SUBSISTENCE SALMON FISHING IN THE UPPER KUSKOKWIM RIVER SYSTEM, 1981 and 1982

by
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Interior Region

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INTRODUCTION

The upper Kuskokwim subsistence salmon fishery is the increasing focus of concern by both resource managers and the Nikolai and Telida inhabitants who have utilized it since contact times with successive gear types including traps and fences, set nets, fishwheels, and rods and reels. User concerns about declining salmon runs were brought to the attention of the Alaska Board of Fisheries in 1979 through the testimony of area residents. Today, users are still concerned about perceived long-term decreases in the size of the salmon runs, especially kings, from the levels of the late 1950's and early 1960's. Regulatory restrictions of certain gear types, in particular, elimination of the traditionally utilized king salmon fence and trap in the m[illegible] 1960's, have resulted in lower harvests which require longer periods of time to fulfill the requirements of area inhabitants.

Activities of Nikolai and Telida residents participating in the upper Kuskokwim salmon fishery have been virtually undocumented. Similarly, consistent data on salmon escapement and knowledge of the role of salmon in the lives of Nikolai and Telida residents have been lacking. In 1981, both the Division of Subsistence and Division of Commerical Fisheries began data collection efforts to address these data gaps. The information presented below addresses the salmon harvest activities of Nikolai and Telida residents in the upper Kuskokwim fisheries. Data on salmon harvests by species, by location of harvest, and by gear type, are described. It is the result of field investigations during two consecutive salmon fishing seasons. Data were collected by field observations from numerous discussions with the users, both at the sites of fishing activities and at other points in the

year, and through the use of various applicable reports of the Division of Commercial Fisheries. Field observations required periodic travel to fishing sites where the researcher identified the salmon harvest to date both visually and in conversation with participants. Final harvest numbers were compiled both through observations of the products and from estimates supplied by users. In summary, 778 king salmon, 4365 chums, and 978 coho were harvested by Nikolai residents in 1982 from both the Salmon River and South Fork drainages. Less than 5 kings and chums and around 200 cohos were caught by Telida residents this year.

It is anticipated that this report will provide the Alaska Board of Fisheries with new information on the activities of upper Kuskokwim subsistence salmon users and will present a greater base of knowledge for any regulatory revisions they may wish to undertake.

SALMON FISHING IN THE UPPER KUSKOKWIM RIVER SYSTEMS

Nikolai and Telida residents use three drainages of the Upper Kuskokwim for the harvest of salmon (Fig. 1). Use of these drainages is not mutually exclusive, rather fishermen utilize the drainages in various combinations in order to fulfill their salmon needs. In 1981, Nikolai and Telida residents combined harvested a total of 500 king salmon, 3,700 chum salmon, and 250 coho salmon. In 1982, those numbers were 778, 4,365 and 1,178 respectively (Table 1). These were harvested from the Salmon River, South Fork of the Kuskokwim, and North Fork drainages of the Upper Kuskokwim. Each of these drainages contains clearwater and silt-laden segments, an important differentiation when discussing fishing activities by local residents.

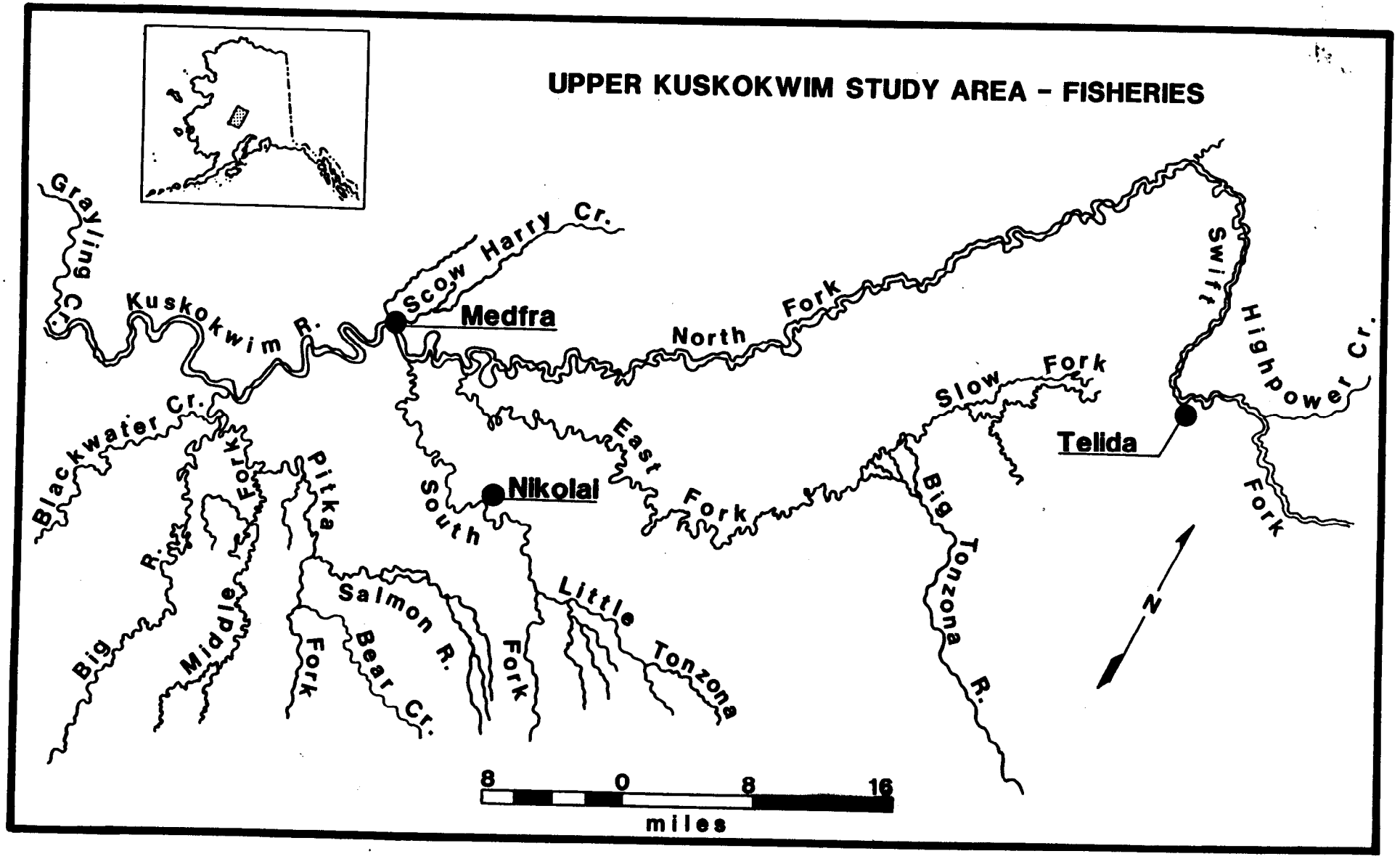
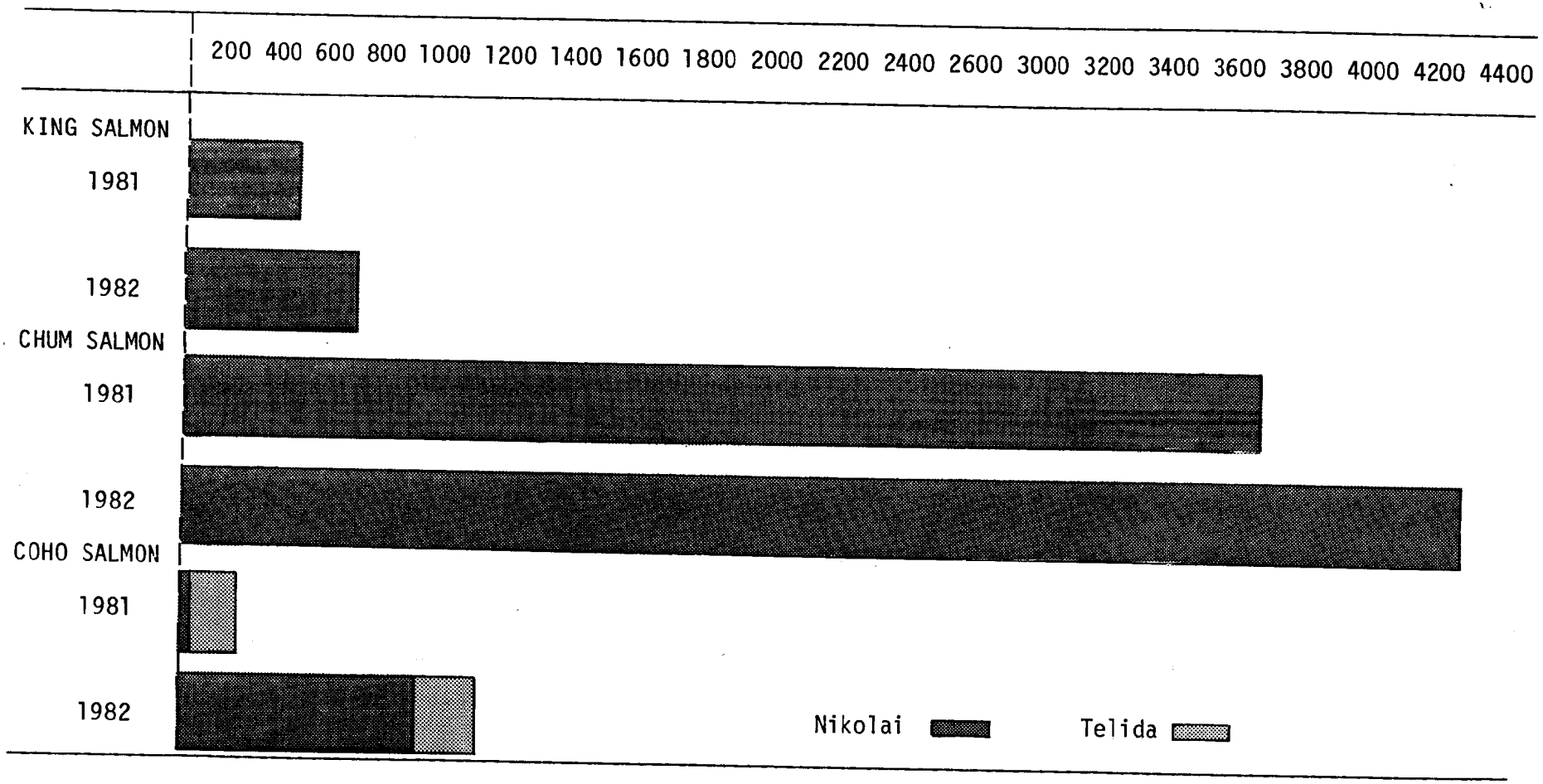

UPPER KUSKOKWIM STUDY AREA - FISHERIES
Grayling Cr.
Kuskokwim R.
Scow Harry Cr.
Medfra
North Fork
Swift
Highpower Cr.
Slow Fork
Telida
Blackwater Cr.
Big R.
Middle Fork
Pitka
Fork
South
Nikolai
East Fork
Big Tonzona R.
Fork
Salmon R.
Bear Cr.
Fork
Little Tonzona
N
8 0 8 16
miles

Fig. 1

Table 1. Nikolai and Telida Residents' Salmon Harvest, 1981 and 1982



Subsistence Salmon Fishing in the Salmon River System. The Salmon River system includes the Big River, Middle Fork, Pitka Fork, Salmon River and a number of lesser tributaries (Fig. 1). The Big River and Middle Fork are generally turbid during summer while Pitka Fork and Salmon River are usually clear. King, chum and coho salmon enter this river system for spawning purposes. No permanent settlements occur within this area. However, the system is fished by residents of Nikolai. The primary fishing sites are approximately 160 river miles from Nikolai.

The major users of the Salmon River system in 1981 and 1982 were Nikolai residents and king salmon was the major species taken in this area. This harvest occurs in three areas of the system: at the confluence of the North and South forks of the Salmon River (Figs. 2,3), near the confluence of the Salmon River with the Pitka Fork (Figs. 4,5), and in the vicinity of the mouth of the Middle Fork (Fig. 1). The first two sites fall within clearwater segments. Until the mid-1960s, most salmon were taken in the clearwater section with fish fences and traps (Appendix 1). The mouth of Middle Fork is primarily silt-laden, although during periods of steady river stages, it too becomes fairly clear in nature.

With the regulatory elimination of the traditionally utilized fish fences in the mid-1960s, users were forced to turn to other methods of harvest. Currently, rod and reel is the predominant gear type used to harvest salmon in the upper Pitka Fork tributaries. Set nets and fishwheels are not used because they are largely ineffective due to their high visibility in clearwater, the relative shallow water depths, narrow river widths, the high vegetative content which tends to periodically foul such gear, and the lack of suitable eddies for net sites. Set nets and fishwheels are most effective in wider, turbid and deeper waters.

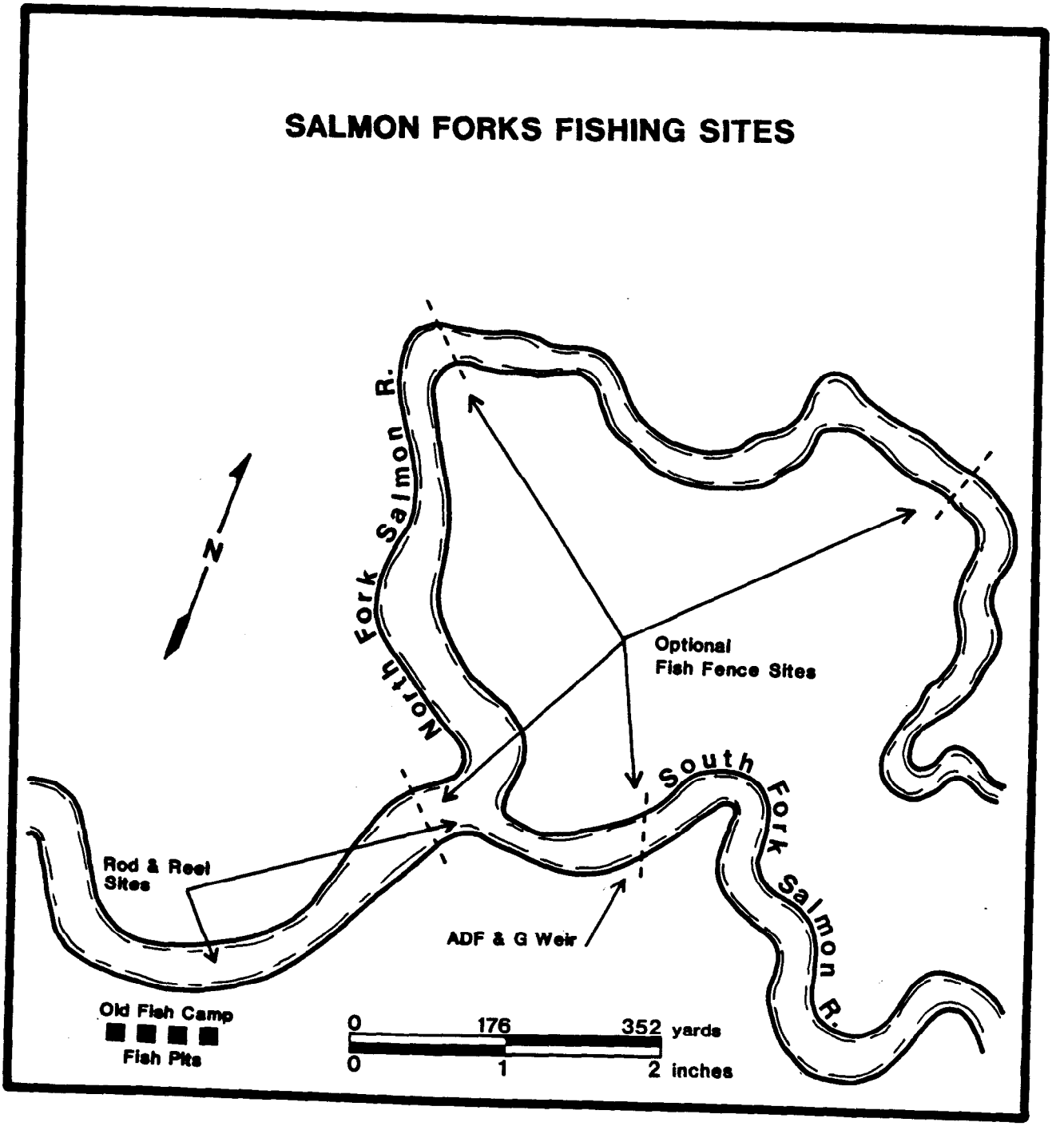

SALMON FORKS FISHING SITES
N
North Fork Salmon R.
South Fork Salmon R.
Optional
Fish Fence Sites
Rod & Reel
Sites
ADF & G Weir
Old Fish Camp
Fish Pits
0
176
352 yards
0
1
2 inches

Fig. 2.

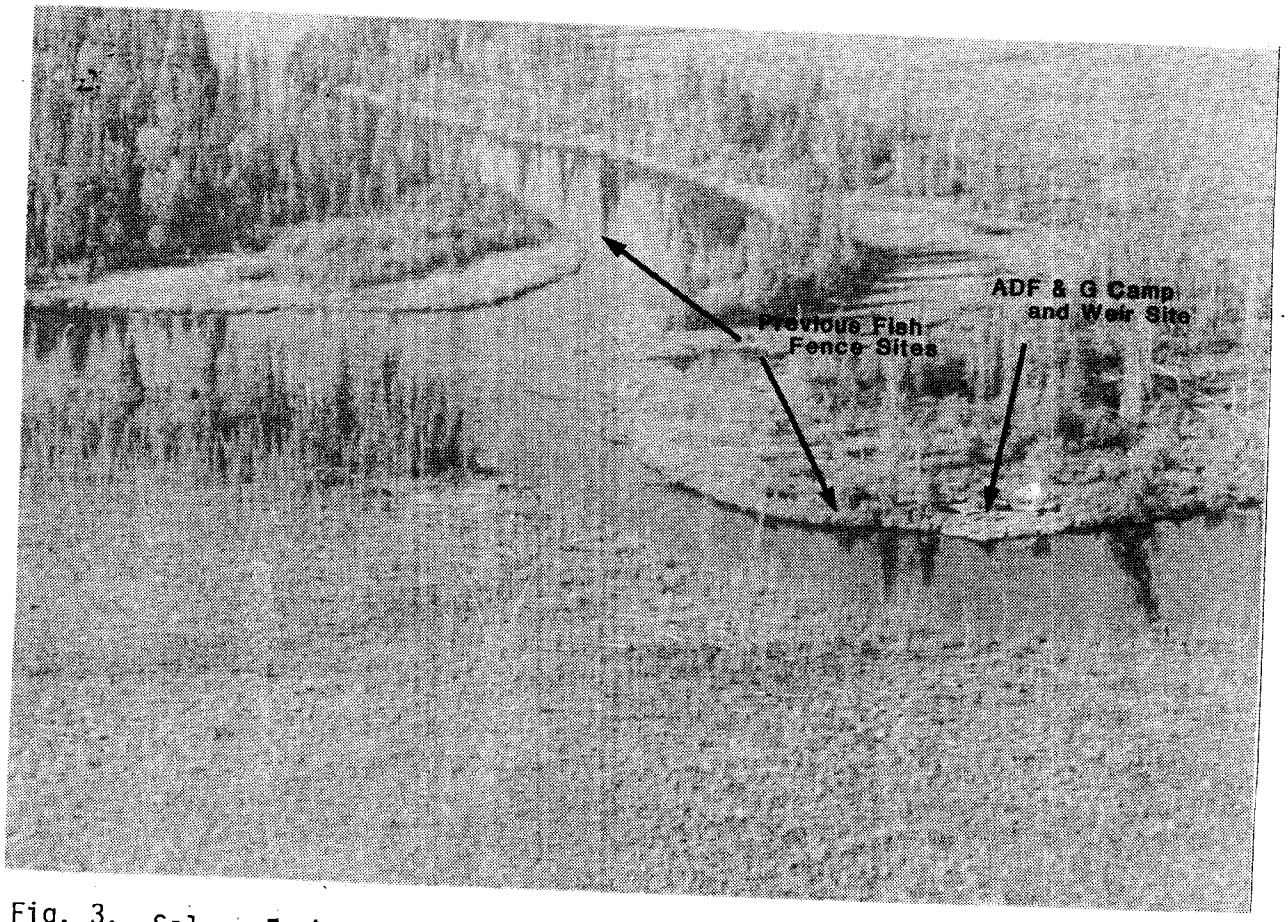


Fig. 3. Salmon Forks Fishing Sites (photo by author).

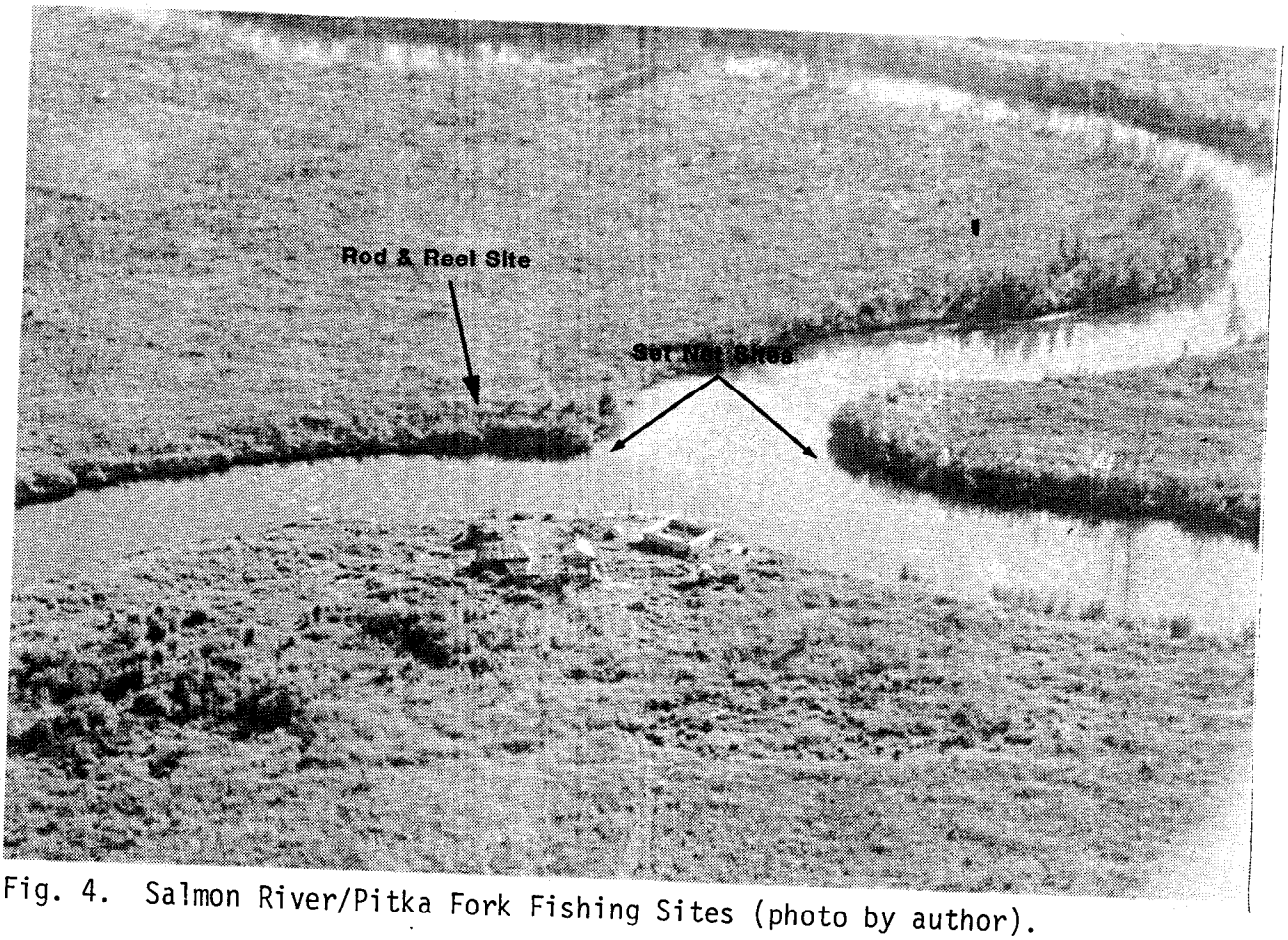


Fig. 4. Salmon River/Pitka Fork Fishing Sites (photo by author).

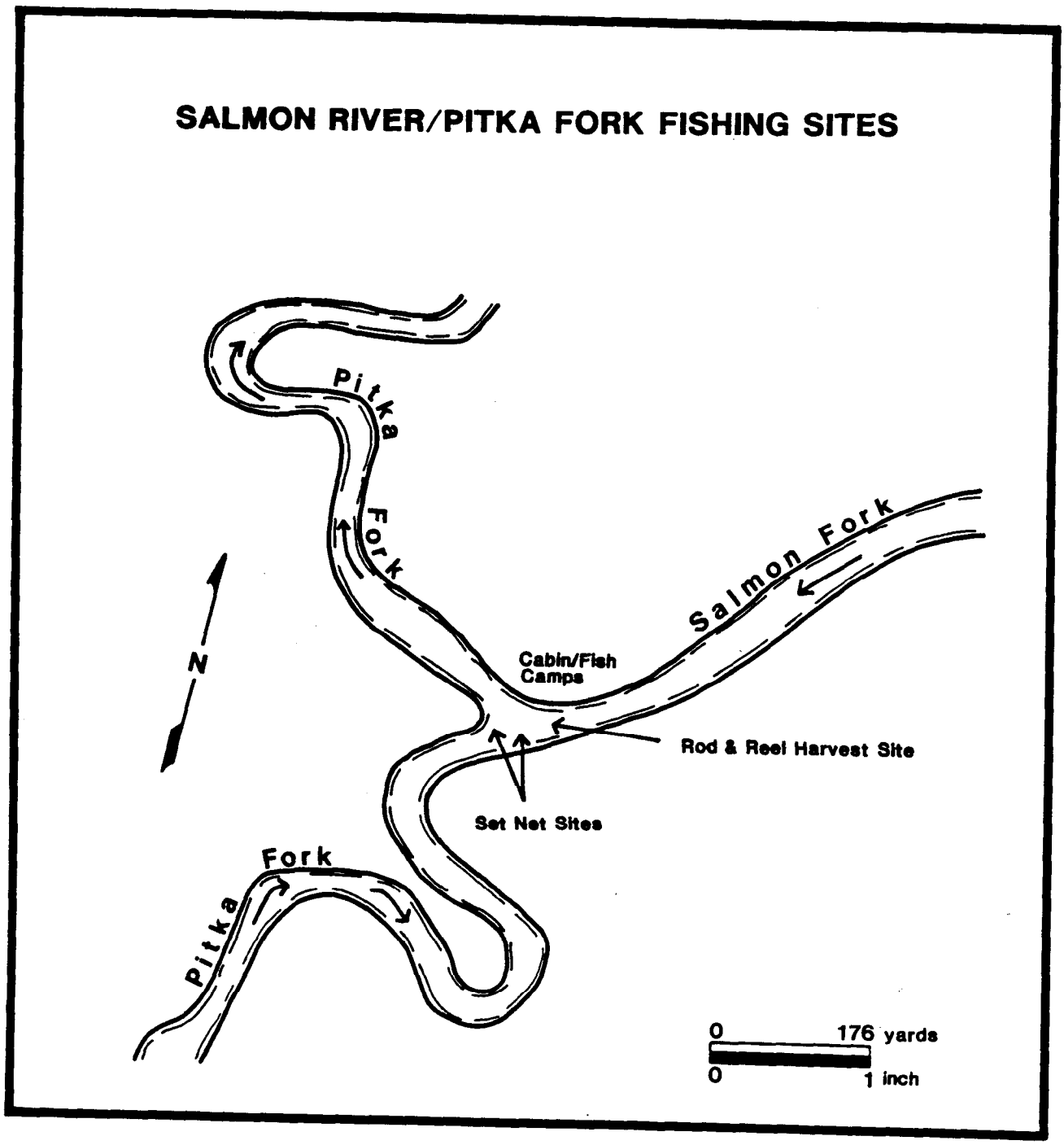

SALMON RIVER/PITKA FORK FISHING SITES
Pitka
Fork
Salmon Fork
N
Cabin/Fish Camps
Rod & Reel Harvest Site
Set Net Sites
Fork
Pitka
0
176 yards
0
1 inch

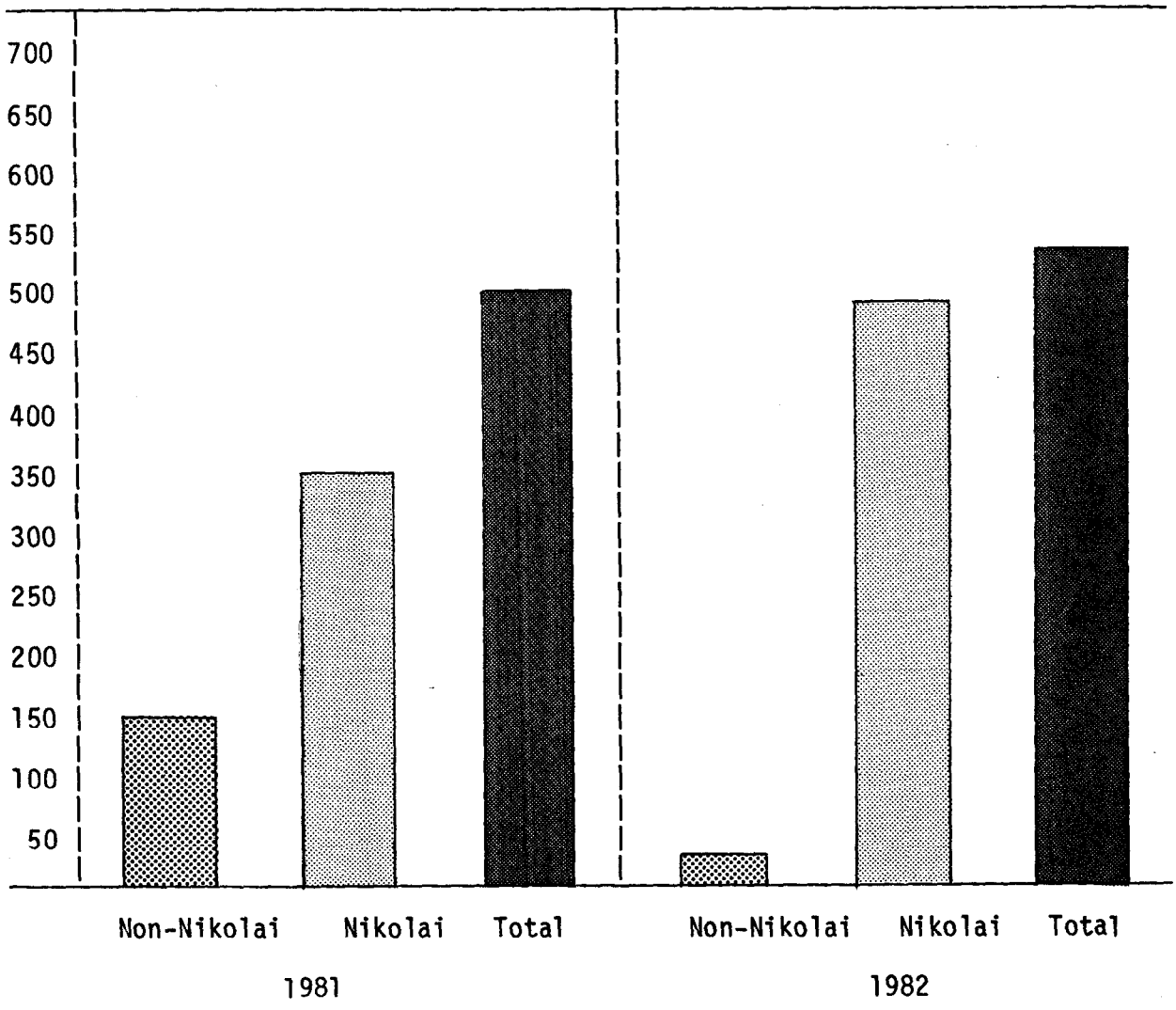
Fig. 5.

The Salmon River has been fished for king salmon by local residents almost continuously each season at least since contact with non-Natives. The importance of king salmon has apparently diminished little over time based on the accounts of older Nikolai residents. According to local residents, catches of 2,000 or more kings were common on the Salmon River throughout the period of fence utilization with little detrimental effect on the condition of the resource. Many times harvests in excess of 2,000 kings occurred consecutively for a number of seasons.

King salmon harvests for 1981 and 1982 are shown in Table 2. In 1981, the total Salmon River king harvest was approximately 500 fish. Three hundred and fifty of these were taken by 15 Nikolai households, with the balance taken by parties originating from McGrath. In 1982, the Salmon River harvest was approximately 527 kings, of which 497 were taken by 15 Nikolai households. This represents an increase of 230 kings by Nikolai-based fishermen over 1981 levels, and the third consecutive season showing increased king harvests. Number of households participating in this fishery from Nikolai has remained constant over the past two seasons (Table 3).

The 1982 harvests by fishermen from McGrath were lower than 1981 levels because of the late 1982 run. McGrath based groups have in the past fished at Salmon River over the Fourth of July weekend. In 1982 this holiday preceded the king salmon run by about a week. Use of the Salmon River fishery by McGrath-based fishermen has occurred for about the past five years, according to one participant. It should be noted that some of the Mc Grath-originating participants were not state residents, with at least one individual being a non-resident alien. In addition to its lateness, the king salmon run extended over a longer period of time than usual. The protracted nature of the run initially gave rise to a concern by one Nikolai

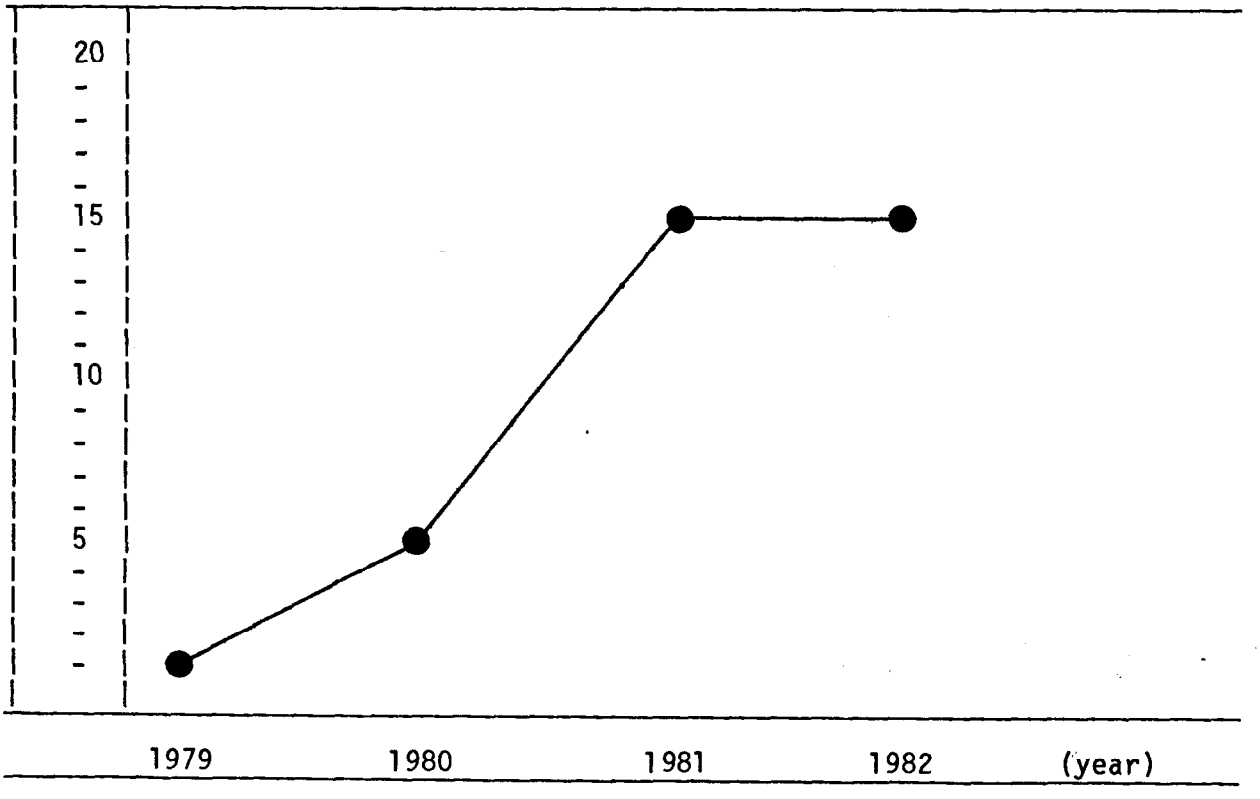
Table 2. Salmon River King Salmon Harvest -- 1981 and 1982



participant that the king return might be poor as a result of the Bear Creek Fire which burned through much of the spawning area in August 1977. In reaction to this possibility, set nets were deployed at the confluence of the Pitka Fork and Salmon River for the first time in recent years. Initially, one net was set but because of a poor yield a second was set in the hope of enhancing the low catch. These nets proved to be only minimally productive especially as five households were sharing the catch. The average daily

catch was about 10 fish; the best overnight harvest was around 20 kings. Once users were confident that the run was improving, the second net was removed and rod and reel activities began. One net remained in place for several additional days to supplement the catches from using rod and reel gear. One noteworthy aspect of the late king salmon run was the higher than usual incidental harvest of sheefish which generally follow the kings in this area according to one participant.

Table 3. Nikolai Housholds Harvesting King Salmon at Salmon River



The 15 Nikolai households stayed an average of 20 days on the Salmon River, with lengths of stay ranging from overnight to more than one month. This represents a noticeable increase over 1981. At least one household fished first

in the lower silt-laden portions of the Salmon River systems and then transported their partially dried catch 80 miles upstream to the Salmon River/Pitka Fork site where they resumed fishing.

In 1982, chum salmon were harvested incidentally to the king run along the Salmon River. This has been the general pattern for a number of years as most Nikolai households elect to harvest this species elsewhere. There was no coho harvest on the Pitka Fork in 1982.

Subsistence Salmon Fishing in the South Fork System. The South Fork includes the main Kuskokwim upstream from the confluence of the Big River and includes the silt-laden South Fork and the clear water Little Tonzona River (Fig. 1). Nikolai is the largest settlement within the study area with a population of 105 according to the 1981 city census. It is 35 miles upstream of the junction of the North and South Fork of the Kuskokwim and approximately 10 miles downstream from the mouth of the Little Tonzona River. Medfra is a seasonal settlement of historical significance, situated approximately 1 mile below the confluence of the North and South Forks. Currently, it has no permanent population, although it is periodically utilized by individuals who own houses there. All three species of salmon common to the upper Kuskokwim enter the South Fork system.

While many Nikolai households participate in the Salmon River fishery, others choose to harvest king salmon in the South Fork drainage. Harvest activities occur throughout the turbid lower portions from the confluence of the North and South forks of the Kuskokwim upstream to the mouth of the Little Tonzona River. Nikolai residents use set nets, fishwheels, and infrequently small dip nets. In the clear Little Tonzona River, rod and reel is

the most frequently utilized gear for catching king salmon today (Fig. 6). The Little Tonzona, like the Salmon river, was the site of a fish fence until discontinued due to regulatory restrictions in the mid-1960s.

In 1982, approximately 281 kings were taken from the South Fork by 16 households from Nikolai. The major part of the king salmon catch in the South Fork System came from the Little Tonzona River (Table 4). In comparison, the 1981 catch was approximately 150 kings harvested by 15 households for the same area. The 1982 harvest was an 87 percent increase over 1981. Like 1981, a number of Nikolai households participated in both the South Fork and Salmon River king salmon fisheries during 1982.

As is often the case when fishing in silt-laden waters, fluctuating river stages lead to a sporadic, non-continuous harvest pattern in some river systems. This is especially true for the South Fork where the king salmon run is coincidental to higher water and daily changing depths. Flotsam that accompanies changes in water levels is hazardous to set nets and fishwheels and is an important factor affecting the success of fishing activities in any given year

The Little Tonzona River has apparently never supported the large king salmon run characteristic of the Salmon River. Nevertheless, to many Nikolai households the Little Tonzona is of equal importance. Interestingly, at one time the Little Tonzona was the site of a fish fence situated in the lower, silt-laden portion of the river. This particular fence site is the only known instance of a king salmon fence in muddy water in the upper Kuskokwim. In later historic periods, the fence was located in the upper, clearwater portions of the river in a manner similiar to the Salmon River site.

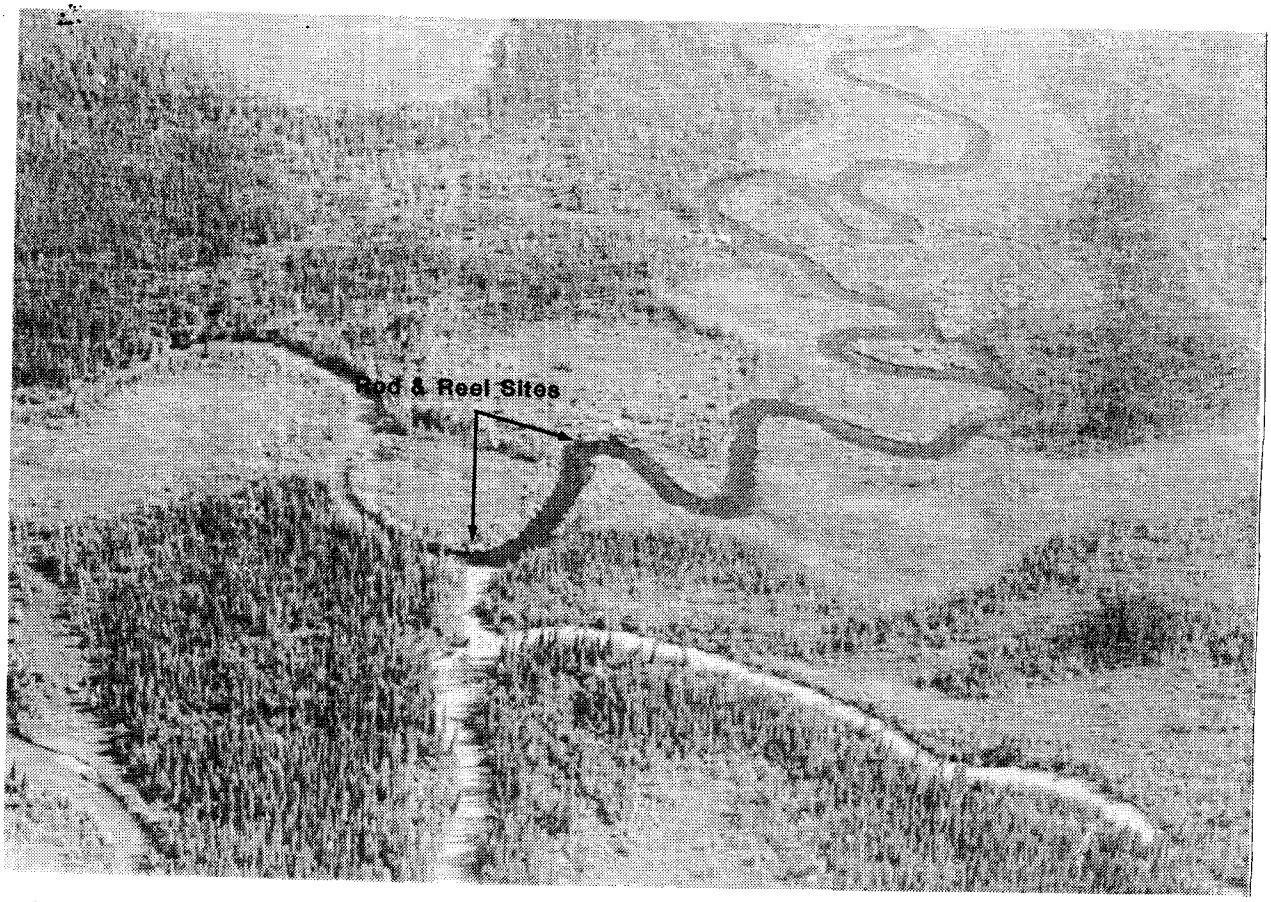


Fig. 6. Little Tonzona Fishing Sites (photo by author).

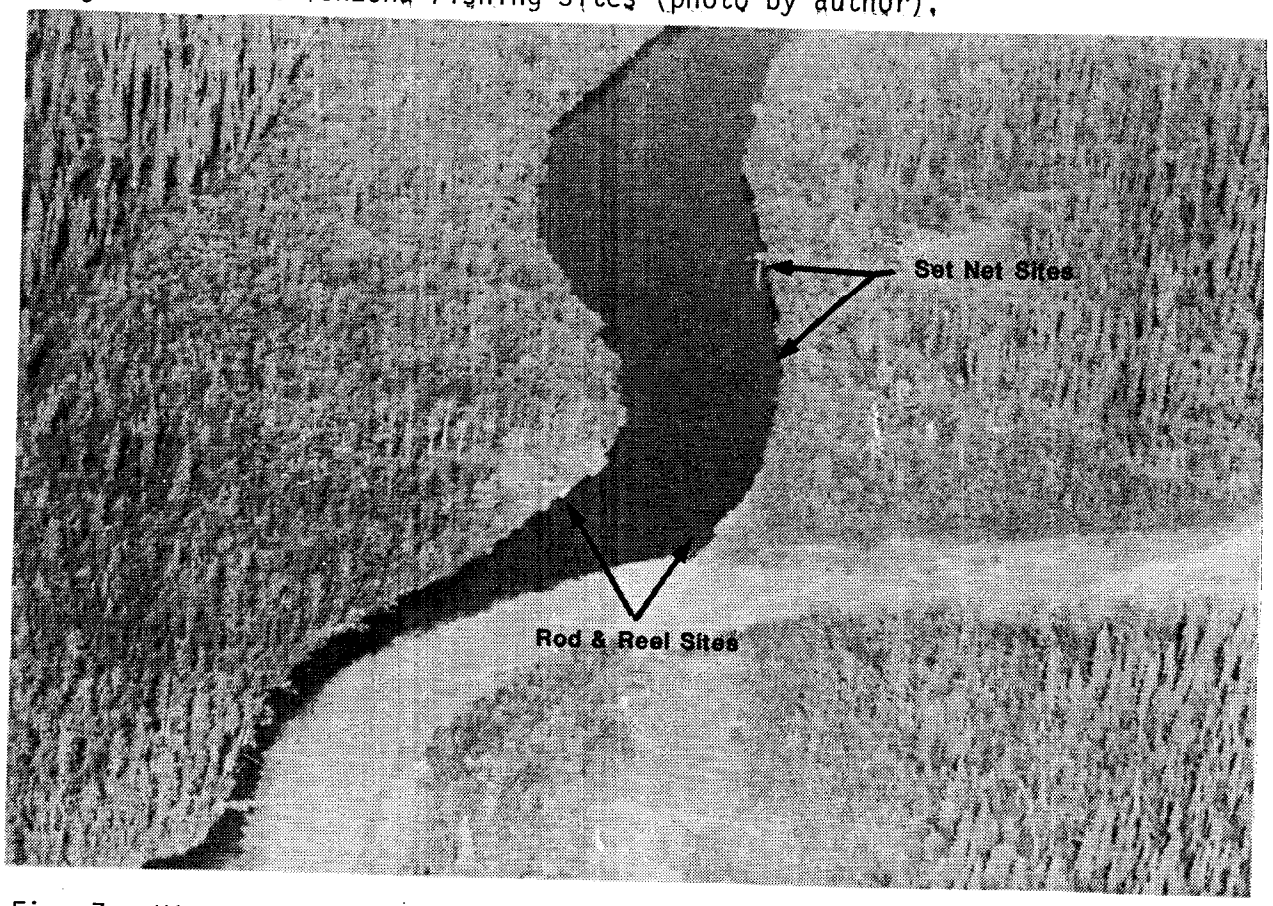
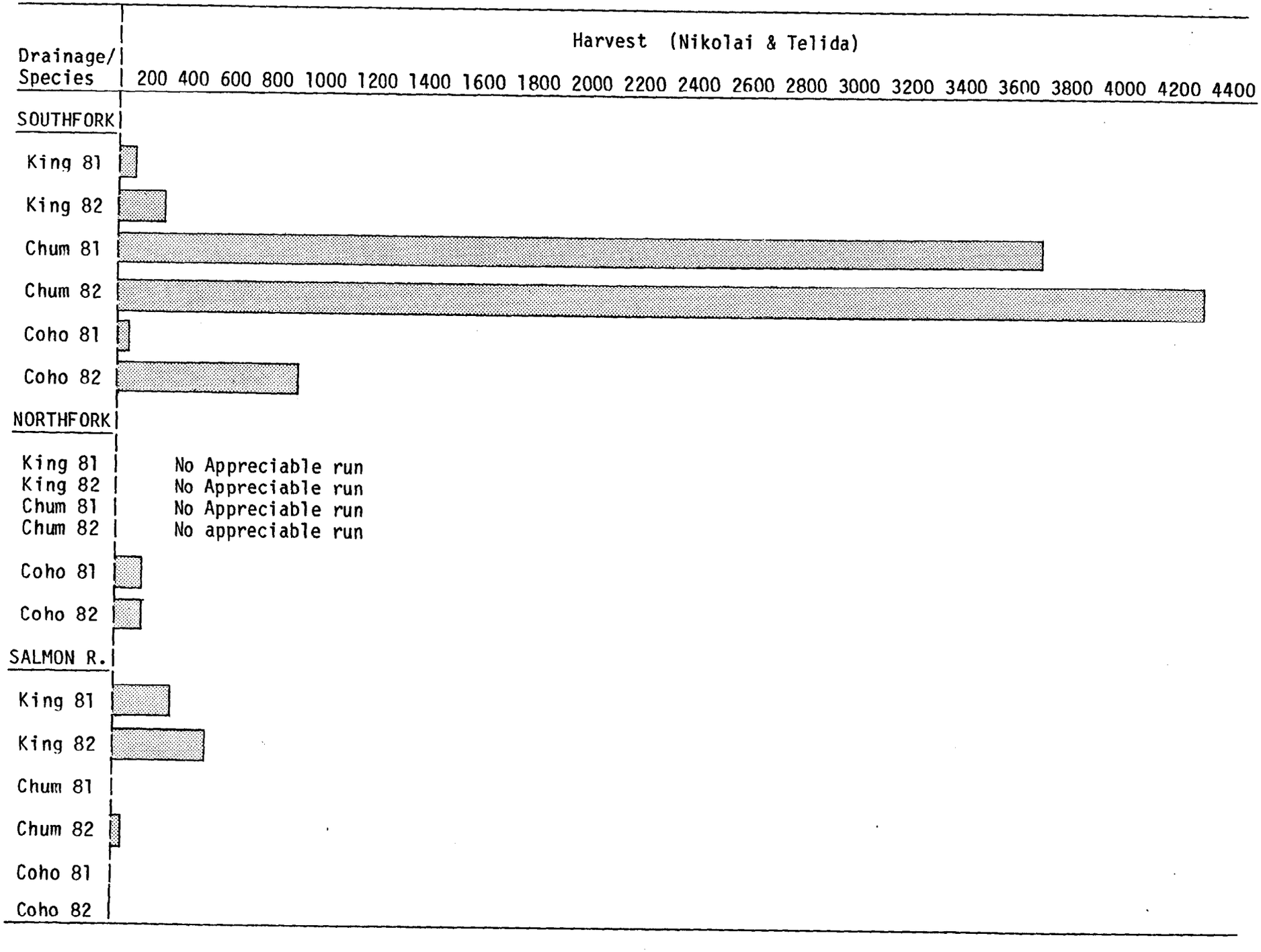


Fig. 7. Highpower Creek Fishing Site (photo by author).

Table 4. Salmon Harvest for Nikolai and Telida in Upper Kuskokwim Drainages



The South Fork is heavily utilized for the harvest of chum salmon. Set nets and fishwheels are well suited for this activity, and in 1982, 19 households harvested approximately 4,360 chums, a 17.8 percent increase over the 3,700 taken in 1981 (Table 4). A large portion of the Nikolai harvest came from two fishwheels located near the village. Because of the productivity of fishwheels for catching chum, salmon in surplus to the owner's requirements or processing capabilities was given to others and supplemented their own set net catches. From observation by local residents the chum harvest is on the increase from low levels during the early 1970s and may be due, in part, to an increasing working dog population in Nikolai. It is noteworthy that there was some dispersal in chum salmon set net sites in 1982 in comparison with previous years when virtually all chum salmon fishing occurred in the immediate vicinity of Nikolai.

Users characterized the 1982 South Fork coho salmon run as "outstanding," a perception clearly reflected in harvest data. In 1981, less than 50 cohos were caught on the South Fork using fishwheels and set nets. This year, coho harvest by Nikolai residents was 978 fish. One contributing factor in this higher harvest may have been the turbidity of the river later into the fall than usual which makes use of fishwheels and nets more productive.

Subsistence Salmon Fishing in the North Fork System. The third major river division, the North Fork of the Kuskokwim, includes the North, East, Swift, and Slow forks; Big Tonzona River, and Highpower Creek (Fig. 1). Based on the Divisions' 1981 count, Telida has a population of 25, and is located on the Swift Fork approximately 50 miles upstream from its confluence with the North Fork, 10 miles below the mouth of Highpower Creek. The greatest salmon harvests of Telida residents are taken from the clear waters of Highpower Creek. Few kings and chums enter the North Fork and tributaries, although a coho salmon run is noted by Telida residents each fall.

Apparently a small population of king salmon spawns in tributaries of the North Fork but fails to reach Telida 50 miles up the Swift Fork. The same seems to hold true for chum salmon. However, both species are taken at times in conjunction with whitefish harvest during summer. Whitefish is a major food of Telida residents.

The residents of Telida, by virtue of their relative isolation from major salmon-bearing rivers, utilize whitefish instead of salmon. The community is situated a short distance below Lower Telida Lake, a major whitefish-producing location. Until the mid-1960's, most Telida households moved each spring to fishcamps in the vicinity of Medfra where they spent the summer fishing for salmon. With decreasing use of chum salmon to feed dog teams, this move was no longer necessary. However, like Nikolai, the use of dog teams in Telida is on the upswing. At least one individual expressed interest in returning to the South Fork fishery in the summer to harvest chum salmon for use as his dog food.

The species with the largest run to pass Telida is coho salmon, which spawn up Highpower Creek above the community (Fig. 7). Most harvest activities

by Telida residents for this species take place in the fall near the confluence of Highpower Creek and Swift River often in conjunction with sheefish and whitefish fishing. The 1982 catch was about 200 cohos taken by 3 households Harvest was similiar to the 1981 levels. The cohos are taken with set nets and rods and reels. Chum salmon and king salmon were not harvested.

SUMMARY

Area-wide harvest efforts for kings, chums, and cohos increased in 1982 over 1981. An increased demand for chum salmon for dog food may have been a factor in increased harvest. Favorable water conditions may have also contributed to more productive fishing. Seasonal employment opportunities were at an all time high in Nikolai in 1982, and a number of households were able to participate successfully in both endeavors. Some dispersal of fishing sites was noted. Users perceived a decrease in the size of the king salmon run, particularly in the Salmon River fishery. Some participants commented on the inadequacies and limitations associated with current harvest techniques, a factor discussed in the next section.

DISCUSSION

As detailed in the report, several technologies have been used by residents to procure subsistence salmon in the upper Kuskokwim River system over the last thirty years, including fish fences, set gill nets, fish wheels, and rod and reel. Currently, set gill nets, fish wheels, and rod and reel are used, depending upon local fishing conditions, targeted species, and factors of harvest efficiencies. Rod and reel is the primary technique for

harvesting king salmon. This is due in part to regulatory restrictions on the use of fish fences, the traditional method for harvesting kings. Also, set nets and fish wheels are less suitable techniques in the clear, shallow waters at the traditional king salmon sites along the Salmon and Little Tonzona rivers. Rod and reel fishing currently falls under sport regulation, raising a management question. Should the king harvest activities at these locations appropriately fall under sport regulations? Some residents have expressed concern about the absence of any distinction between their activities and sport fishing using rod and reel. Whether fish and game regulations might accommodate the use of traditional fish fences within the special conditions of this area is a second issue (the Appendix describes the history of fish fence use along the Salmon and Little Tonzona rivers).

One difficulty in discussing Upper Kuskokwim salmon stocks is incomplete and discontinuous escapement data. Systematic and successive data are not available. The Division of Commercial Fisheries placed a weir at the mouth of the South Fork of the Salmon River to measure escapement in 1981. In 1982, the weir was relocated a short distance upstream. The weir project is slated to be discontinued in 1983. There were sharp contrasts in numbers between the two seasons. The estimated Salmon River escapement was 2,153 kings for 1981 and 732 kings for 1982 (D. Schneiderhan, personal communication 1982). No consistent or accurate escapement data have been obtained from the South Fork of the Kuskokwim and Little Tonzona system, an important area to at least 16 Nikolai households that fished for king salmon there in 1982. With an on-going cooperative effort between the Divisions of Commercial Fisheries and Subsistence, a broader data base could be established for the Upper Kuskokwim fisheries which might contribute to management in this area.

Appendix 1. King Salmon Fish Fences in the Upper Kuskokwim

Until the mid-1960s the fish fence was the most effective and favored method of king salmon harvest in the Upper Kuskokwim. This method of harvest apparently dates back into the prehistoric period according to the oral accounts of several older residents of the area. The physical remnants of fish storage pits in the proximity of fence locations also attest to its antiquity. Discussions with residents of Nikolai who had used fish fences as late as 1966 resulted in information on their placement, construction and use.

LOCATION OF SALMON RIVER FENCES

On the Salmon River, the main fishcamp of area inhabitants was situated on a low hill approximately 100 yards downstream from the confluence of the North and South forks of the Salmon river (Figs. 2 and 8). The South Fork fish fence was constructed nearby. Usually, fences were built across each fork of this river, although only one of the forks featured a trap in conjunction with the fence. Thus, the fork opposite the one with the trap-fence was fenced to prevent fish from running or milling up it. Whether fish would actually spawn up the fork opposite their birtplace is not clear, but in highwater the kings may have possibly skirted the trap fence because of the low ground, sloughs, and ditches that may interconnect the two tributaries above the mouth. Generally, the South Fork was the site of the trap fence where people harvested the king salmon, however, at times fishing took place at the North Fork fence. Occasionally, people fished both forks simultaneously. The choice of the South Fork over the North Fork for fishing was apparently based on the larger run of salmon

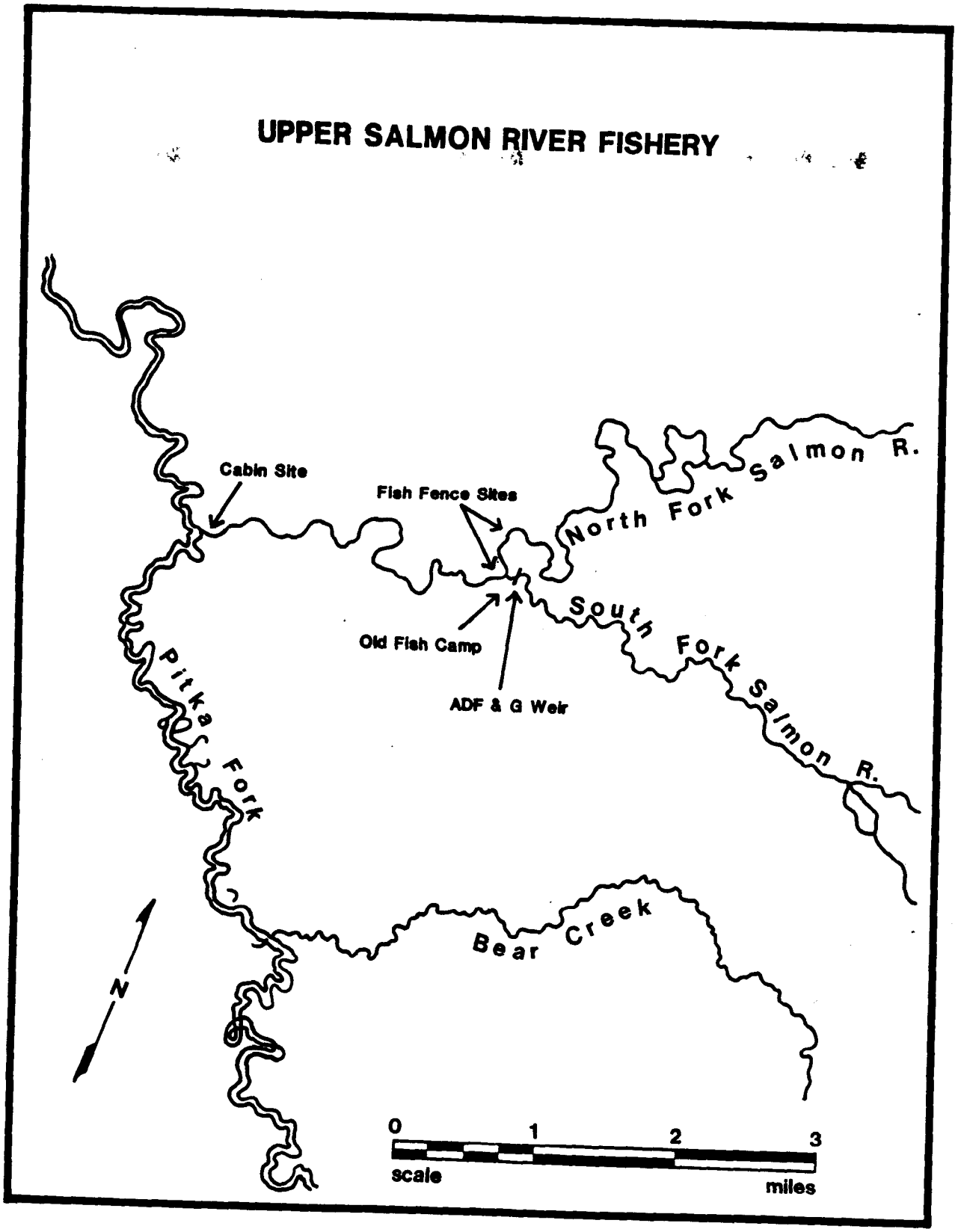

UPPER SALMON RIVER FISHERY
Cabin Site
Fish Fence Sites
North Fork Salmon R.
South Fork Salmon R.
Old Fish Camp
ADF & G Weir
Pitka Fork
Bear Creek
N
0
1
2
3
scale
miles

Fig. 8.

up this tributary and because of the site's proximity to the main fish camp below the mouth of the forks. One individual recalls hearing that at one time no king salmon spawned up the North Fork. At least once in the recent past users fenced the main river immediately below the forks (Fig. 2). This fence collapsed shortly after installation because of the greater depth of the river at this point and the increased force of the current compared with upstream fence sites.

CONSTRUCTION OF FISH FENCES AND TRAPS AT SALMON RIVER

The Salmon River fish fence was a major endeavor requiring several households' participation in its construction and maintenance and in processing the harvest. In the early summer, posts were driven with wooden mallets into the bottom of the river at 2- to 3-foot intervals. Fence sections were built of wooden slats, approximately 1/2-inch by 3/4-inch, which were made from straight grained spruce and placed about 3 inches apart (Figs. 9 and 10). The slats were sometimes prepared in the spring at Nikolai and transported in bundles to Salmon River for final assembly. Fence sections were up to 10 feet long and were of sufficient height, generally 7 to 10 feet, to extend from the bottom of the river to several feet above the surface of the water. They were then set against the upstream side of the driven posts and tied into position. Gravel was banked against the base of the sections from the upstream side using either one's foot or, in later years, a shovel. This banking prevented salmon from immediately escaping beneath the fence.

Some fences were built for use in conjunction with a trap. The trap was located near the middle of the fence on the downstream side of it

and was held in place by the construction of "wing fences" (Fig. 9). The trap was 18 to 30 feet long and constructed from straight-grained spruce running both lengthwise and cylindrically. Fish were removed from a door which was located on top of the trap near its lower end. Overall, the trap was about 16 inches in diameter. The diameter of the trap tapered only slightly, if at all, between the upper and lower ends, and this was apparently not significant in the principle of operation.

A funnel fit into the upper end of the trap, although one individual noted that sometimes the trap and funnel were of one-piece construction. The funnel was constructed in a manner similar to the trap itself. The trap, complete with the funnel device, extended from a corral which was built mid-way along the fence. The dimensions of the corral varied. The width may have ranged from 4 to 8 feet and was of similar length. The upper wing fences apparently created an illusion of passage upstream, luring salmon to enter the corral area. A slatted section was sometimes sunk into position on the bottom of the corral or pen section to prevent fish from tunneling out, especially on the sides perpendicular to the current not easily banked with gravel.

USE OF THE SALMON RIVER FISH FENCE

As salmon moved along the fence seeking an opening, they entered the pen or corral area through a narrow gap between the lower wing fence and main fence posts. The width of this gap was determined by the width of the builder's foot which was placed between the two posts as they were being driven. Salmon would become confined in the pen area and, unable to locate an opening to escape upstream, would turn and swim back down-

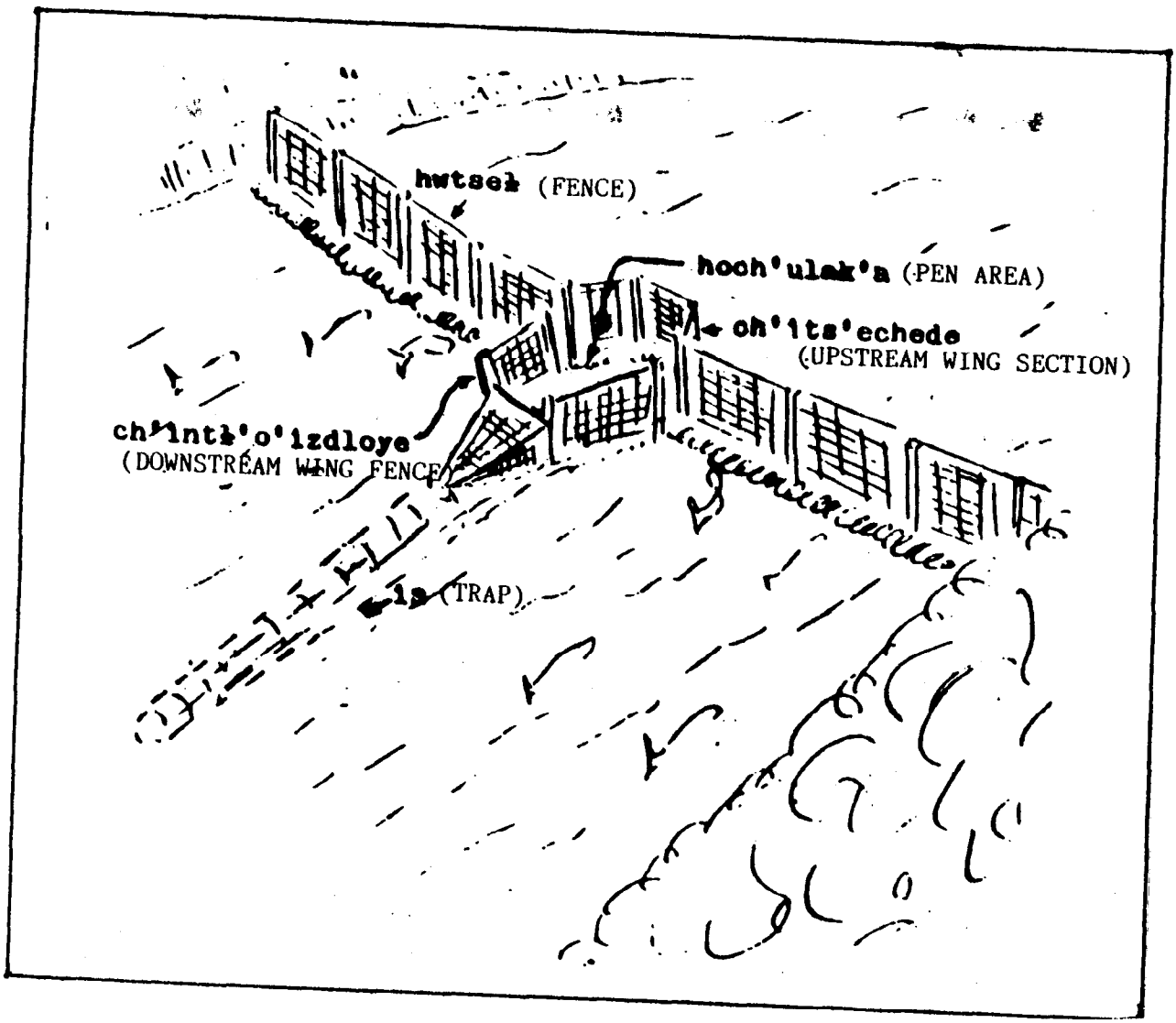


Fig. 9. Upper Kuskokwim Fish Fence with Athabaskan Section Names (from Dinak'i, Upper Kuskokwim Athabaskan Dictionary by R. and S. Collins, 1966).

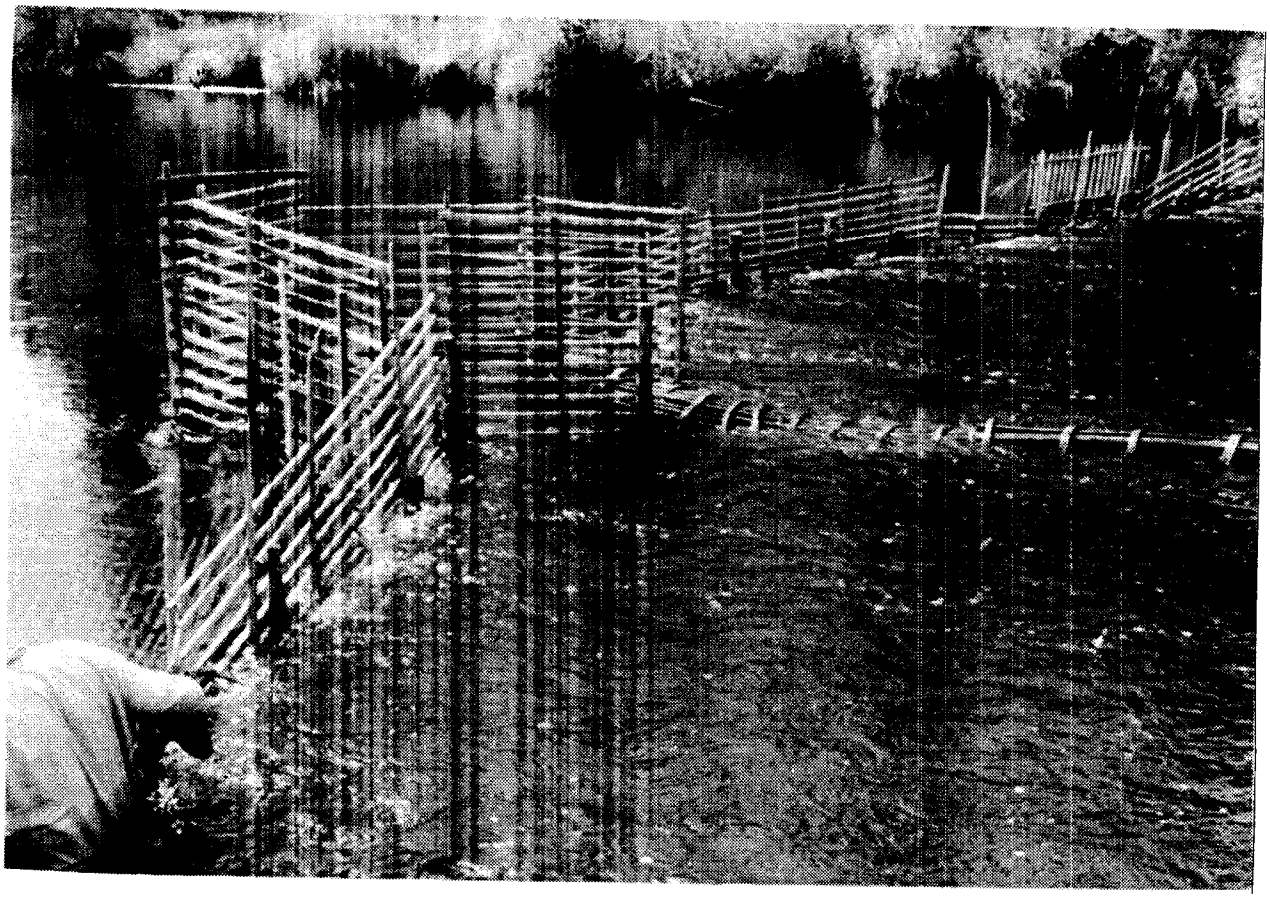


Fig. 10. Fish Fence in Place in the South Fork of the Salmon River--Mid-1960's (photo courtesy of Raymond Collins).

stream, thereby entering the trap by way of the funnel. Once in the trap the salmon could not turn around and, after tiring eventually drifted to the lower end of the trap. Fish were removed from the door in the free-floating end of the trap. This was done with either spears or gaffs. Depending upon the length of the trap, up to 100 kings could be held at one time.

The fence and trap required daily maintenance and inspection to remove vegetative accumulation and to fill in holes beneath the fence where the river current or escaping salmon caused the gravel to wash out. Most individuals who had used the fence characterized it, at best, as only an inhibitor of the "single-minded" salmon. In addition to digging beneath the fence, salmon jumped over the top or chewed their way through the slats. According to some individuals, once the fence was breached hundreds of salmon sometimes escaped prior to detection or repair of the hole. Each season, several fence sections required replacment because of salmon-induced damage. The lower end of the trap was the focus of much salmon gnawing and had to be replaced frequently, according to one individual.

Once fish began entering the trap an intensive period of harvest-related activity began, usually lasting from 10 days to 3 weeks. Nearly every member of fishing households was involved in performing tasks related to processing, preserving, and storing a year's supply of king salmon. These work days often stretched to 18 hours during peak fence production.

The quantity of king salmon harvested was limited to the available space of the drying structures. When these had been filled, fishing stopped, usually for the season. In years when users perceived the king salmon run

to be somewhat smaller than usual, the fence was opened before optimum and usual harvest levels were obtained. This practice was reported as a measure taken to avoid damaging the salmon stock and to avoid harvesting salmon in relatively poor condition, one that characterizes the end of the run. When it was decided to cease king salmon fishing for the season, the fence sections were removed and stacked on the bank for use the following year. Generally, the posts were left in place but eventually washed out or were carried away by river ice the following spring.

Once the fishing stopped and the fence was removed, additional time was necessary to preserve the catch. In late July or early August, most fishing households left the fishery to participate in the chum salmon harvest.

Because king salmon usually milled for a period of time once they encountered the fence, a wait of several weeks was often necesssary before substantial harvest began. It was in this somewhat idle period that a rod and reel line was first used by fishing households on the Salmon River in the early 1960s. Several users characterized these early attempts at rod and reel fishing as more amusing than productive.

FISH FENCES ON THE LITTLE TONZONA

King salmon were harvested on the Little Tonzona River with the use of fish fences until the mid-1960s (Fig. 1). The basic use of the fence was similar to that of Salmon River but the construction differed somewhat.

The overall dimensions were approximately smaller because of the shallower water depth and narrow width of the river at the harvest site. Fishing sites on the Little Tonzona apparently varied over the years, but according to one fisherman, they were usually situated below the confluence

of the North and South Fork of the right branch of the river. According to one individual, there was at one time a fence in the turbid portion of the river. This is the only known account of such a fence in the Upper Kuskokwim and serves to emphasize the importance of the Little Tonzona River for harvesting king salmon. The silty nature of the lower Little Tonzona River is the result of the braided nature of the South Fork of the Kuskokwim and the number of intersecting sloughs.

Fence installation was less labor-intensive than that of the Salmon River fence due to the less inhibiting river characteristics. Usually it could be installed by only one household.

One appreciable difference between the Little Tonzona and Salmon River fences was the material used for trap construction. Prior to disuse of the fences due to regulatory restrictions, the Little Tonzona fence and trap was built from heavy-gauge chicken wire. Users report that such material was suitable because of the reduced dimensions of the trap-fence and the smaller salmon run.

Little harvest data are available from the period when fences were used on the Little Tonzona River, however, one user believes that on the average 200 to 300 king salmon were harvested with the use of the trap fence. According to fishermen, the fence was usually removed the the stream "when they started catching old fish." Despite a harvest which was less than that of the Salmon River, the Little Tonzona River fence was of equal importance to households which used it as the Salmon River fence was to other fishing households.

CONCLUSION

The importance of fish fences is evident in several ways. Technologically the foremost demonstration of the importance, effort, and long-term use of this technique is shown by the refinement of the device itself. The fence was designed to withstand both the river current and the determination of the salmon to get upstream. Each component of the trap-fence had a specific purpose. The efficiency of these components and the fence as a whole is reaffirmed by its persistent use into the mid-1960s. Even after the availability of manufactured materials, the basic parts of the fence were still constructed with traditional materials and the design remained unchanged. Similarly, use of the fences also remained essentially the same.