by Kwethluk residents totaled 5,824 fish. This harvest is lower than the average number of king salmon harvested between 1980 and 1985 (Table 2). Fishermen reported that clear, low water during June were factors which impacted their fishing success. Clear water allowed salmon to more easily avoid their nets while low water made some drifting areas unsuitable due to snags which would catch and tear nets.

The method of harvest, use of set gill nets versus drift gill nets, may have influenced harvest success. Families which used drift nets as one of their harvest methods, harvested an average of 120 king salmon compared to 33 king salmon for families that did not use drift nets.

The majority (85 percent) of the king salmon harvested were dried and smoked for use during the coming year. Approximately two percent were salted whole, relatively few were eaten immediately, and two

percent were frozen. Virtually all the salmon caught were completely utilized. Heads, eggs, and backbones were often preserved for human use or were fed to dogs.

#### SUMMARY

In summary, chinook is a major subsistence fish in the Kuskokwim drainage, especially in the lower portions of the river. Subsistence salmon fishing by families along the Kuskokwim varies considerably in terms of its timing, methods and means, and harvest levels from community to community. The harvest of chinook is important to communities along the entire length of the river in spite of differences in harvest numbers from community to community. In terms of harvests, the fishery has remained relatively stable over the past ten years, and has only increased a modest 15 percent this decade when compared with the previous decade. The reasons for somewhat increased average family harvests in some areas are not clear but may reflect changes in other subsistence fisheries and changes in other aspects of the subsistence economy.

## REFERENCES

**Alaska Department of Fish and Game**

1986 Regulations of the Alaska Board of Fisheries for Commercial and Subsistence Fishing in the Arctic-Yukon Kuskokwim Region. 1986 Edition. Juneau.

**Alaska Department of Labor**

1985 Alaska Population Overview. Alaska Department of Labor, Juneau.

**Stokes, Jeff**

1985 Natural Resource Utilization of Four Upper Kuskokwim Communities. Technical Paper No. 86. Division of Subsistence, Alaska Department of Fish and Game. Juneau.

TABLE 1. KUSKOKWIM RIVER SUBSISTENCE CHINOOK SALMON HARVEST, 1960-1985

Year	Total River		Lower River		Upper River		Sampled	
	Estimated Catch	Sampled Fishing Families						
1960	18887	0	13734	0	5153	0	0	0
1961	28672	0	24003	0	4669	0	0	0
1962	13582	0	11309	0	2273	0	0	0
1963	34482	0	28755	0	5727	0	0	0
1964	29017	273	23309	273	5708	0	0	0
1965	24697	252	21107	252	3590	0	0	0
1966	49325	535	39374	404	9951	131	131	131
1967	59943	568	51824	444	8119	124	124	124
1968	32624	608	27239	468	5385	140	140	140
1969	40208	517	30551	379	9657	138	138	138
1970	69219	642	60768	507	8451	135	135	135
1971	42926	489	34290	377	8636	112	112	112
1972	40145	576	32907	445	7238	131	131	131
1973	38526	520	31774	399	6752	121	121	121
1974	26665	596	19538	444	7127	152	152	152
1975	47569	589	37745	430	9824	159	159	159
1976	57899	494	46504	378	11395	116	116	116
1977	55339	618	39470	467	15869	151	151	151
1978	35881	701	26779	539	9102	162	162	162
1979	55528	849	41537	623	13991	226	226	226
1980	59509	798	44903	611	14606	187	187	187
1981	60303	600	47156	427	13147	173	173	173
1982	57503	695	45639	494	11864	201	201	201
1983	48687	341	34364	237	14323	104	104	104
1984	57423	351	45415	201	12008	150	150	150
1985	42894	586	32929	440	9965	146	146	146

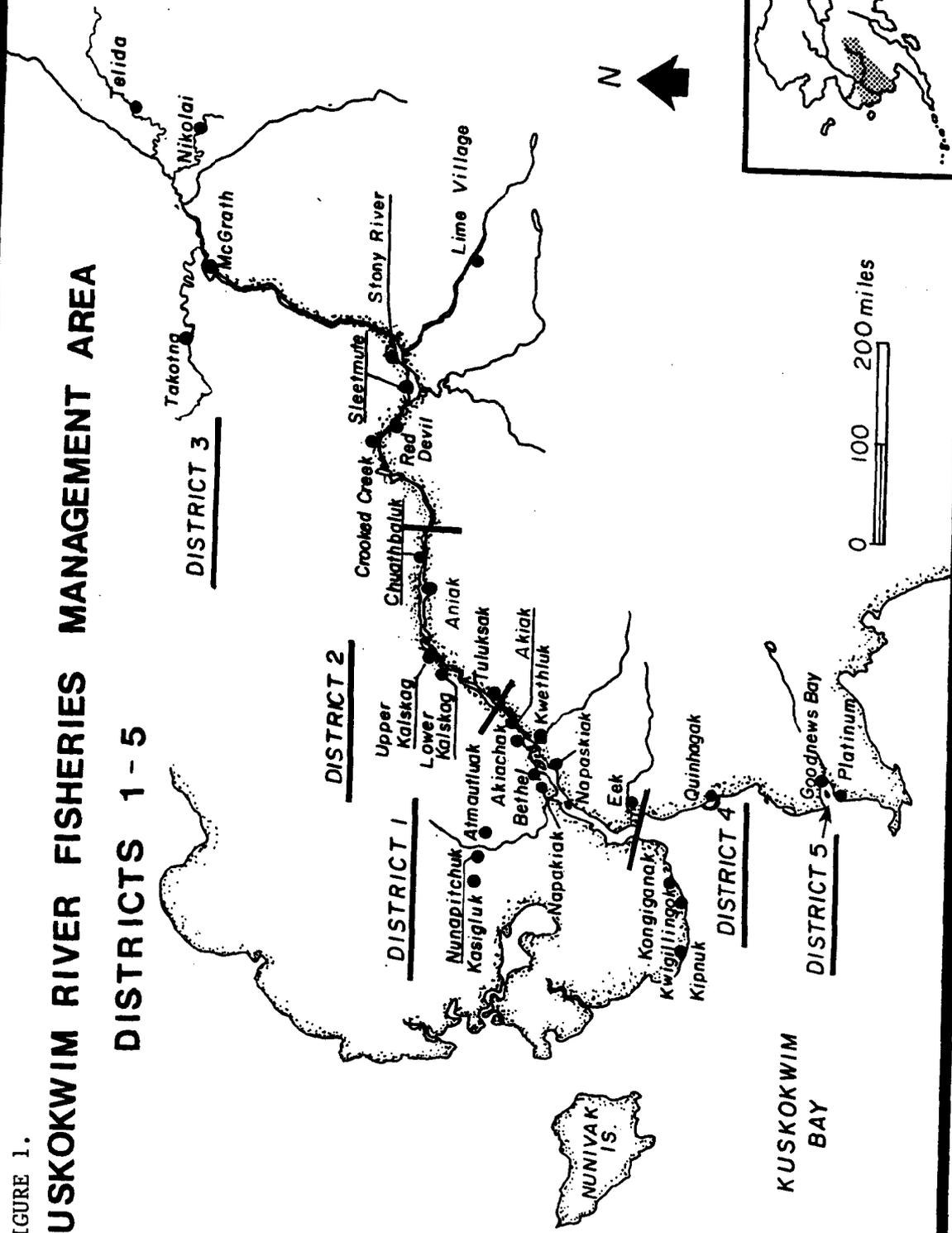
TABLE 2. KWETHLUK SUBSISTENCE SALMON HARVEST, 1980 TO 1986.

Year	-----Species-----		
	Chinook	Sockeye, Chum and Pink	Coho
1980	7,627	18,188	6,376
1981	6,167	10,736	770
1982	5,897	16,837	4,657
1983	-----data not collected-----		
1984	6,732	14,516	data not collected
1985	4,937	12,476	3,041
Average annual harvest	6,272	14,551	3,711
1986 harvest	5,824	15,780	3,545

FIGURE 1.

# KUSKOKWIM RIVER FISHERIES MANAGEMENT AREA

## DISTRICTS 1 - 5



**FIG. 2. SAMPLED FISHING FAMILIES**

KUSKOKWIM RIVER SUBSISTENCE SALMON

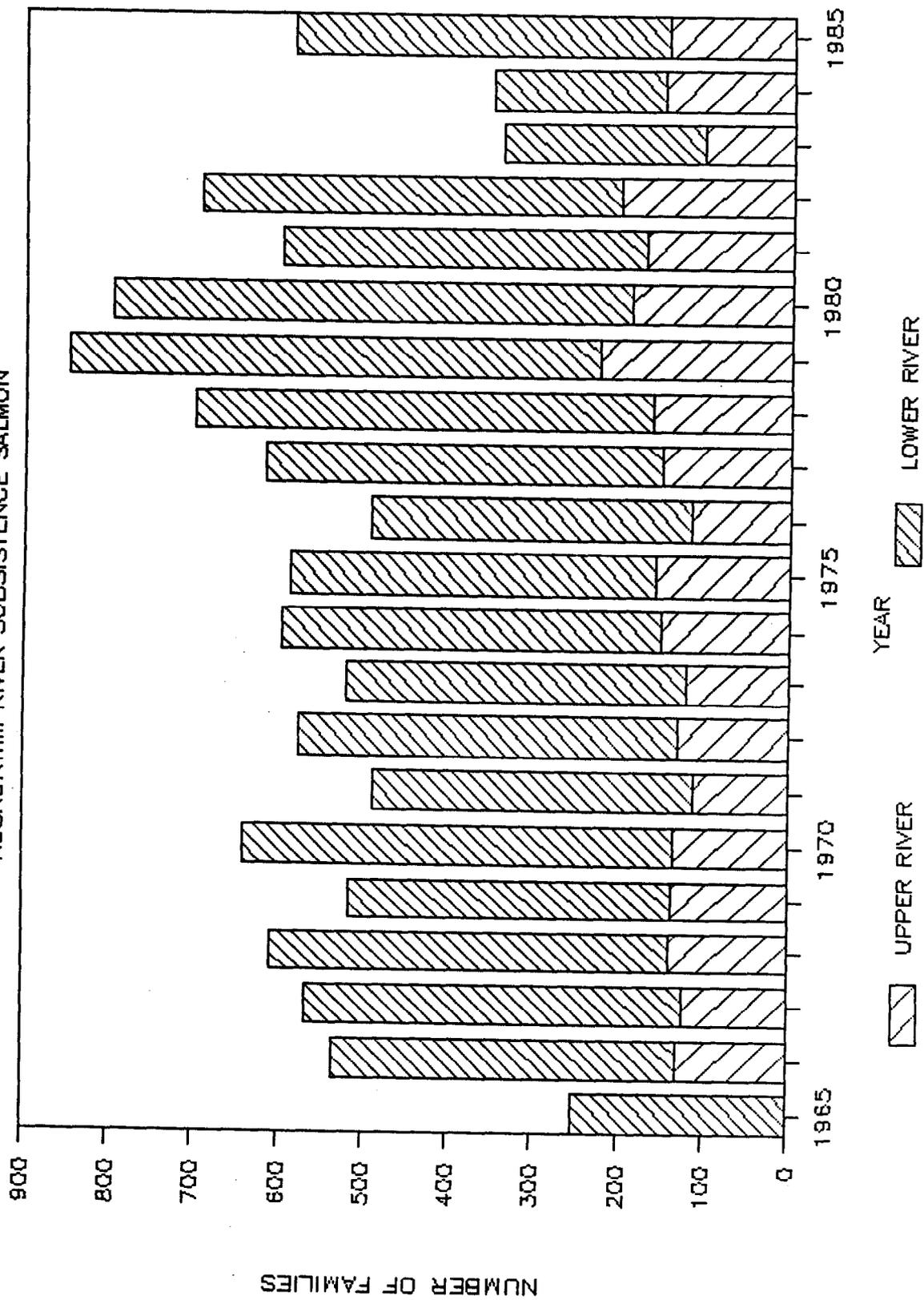


FIG. 3. TOTAL KUSKOKWIM CHINOOK

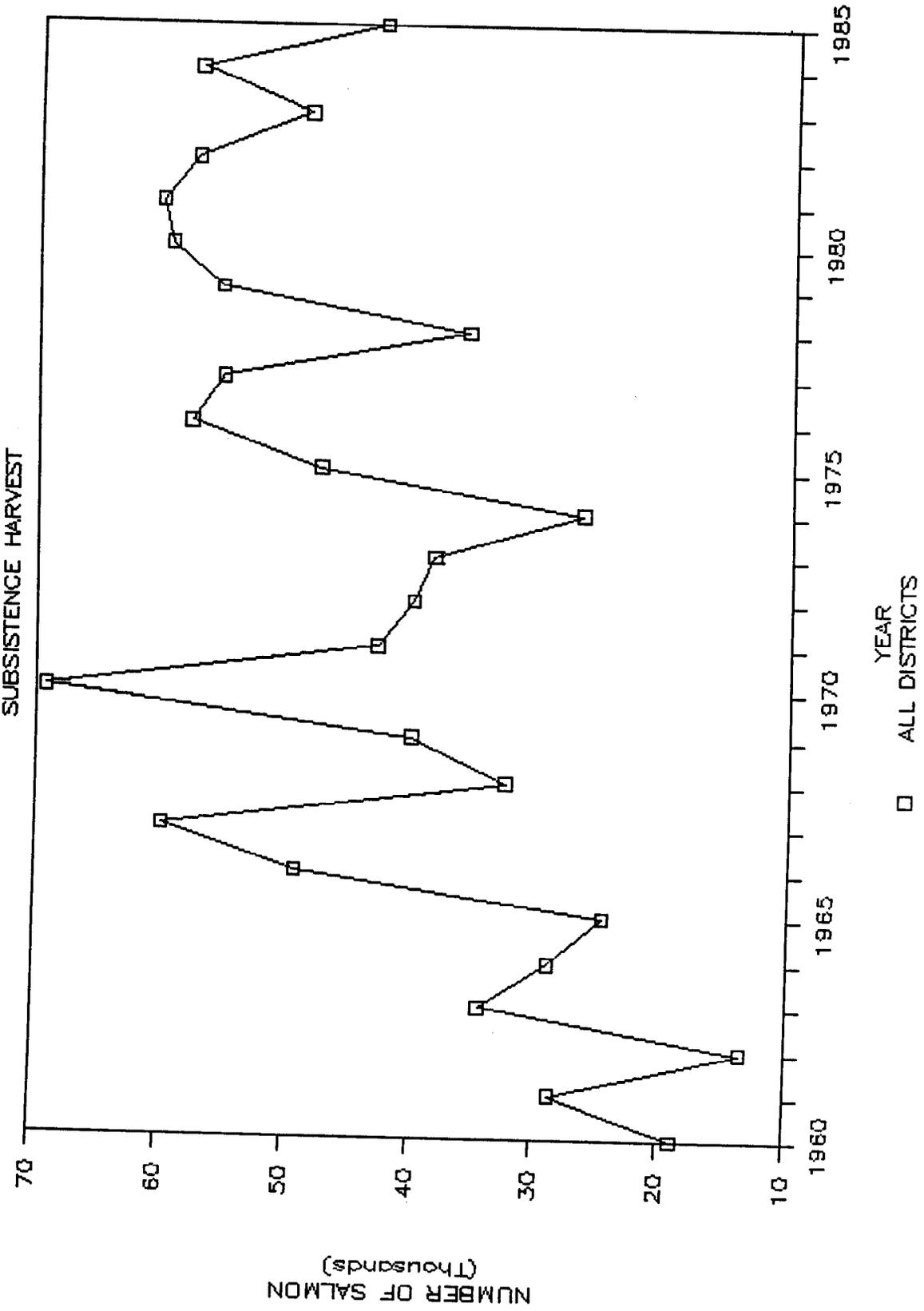
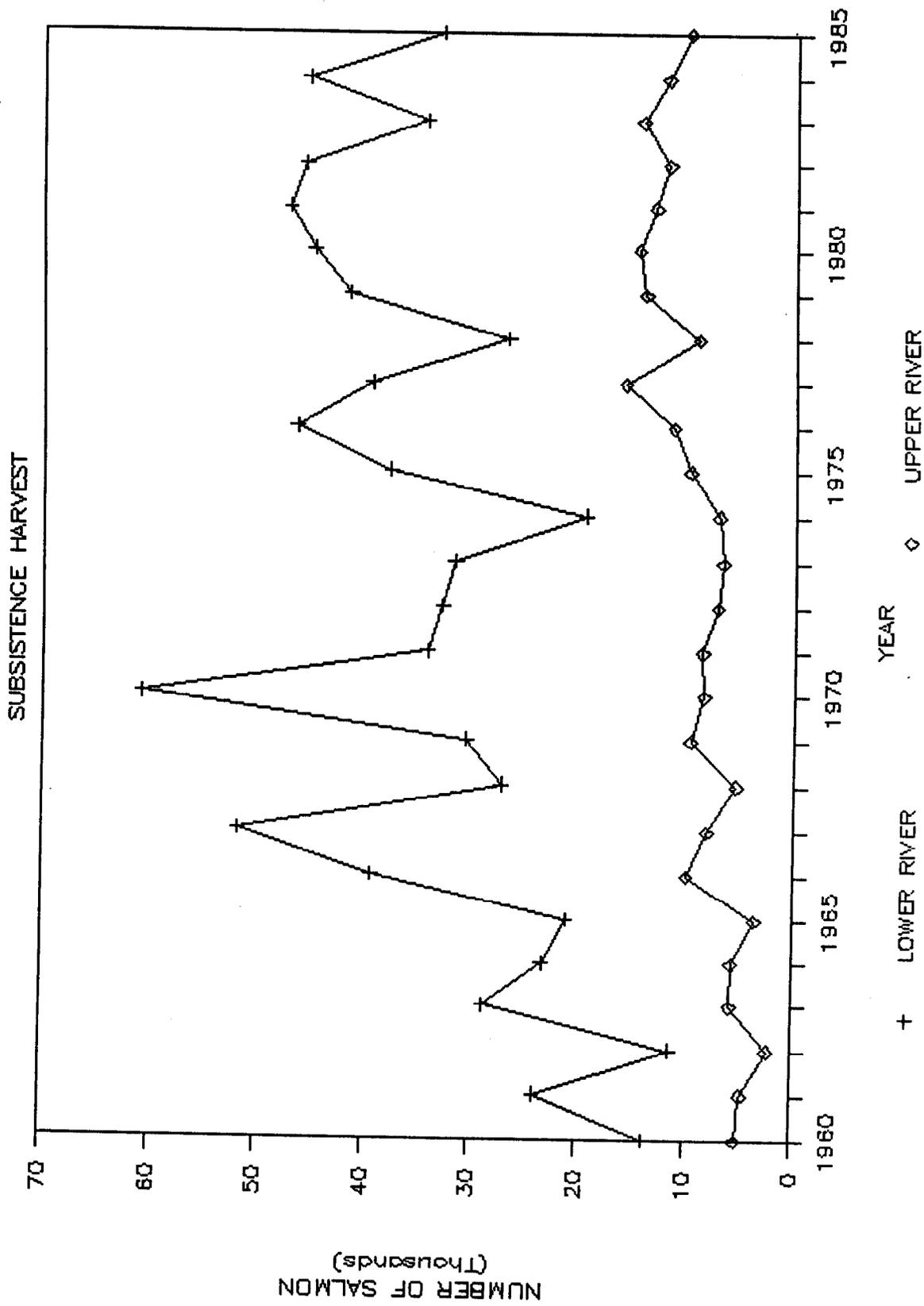


FIG. 4. KUSKOKWIM CHINOOK BY AREA



# FIG. 5. COMMERCIAL CHINOOK CATCH

KUSKOKWIM RIVER, 1960-1985

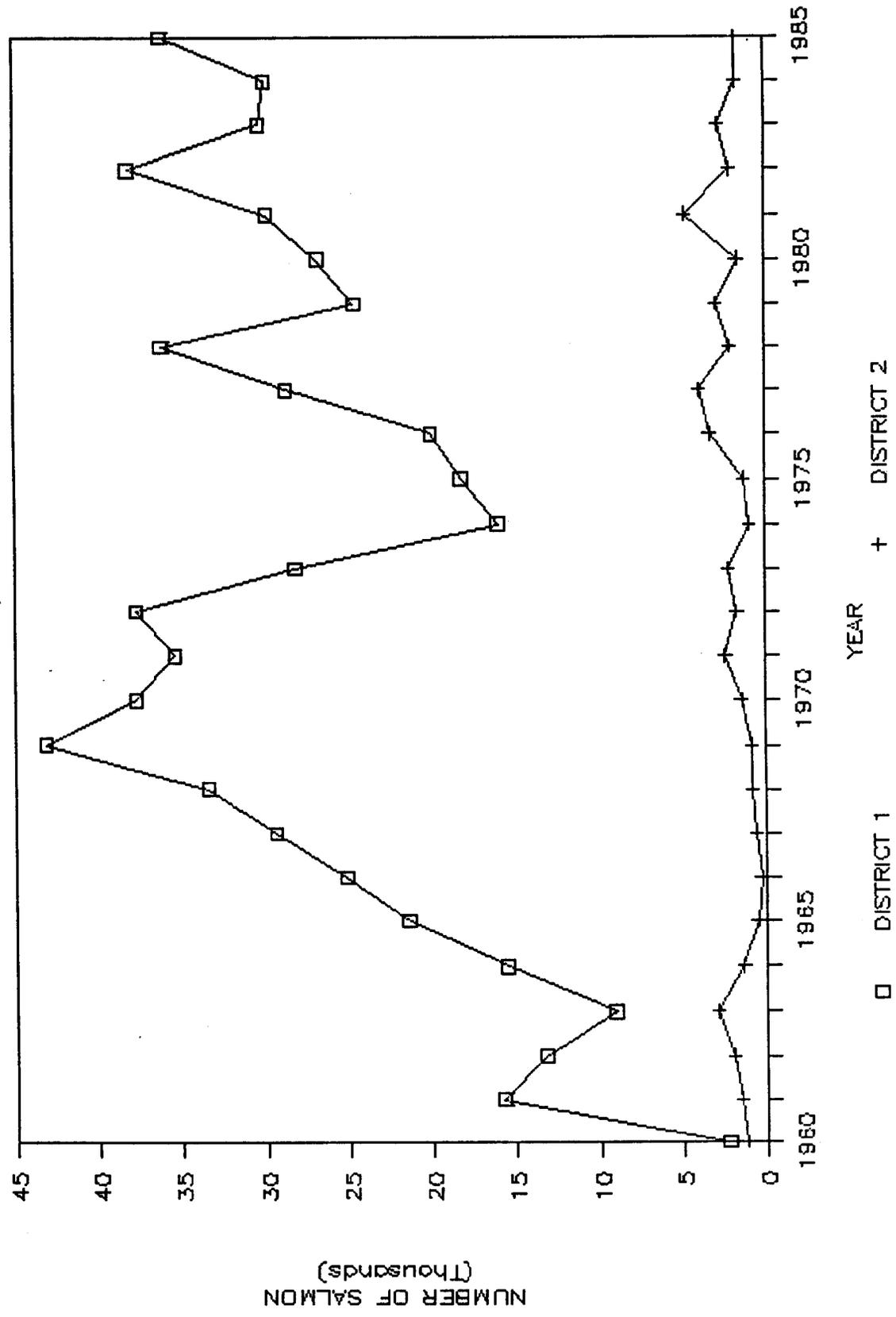


FIG. 6. AVG. FISHING FAMILY HARVEST

KUSKOKWIM SUBSISTENCE CHINOOK

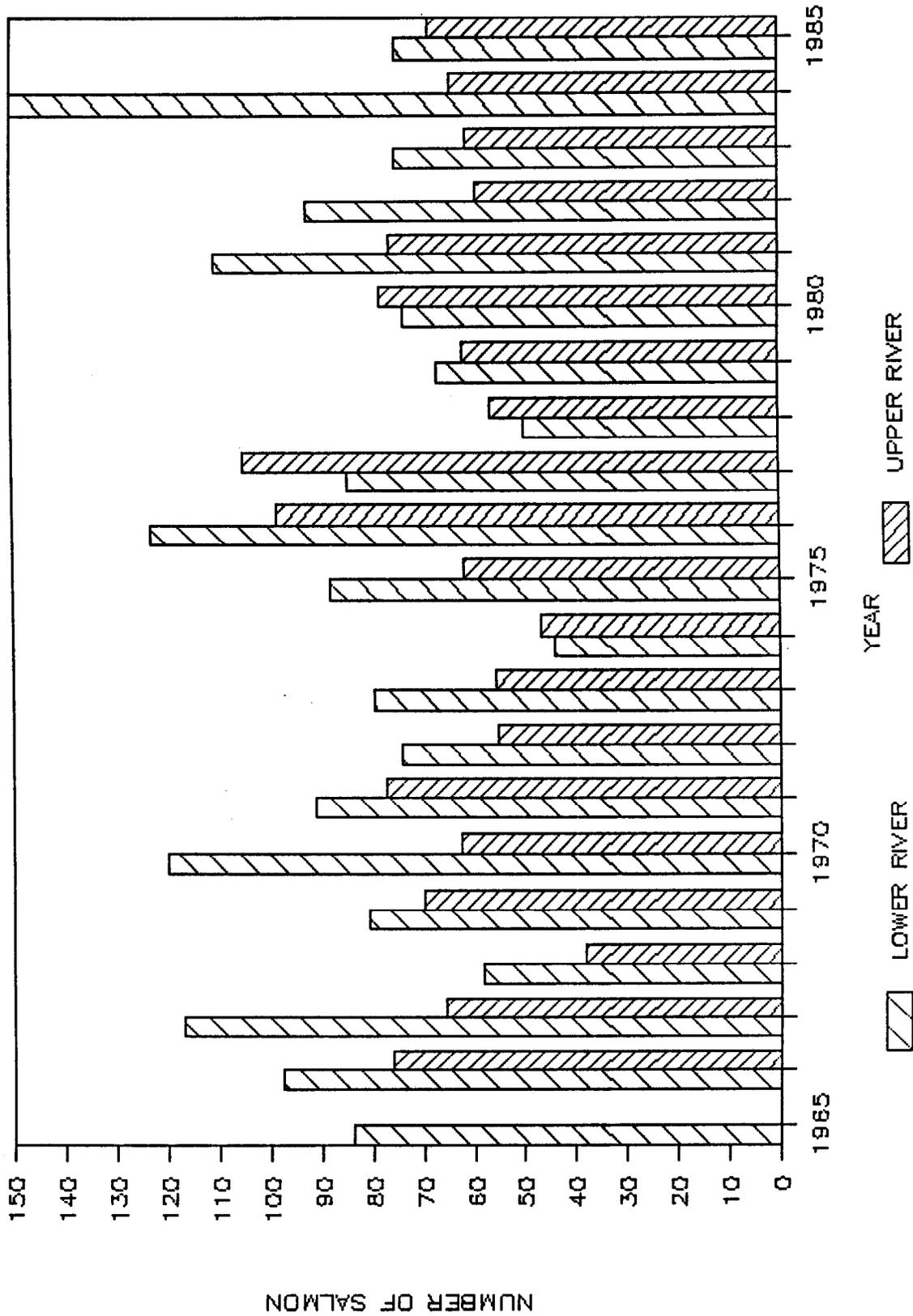
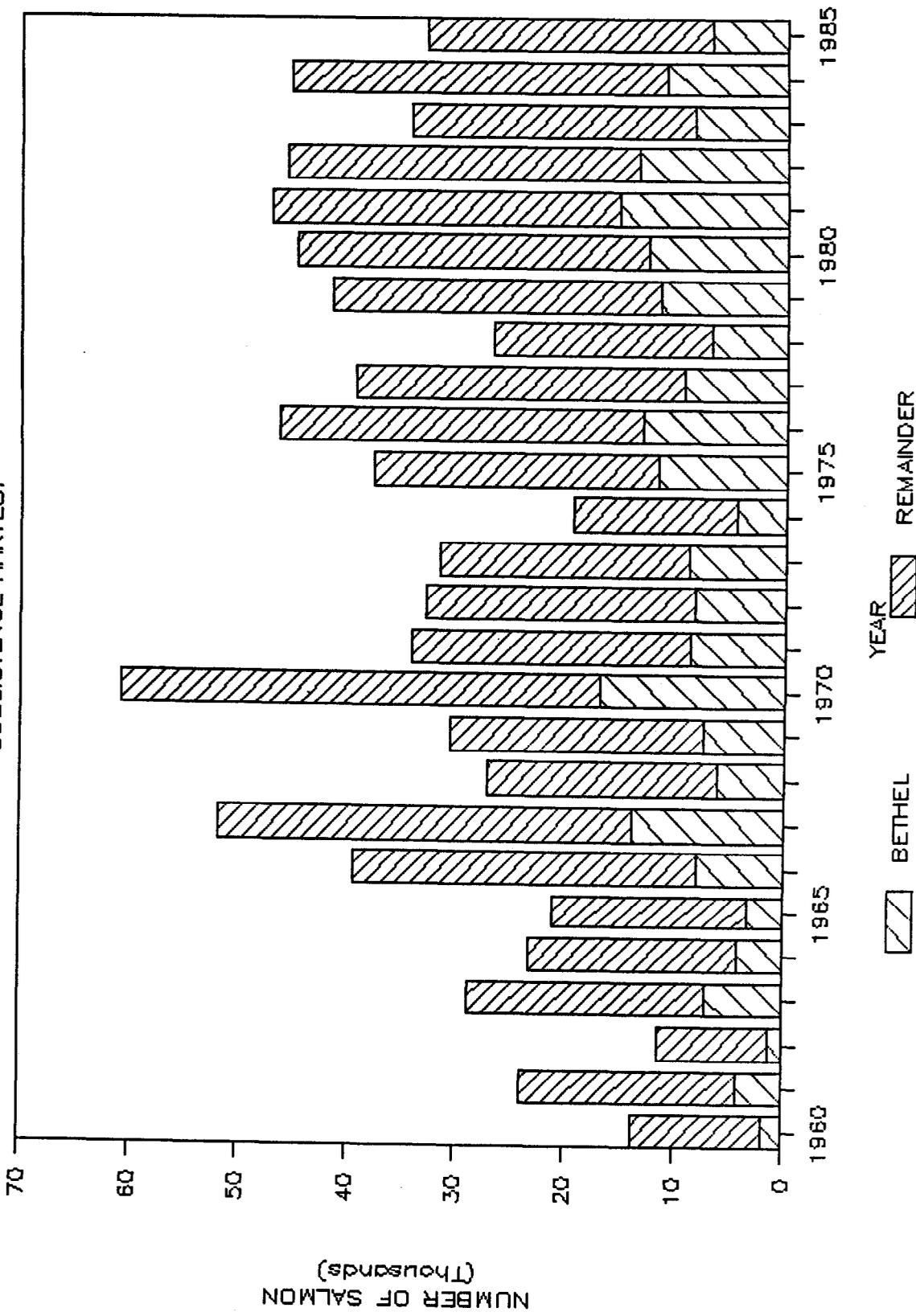


FIG. 7. LOWER KUSKOKWIM CHINOOK  
SUSTISBENCE HARVEST



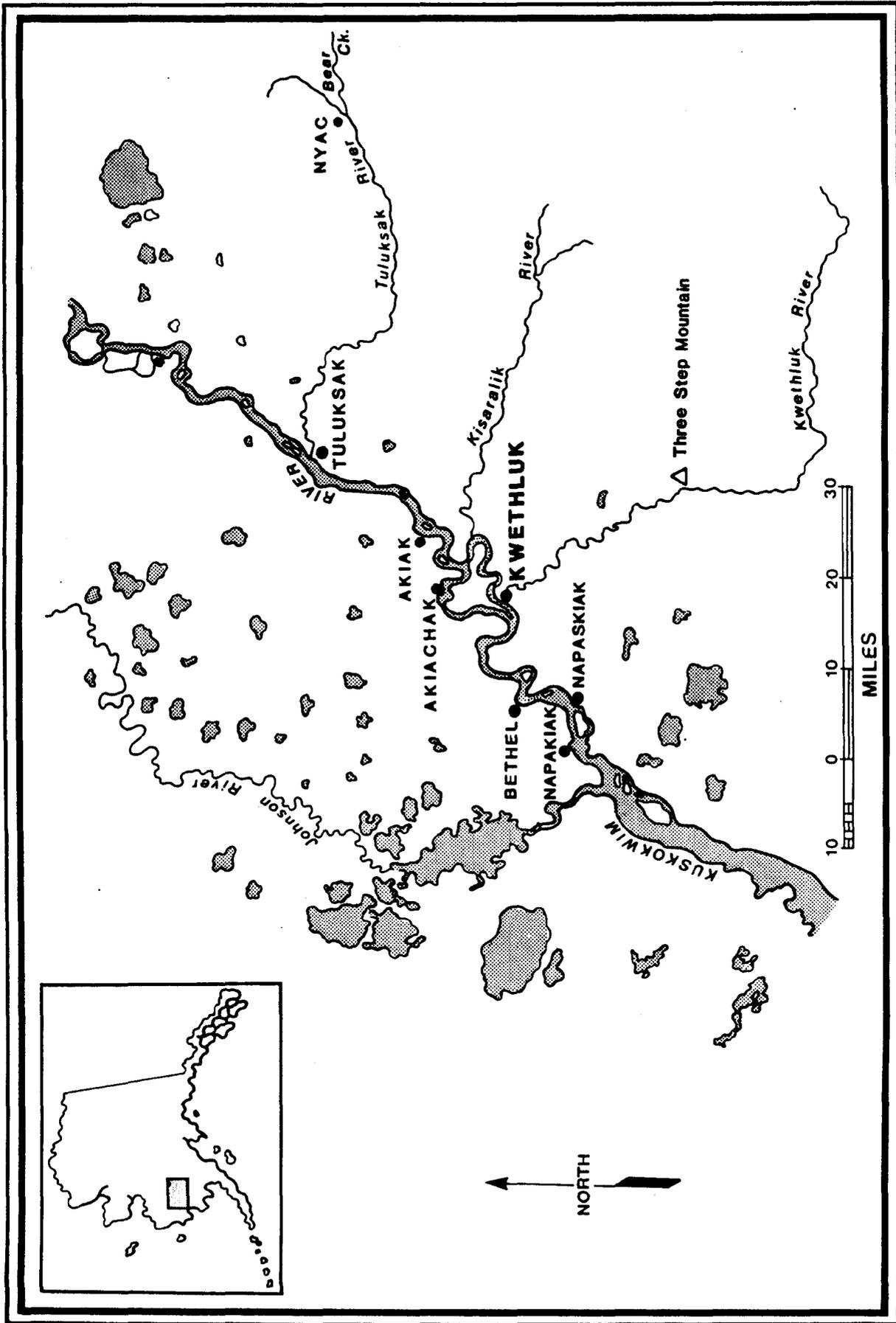


Fig. 8. The location of Kwethluk along the lower Kuskokwim River.

