Volume 22 Study G-I-E

STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

INVENTORY AND CATALOGING OF SPORT FISH AND SPORT FISH WATERS OF THE BRISTOL BAY AREA

by

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RESEARCH PROJECT SEGMENT

State: ALASKA NAME: Sport Fish Investigations of Alaska

Project No: F-9-13

Study No: G-I Study Title: INVENTORY AND CATALOGING

Job No.: G-I-E Job Title: Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Bristol Bay Area

Cooperators: Louis A. Gwartney and Richard B. Russell

Period Covered: July 1, 1980 to June 30, 1981

ABSTRACT

The Bristol Bay area includes all waters flowing into Bristol Bay from Cape Newenham to Port Heiden. Research activities in the area are designed to monitor traditional fisheries and to expand studies into areas with developing sport fisheries.

The 1980 Naknek River sport harvest of chinook salmon, Oncorhynchus tshawytscha (Walbaum), was estimated to be 2,500 fish. No escapement counts were made due to high, muddy waters.

Rainbow trout, Salmo gairdneri Richardson, spawning surveys were made at Lower Talarik Creek and Brooks River. Both streams had average runs. A creel census was conducted on the upper Naknek River between January 5 and April 9, 1980. During the period, 830 anglers retained 913 rainbow trout. Catch by month is presented for this winter fishery.

A 2-day survey of Arctic grayling, Thymallus arcticus (Pallas), at lower Ugashik Lake resulted in a population curve similar to all previous years' data. Basic catalog and inventory surveys were completed on five systems throughout the area. Stream or lake characteristics are discussed along with sizes and/or ages of fishes present.

BACKGROUND

The Bristol Bay area includes all waters flowing into Bristol Bay from Cape Newenham to Port Heiden. The area shown in Figure 1 reflects the area of study within the total Bristol Bay area. The area contains some of the

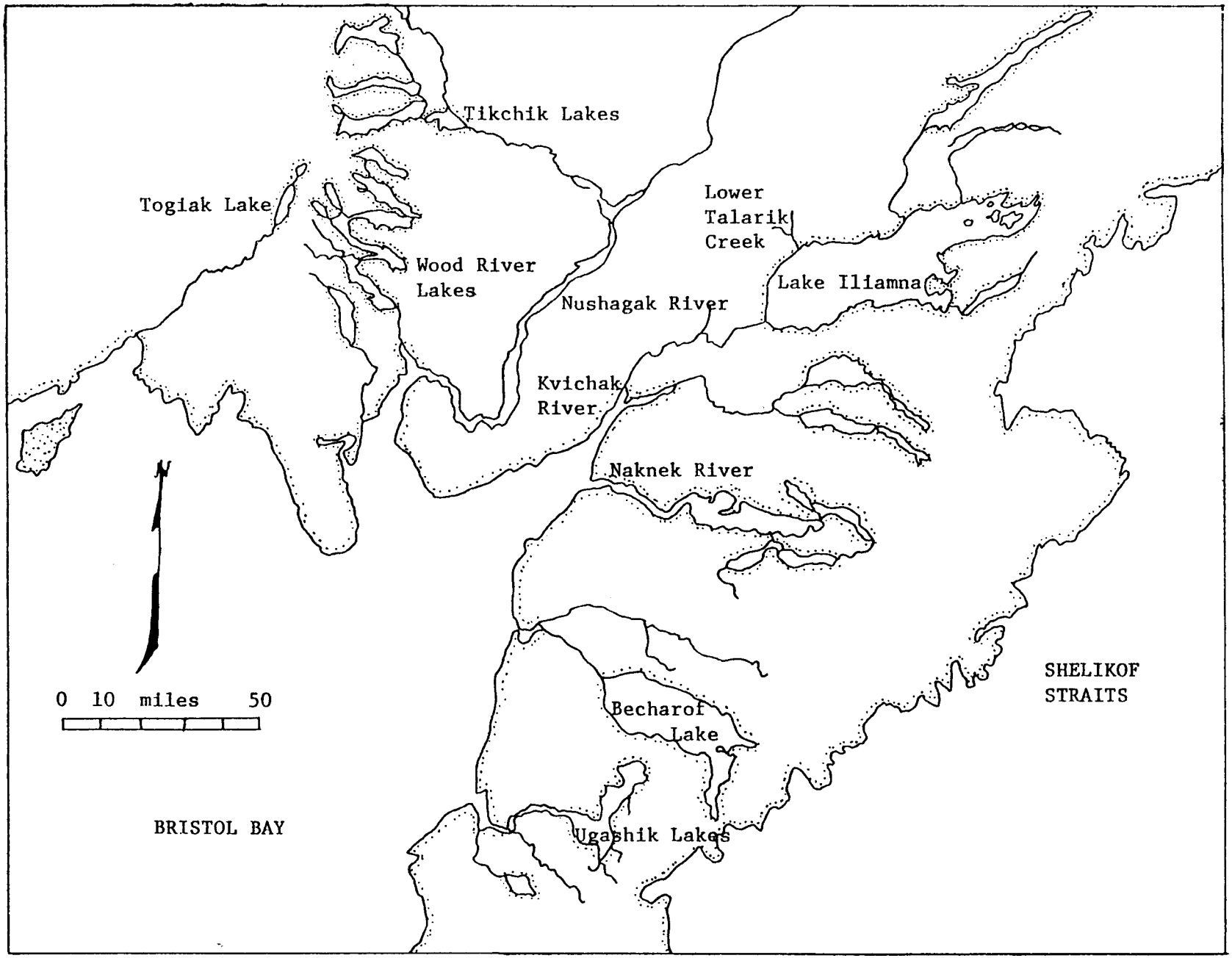


Figure 1 Bristol Bay Study Area.

best recreational fishing waters in the State. While the Kvichak and Naknek drainages have been sport fished for many years, there is still the opportunity for expansion of the recreational fishery into other Bristol Bay waters less well known to the general public. Many professional fishing guides and anglers with airplanes are currently fishing these areas.

Rainbow trout, abundant throughout the area, require a large amount of staff time for monitoring, particularly in the Naknek and Kvichak drainages. A comprehensive, 5-year study of rainbow trout in Lake Iliamna was completed in 1976 (Russell, 1977). Since this study was completed spawning surveys and creel censuses have been continued on select streams to determine the minimum number of large rainbow trout available for harvest by the angling public.

In the early 1970s, the Sport Fish staff collected biological data and made population estimates of Arctic grayling at lower Ugashik Lake outlet. In 1980 this work was repeated for comparisons and for information upon which to base regulatory recommendations.

Another major sport fishery in the area occurs in June and July on the Naknek River for chinook salmon. Sport, subsistence and commercial catches have been estimated annually.

With the establishment of the Lake Clark National Monument, a basic 2-year inventory study was initiated in 1978. This project was jointly funded by the State of Alaska and the National Park Service. Results were published as a completion report in 1980 (Russell, 1980). Inventory studies continued through 1980 with surveys made in the Nushagak, Tikchik, Wood River, Kvichak and Becharof drainages. Table 1 presents common and scientific names of species mentioned in the following report.

RECOMMENDATIONS

1. The Naknek River chinook salmon creel census should be repeated in 1981.

2. The enumeration of chinook salmon and rainbow trout in selected streams in the Naknek and Kvichak drainages should continue in order to establish a minimum spawning escapement.

3. Population estimates of Arctic grayling at Lower Ugashik Lake outlet and Ugashik Narrows should be continued.

4. The survey of selected streams within the Bristol Bay area to determine the existence of, or the potential for, a recreational fishery should be continued and information collected about the sport fishes present.

Table 1. List of Common and Scientific Names.

Common Name	Scientific Name and Author
Chinook salmon	Oncorhynchus tshawytscha (Walbaum)
Chum salmon	Oncorhynchus keta (Walbaum)
Coho salmon	Oncorhynchus kisutch (Walbaum)
Sockeye salmon	Oncorhynchus nerka (Walbaum)
Rainbow trout	Salmo gairdneri Richardson
Lake trout	Salvelinus namaycush (Walbaum)
Arctic char	Salvelinus alpinus (Linnaeus)
Dolly Varden	Salvelinus malma (Walbaum)
Arctic grayling	Thymallus arcticus (Pallas)
Northern pike	Essox lucius Linnaeus
Burbot	Lota lota (Linnaeus)
Arctic lamprey	Lampetra jamonica (Martens)
Longnose sucker	Catostomus catostomus Forster
Round whitefish	Prosopium cylindracium (Pallas)
Alaska blackfish	Dallia pectoralis Bean
Ninespine stickleback	Pungitius pungitius (Linnaeus)
Threespine stickleback	Gasterosteus aculeatus Linnaeus
Sculpin	Cottus sp.

OBJECTIVES

1. To determine the distribution and utilization of sport fish species within the waters of the job area, with emphasis on the Tikchik and Upper Nushagak systems.

2. To determine the magnitude of rainbow trout spawning stocks in Lower Talarik Creek, Dream Creek, Copper River, Naknek River, Brooks River and other streams as time permits.

3. To determine the magnitude of chinook salmon spawning stocks utilizing the Naknek drainage.

4. To determine sport harvest of chinook salmon in the Naknek River.

5. To estimate the population of Arctic grayling at Lower Ugashik Lake Outlet and Ugashik Lake Narrows.

6. To provide recommendations and identify future research needs relative to the management of the area sport fish resources.

TECHNIQUES USED

Anglers were interviewed to determine creel and effort information. Those not interviewed were enumerated to provide estimates of total effort. The interview data were expanded to include all anglers enumerated by a ratio proportion formula, thus yielding estimates of total angler effort and total rainbow trout harvest.

Expansions

$$\text{Angler Effort In Angler Hours} \quad \frac{\text{No. of anglers interviewed}}{\text{No. of anglers hrs. fished}} = \frac{\text{Total No. anglers observed}}{X}$$

$$\text{Rainbow Trout Harvested} \quad \frac{\text{No. of anglers interviewed}}{\text{No. of rainbow trout kept}} = \frac{\text{Total No. anglers observed}}{X}$$

The number of spawning salmon and trout was determined by aerial surveys or by walking along stream banks. In areas of large concentrations, fish were estimated in tens or hundreds.

Arctic grayling at Lower Ugashik Lake Outlet were caught with rod and reel, and measurements made with a standard measuring board.

For Catalog and Inventory studies, fish were captured using gill nets, dip nets, hook and line, minnow traps, and backpack electroshocker. Gill nets were of three types:

1. 125 foot long, variable mesh monofilament diving nets, 6 feet deep, comprised of five 25-foot panels bearing mesh sizes 1/2", 3/4" 1", 1-1/2" and 2" respectively (mesh size = square measure).

2. 125 foot long, variable mesh nylon floating net, 6 feet deep, comprised of five panels bearing mesh sizes as above;

3. 75 foot long, monofilament floating net, 10 feet deep, 4-inch mesh.

The electroshocker used for fish collection was a Smith-Root, Type V, 12v, backpack electrofisher. All fish captured were measured to the nearest millimeter (both standard fork length and total length), and examined internally to determine sex and stage of maturity. Scales and otoliths were removed, depending on the species sampled, to be used in age analysis.

FINDINGS

Results

Naknek River Chinook Salmon:

The 1980 Naknek River chinook salmon sport harvest appears to be similar to estimates made in 1978 and 1979. No formal creel census was conducted, but the average 1978 and 1979 harvest estimates of 2,500 chinook salmon appear to be similar to the 1980 harvest.

Chinook salmon escapements counts for the Naknek system were not accomplished in 1980 due to unseasonably high and muddy waters. Based on the success of the anglers, I would estimate that escapements are adequate and similar to that of 1979.

Rainbow Trout Surveys:

Rainbow trout spawning surveys were again conducted in April and May of 1980 in selected index streams in the Naknek and Kvichak drainages. These surveys, continuous since 1972 (Table 2), provide an annual comparison of the numbers of large spawning rainbow trout. Since these large rainbow trout spend most of the summer associated with the lake environment, these spring surveys are made at the only time visual observation of their numbers is possible.

A creel census was conducted on the upper Naknek River between January 5 and April 9, 1980. During this period, 56 days were spent observing and interviewing anglers after they completed each day's fishing. From January 5 to March 2, anglers concentrated their efforts in the upper Naknek (Figure 2) and after March 2, started fishing just above Rapids Camp.

Eight hundred and thirty anglers fished an estimated 2,706 angler hours and caught an estimated 1,494 rainbow trout, 126 Arctic grayling, 34 char, 8 northern pike, 4 lake trout, 1 burbot and 1 round whitefish for a total

Table 2. A Summary of Rainbow Trout Spawning Surveys Made on Streams in the Naknek and Kvichak Drainages, 1973-1980.

Stream	Number of Rainbow Trout Spawners							
	1973	1974	1975	1976	1977	1978	1979	1980
Copper River	102	91	85	*	400-500	250-350	200-250**	***
Brooks River	150	169	88	100	125-175	125-150	250-300	200
Lower Talarik Creek	1,000	1,100	1,100	1,000	800	1,100-1,200**	1,900-2,100**	1,250-1,300**
Dream Creek	218	43	46	200-250	138	175-225	*	***

* No count possible due to turbid waters.
** Aerial survey.
*** No peak count made.

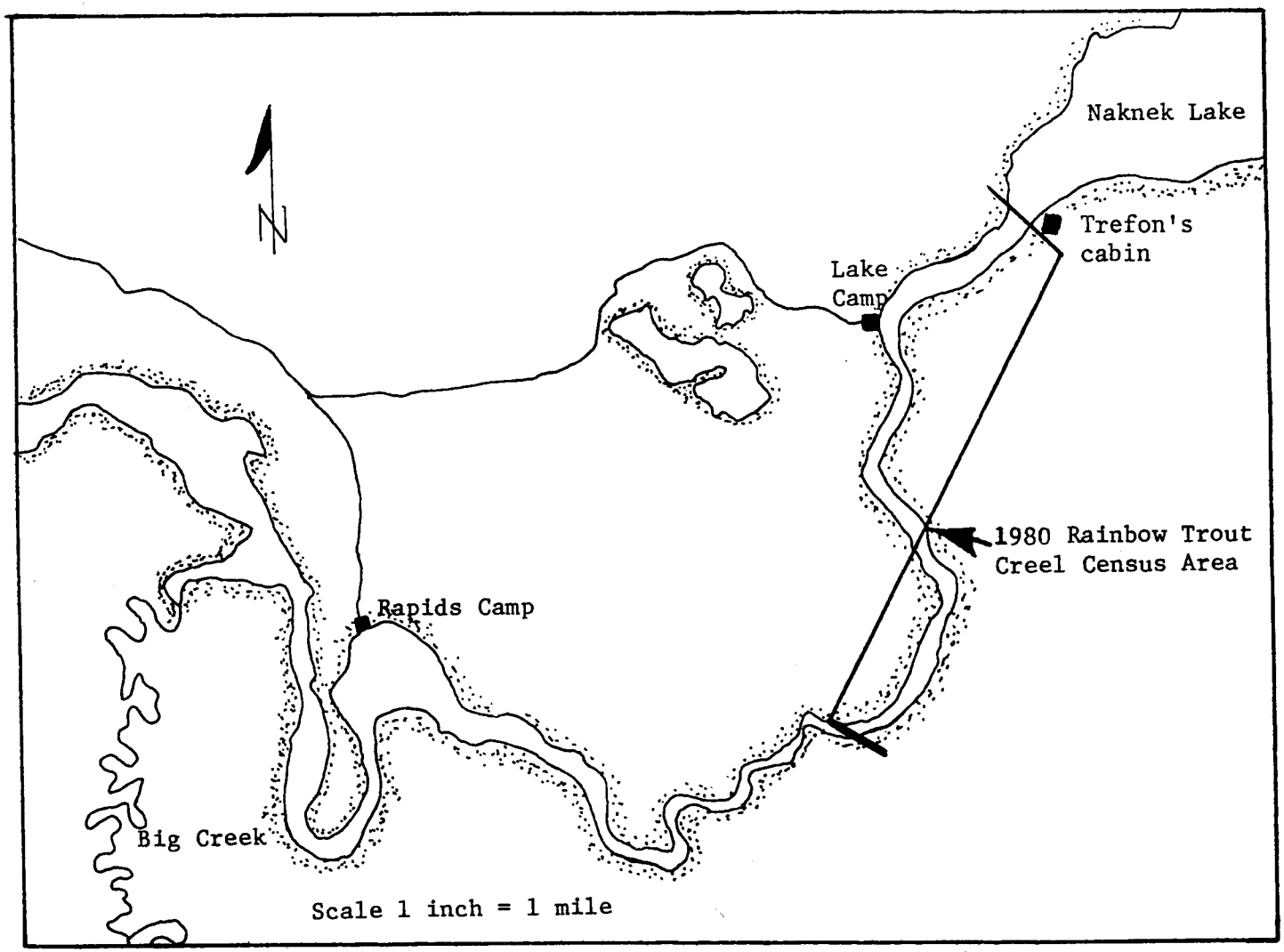


Figure 2. Upper Naknek River Showing Rainbow Trout Creel Census Area, 1980

catch per angler hour of 0.62 fish. Rainbow trout catch per angler hour was 0.55. Anglers retained an estimated 913 rainbow trout, 145 of which were sexually mature prespawners. Table 3 presents these data by month.

Most of the anglers were either local residents or resident military personnel. Of these anglers interviewed, 80% were from the local King Salmon-Naknek area. Only 4% were professionally guided.

Lower Ugashik Lake Outlet Arctic Grayling Survey:

Due to the extremely large numbers of sockeye salmon in the Ugashik system, no attempt was made to estimate Arctic grayling populations at either the outlet or narrows (Figure 3). A 2-day sample on August 12 and 13, 1980, was made at the outlet resulting in a population distribution similar to 1978 and 1979 (Figure 4). In fact, the mean size was indentical to the 1978 sample.

Cataloging and Inventory Surveys:

The field investigations proposed for 1980 included a series of surveys of waters in the upper Nushagak River drainage. Several of the Tikchik Lakes, Tikchik River, Nuyakuk River, and major upriver Nushagak tributaries were scheduled for surveys. However, the field survey program was greatly altered due to a late breakup in the Tikchik Lakes area, as well as a summer of very inclement flying weather, large escapement of sockeye salmon into the Tikchik Lakes, and personnel changes in the area staff. Float surveys of King Salmon River and Tikchik River were accomplished.

King Salmon River:

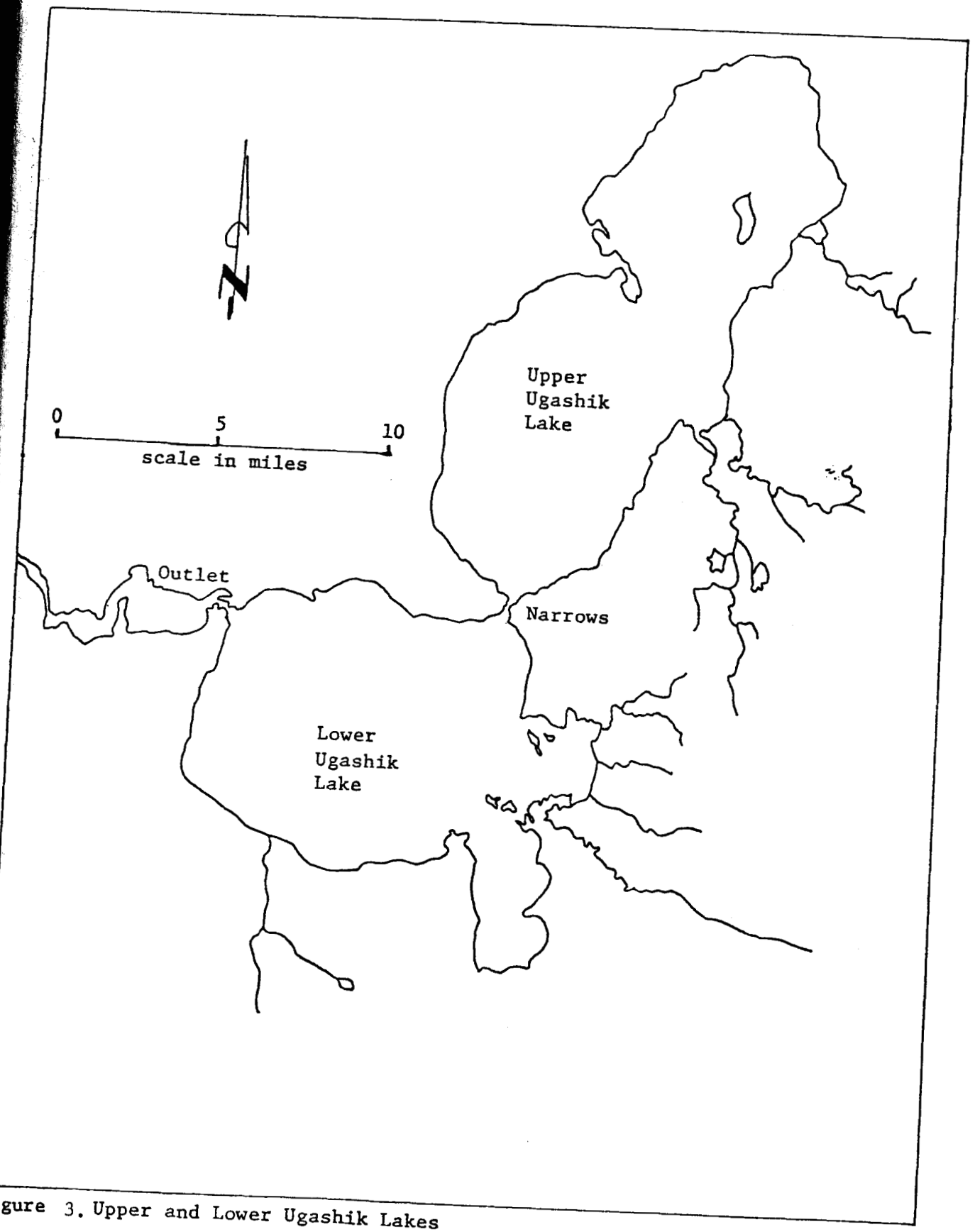
A float survey was conducted from June 16-25 originating in a small pot hole lake approximately 10 miles east of Upnuk Lake and terminating at the mainstem Nushagak River, roughly 60 miles downstream (Figure 5).

The river drops 560 feet in elevation over its 60 mile course. The drop is gradual and there are no rapids. The upper 14-15 miles of river flows through rolling tundra. It is small at this point (25-50 ft. wide) mostly shallow, and is bordered by willows. Just prior to its passage through the Shotgun Hills at Mile 15, it increases in both volume and velocity. At about Mile 22, the first spruce forest is encountered. From there downstream the riverbanks are forested and it flows through lowland tundra with lots of meander, back sloughs, side channels and deep holes (especially on bends). Log debris piles and sweepers are common. The river is approximately 175 feet wide at its confluence with the Nushagak.

Ten species of fish were captured in the river during the survey. These included Arctic grayling, Arctic lamprey, burbot, chinook salmon, coho salmon, Dolly Varden, longnose sucker, rainbow trout, round whitefish and sculpins. Hook and line sampling yielded 149 grayling, 32 rainbow trout, and 21 Dolly Varden in 61 hours of angling. Electrofishing at three locations (560 seconds total) yielded catches of juvenile chinook and coho salmon. No adult salmon were observed or captured during the survey.

Table 3. Upper Naknek River Rainbow Trout Creel Census Between January 5 and April 9, 1980.

	Anglers Observed	Anglers Checked	Hours Fished	Rainbow Caught	Rainbow Kept	Rainbow Spawners Kept
January	6	6	14	4	4	4
February	153	153	421	203	129	31
March	416	391	1164	793	508	61
April	186	151	689	248	125	27
	761	701	2288	1248	766	123
Above expanded to the total of 61 open-water days						
Season Totals	830	-	2706	1494	913	145



gure 3. Upper and Lower Ugashik Lakes

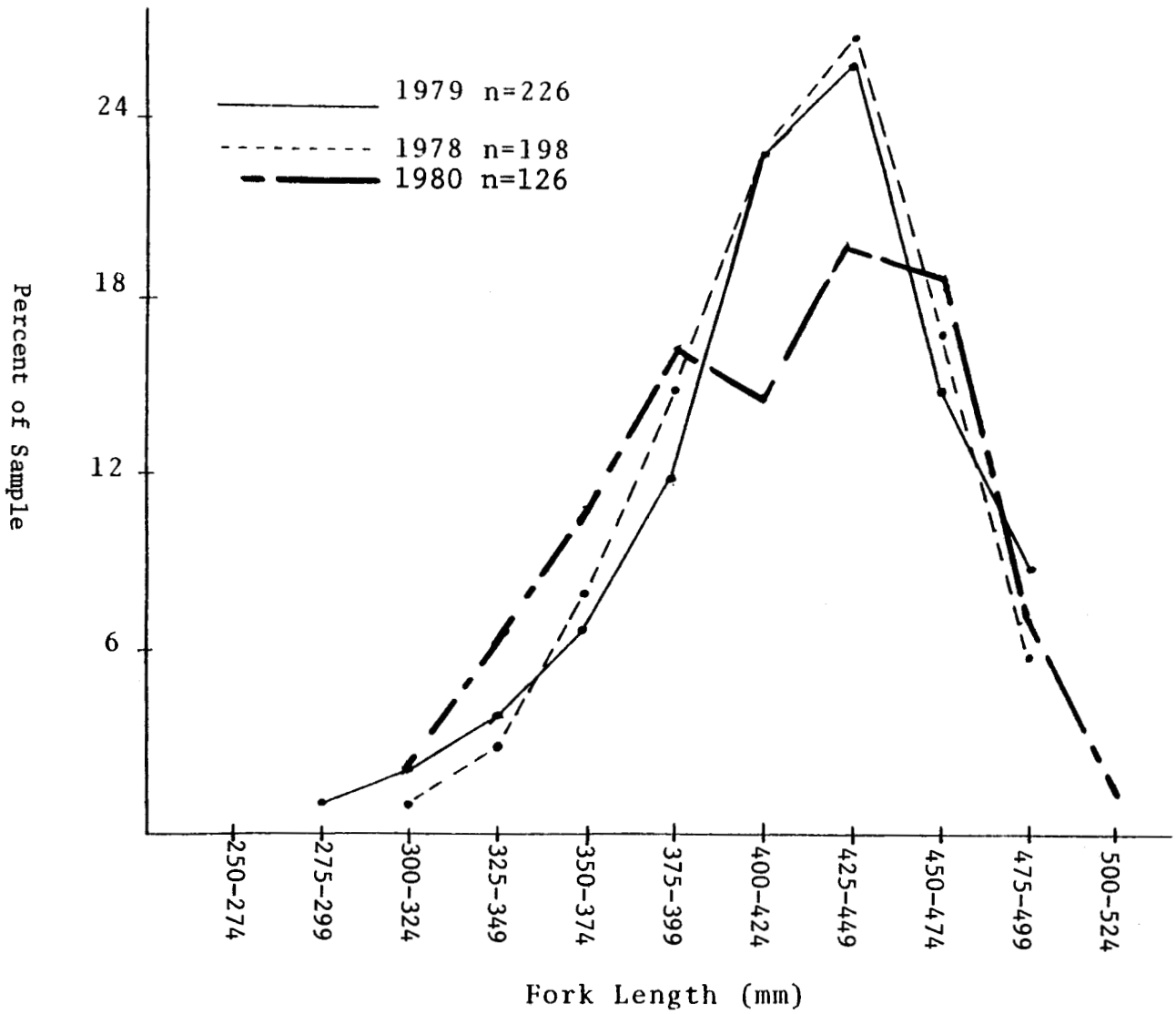


Figure 4. Length frequencies of Arctic Grayling from Lower Ugashik Outlet comparing samples taken in 1978, 1979, and 1980.

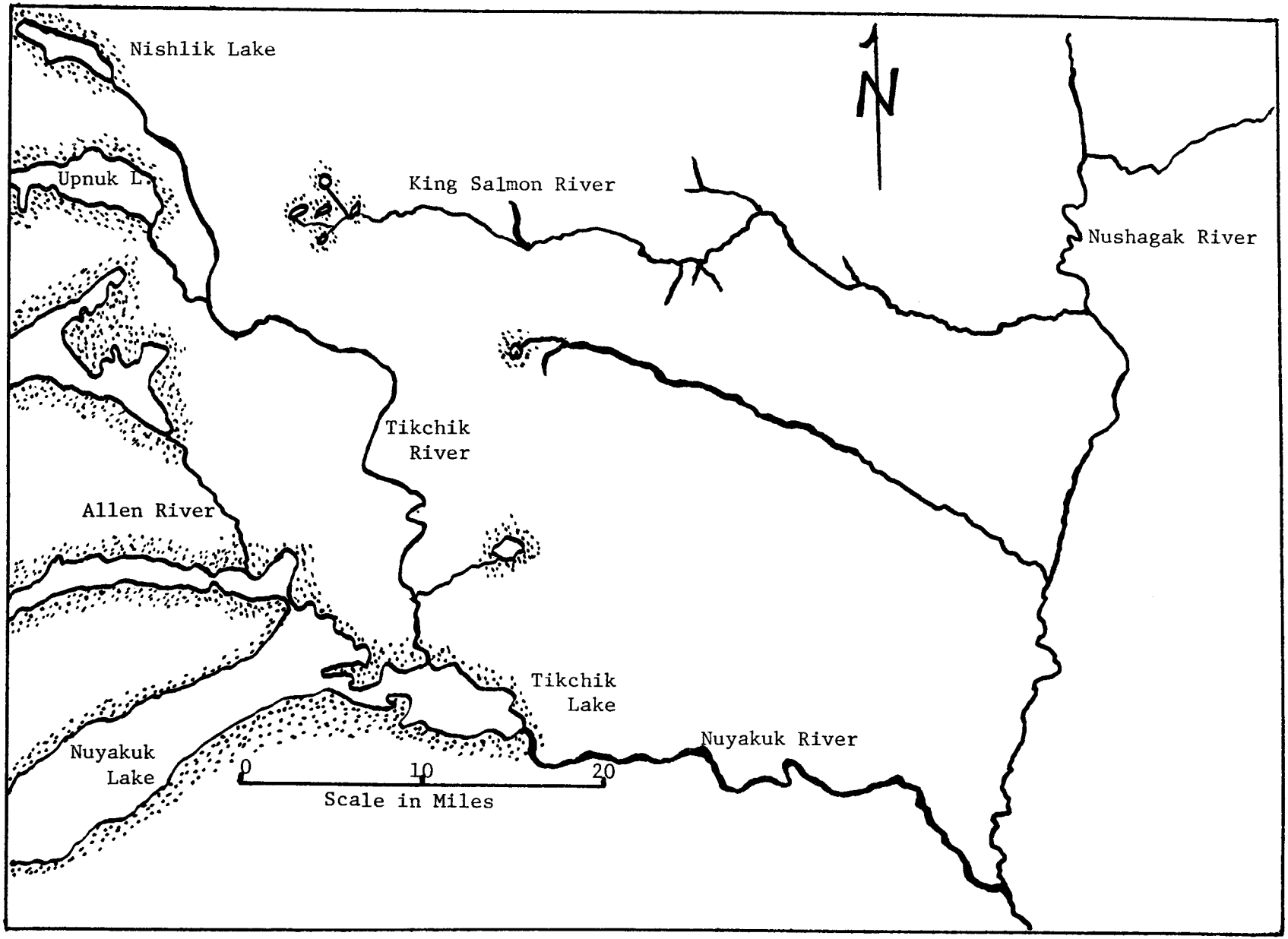


Figure 5. Upper Nushagak River Drainage

Grayling were numerous throughout the river and had apparently finished spawning prior to the survey. Table 4 presents a length frequency of sport fishes captured on hook and line in King Salmon River. Table 5 presents age-length data specifically for Arctic grayling.

Rainbow trout were either absent or very scarce in the upper 25 miles of the river and were not abundant until the lower 15-20 miles. Some were still engaged in spawning activity in this lower river area. No small juveniles were observed or caught during the trip. Table 6 presents a length distribution of those rainbow trout sampled. The largest of these was approximately 650 mm in length. Length/age distribution of those fish sampled is presented in Table 5.

Dolly Varden were caught throughout the river but were more abundant in its lower reaches. They appeared to be schooled, as several were often caught in succession. The length distribution of those caught appears in Table 4. No otoliths were collected. Almost all were uniformly skinny. One juvenile was captured while electroshocking.

The chinook and coho salmon juveniles were found in side channels downriver hiding in roots and log debris and under overhanging banks. One large school of adult round whitefish was observed in a side slough at about Mile 13 and one round whitefish fry was captured nearby.

The river characteristics are conducive to wilderness float trips and fishing. However, caution should be exercised by floaters, especially after reaching the spruce forest area, as sweepers are common and there are places where the river runs through the open forest with no defined channel. Side channels are numerous and log debris in the river could provide problems for float trips.

Tikchik River:

This river was float-surveyed July 11-17 from Upnuk Lake to Tikchik Lake (Figure 5), a distance of approximately 48 river miles. The river is floatable from Nishlik Lake as well as from Upnuk Lake. The latter was chosen as a starting point because it was clear, while the Nishlik fork had a substantial amount of silt.

Tikchik River drops 481 feet over its course from Upnuk Lake to Tikchik Lake. There are no rapids of consequence, although two short areas of Class II white water were encountered at Miles 18 and 20 below Upnuk Lake. At normal summer water levels, these would be hardly noticeable.

The river flows through rolling tundra from Upnuk Lake southeasterly to the forks. At its origin, it is approximately 80-90 feet wide with a velocity of 3 to 4 miles per hour. Shortly downstream, it widens and shallows and many small islands are present in midstream. There is very little cover for fishes in the Upnuk Lake fork of the river.

At the forks, the river channel nearly doubles in size and willow cover becomes more abundant. However, at the time of this survey, the trans-

Table 4. Length Frequencies of Fishes Caught on Hook and Line from King Salmon River Between June 16 and June 24, 1980.

Fork Length (mm)	Arctic Grayling	Rainbow Trout	Dolly Varden
200-224	...	...	...
225-249	1	...	...
250-274	...	...	...
275-299	3	...	...
300-324	4	...	...
325-349	23	3	...
350-374	56	1	...
375-399	39	5	4
400-424	22	3	5
425-449	1	9	7
450-474	...	5	2
475-499	...	3	3
500-524	...	...	...
525-549	...	2	...
550-574	...	1	...
Totals	149	32	21

Table 5. Average Fork Lengths by Age Group of Arctic Grayling from the King Salmon and Tikchik Rivers.

	King Salmon River		Tikchik River	
Age Group	Sample Size	Mean Ford Length(mm)	Sample Size	Mean Fork Length(mm)
0	...	...	1	21
1	...	...	...	...
2	...	...	...	...
3	...	...	5	273
4	2	309	20	304
5	10	335	44	357
6	23	346	42	384
7	27	371	18	404
8	38	383	20	430
9	17	391	11	450
10	2	404	2	469
Totals	119		163	

Table 6. Average Fork Lengths by Age Groups of Rainbow Trout from the King Salmon River.

Sample Size	Age Group (Years)	Mean Fork Length (mm)
4	4	370
6	5	402
9	6	438
9	7	448
2	8	504
1	9	537
Total 31		

parency of the Nishlik fork was only 2 feet and the waters downstream were much more turbid than the Upnuk fork had been.

The river below the forks was quite braided for about 6 miles until it entered a small canyon, through which it descends for the next 16 miles. River terraces extended 75 to 150 feet above the level throughout the canyon. About 8 miles down the canyon the walls diverge, and the river resumes its braided character and continues all the way downstream to the mouth. Spruce, cottonwood and birch forests border this entire lower 27 miles of river. Large, deep holes are found on bends and at channel confluences. Back sloughs and log debris piles are numerous. The river averages 150-200 feet in width through much of its lower reaches.

Nine species of fish were found in the river during the survey. These included: Arctic grayling, burbot, chinook salmon, coho salmon, Dolly Varden, northern pike, round whitefish, sockeye salmon and sculpins. Hook and line sampling yielded: 166 Arctic grayling, 5 Dolly Varden, and 3 northern pike in 52 total hours of fishing. Electrofishing at two locations (393 seconds) yielded catches of juvenile chinook, coho, and sockeye salmon as well as sculpins, burbot and Dolly Varden fry. One grayling fry was caught by hand near the forks. Round whitefish were observed in a slow flowing side slough, but were not captured. An estimated 85,000 to 100,000 adult sockeye salmon were observed migrating upstream in the lower 20 miles of river between July 15 and 17. A large school of sockeye salmon was also present at the river mouth, and several other schools were observed in the general vicinity of the mouth on July 17. A few adult chinook salmon were also observed in the lower 20 miles of river. No rainbow trout or lake trout were caught or observed during the survey.

Grayling were caught in the lower mile of the Upnuk fork and from there they were found all the way downstream to Tikchik Lake. The length frequency of those captured is presented in Table 7. The length-age distribution of these fish compared to the King Salmon grayling appears in Table 5. Dolly Varden were caught infrequently on hook and line in the lower 30 miles of river. Table 7 presents their length distribution. Juveniles were captured with electrofishing gear at the forks and again downstream about 18 miles above the river outlet. Others were observed occasionally in side channels and back waters.

Northern Pike were all caught in back waters within the lower 15 miles of the river. Several juveniles were seen but not captured.

Chinook, sockeye and coho salmon fry were frequently observed in side channels and back waters. Chinook and sockeye salmon fry were noticeably abundant.

The river is easily floatable and it would be suitable as a first wilderness float trip for a raft or kayak enthusiast.

Peck's Creek:

Table 7. Length Frequencies of Fishes Caught on Hook and Line from Tikchik River Between July 11 and July 17, 1980

Fork Length (mm)	Arctic Grayling	Dolly Varden	Northern Pike
150-174	...	...	...
175-199	1	...	...
200-224	...	...	...
225-249	...	...	...
250-274	2	...	...
275-299	12	...	...
300-324	14	...	...
325-349	14	...	...
350-374	32	...	...
375-399	36	1	...
400-424	24	...	...
450-474	11	...	...
475-499	1	1	1
500-524	...	...	...
525-549	...	1	...
550-574	...	2	...
575-599	...	...	...
600-624	...	...	...
625-649	...	...	...
650-674	...	...	...
675-699	...	...	1
Totals	147	5	2

A 23-mile float survey was conducted between July 30 and August 4 on Peck's Creek (Figure 6). The starting point was a small lake adjacent to the stream approximately 23 miles upstream of the Kvichak River. A short portage of approximately 150 yards was necessary to reach the creek.

The creek is 15 to 30 feet wide throughout its length. It meanders through low, rolling tundra and has a thin corridor of spruce, birch and willows bordering it throughout its length. Velocity rarely exceeds 2 f.p.s. There are no rapids. Sweepers and shallows are the only obstacles to float navigation.

Eight species of fish were found in the creek. These included: Arctic grayling, Alaska blackfish, chinook salmon, chum salmon, ninespine stickleback, rainbow trout, sculpins and threespine stickleback. Hook and line sampling yielded: 22 rainbow trout, 4 chinook salmon and three Arctic grayling in 13 angler hours. Electrofishing (349 seconds) yielded two chinook salmon fry, one juvenile blackfish and several sticklebacks and sculpins.

All the rainbow trout, grayling, and chinook salmon caught on hook and line were taken in the upper 6 miles of the float in an area utilized by spawning chinook and chum salmon. Only one rainbow trout was seen downstream. Table 8 presents length frequencies of rainbow trout and Arctic grayling caught in Peck's Creek. A total of 89 chinook salmon spawners and 167 chum salmon spawners were seen during the float. Due to poor viewing conditions, however, this was a minimal count. All were spawning in the upper stream area.

The stream, in its upper reaches, offers recreational angling potential for rearing rainbow trout and spawning chinook salmon. It is not a highly recommended float stream due to its small size, sluggish flow and the abundance of sweepers.

Ruth Lake:

Ruth Lake is a tributary to the Island Arm of Becharof Lake (Figure 7). It was surveyed on June 4 and 5, 1980. Geographical characteristics, as well as basic species composition and length distribution data were objectives of the survey.

The lake is 3.75 miles long and varies in width with a maximum of 0.75 miles. Surface elevation is approximately 25 feet above sea level. It drains via Ruth River into Becharof Lake. The lake basin is bordered on the east, south and west by steep walled mountains. Run-off from these and two small inlet creeks are the water source. Bank cover around the lake is primarily alder with some willow along inlet creeks.

Seven species of fish were captured from the lake. These were: Arctic char, Dolly Varden, humpback whitefish, ninespine stickleback, round white fish, sockeye salmon and threespine stickleback. Gill-netting yielded 13 Arctic char, 19 Dolly Varden, 3 humpback whitefish, 4 round whitefish and 8 sockeye salmon smolts. The two species of sticklebacks were found in the

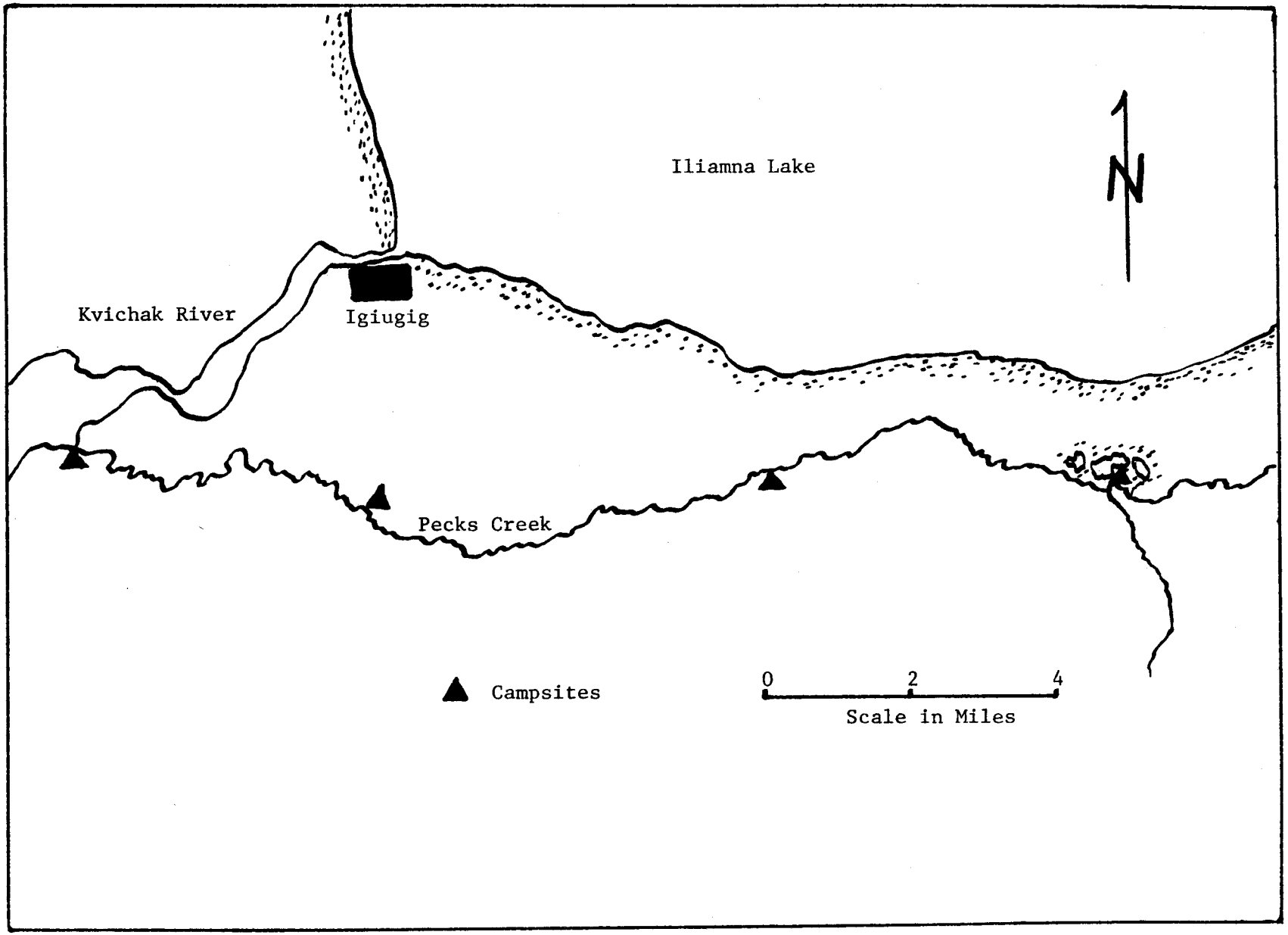


Figure 6. Pecks Creek

Table 8. Length Frequencies of Rainbow Trout and Arctic Grayling Caught on Hook and Line from Pecks Creek Between July 30 and August 4, 1980.

Fork Length (mm)	Rainbow Trout	Arctic Grayling
175-199	3	...
200-224	3	...
225-249	3	...
250-274	6	2
275-299	4	1
300-324	3	...
Totals	22	3

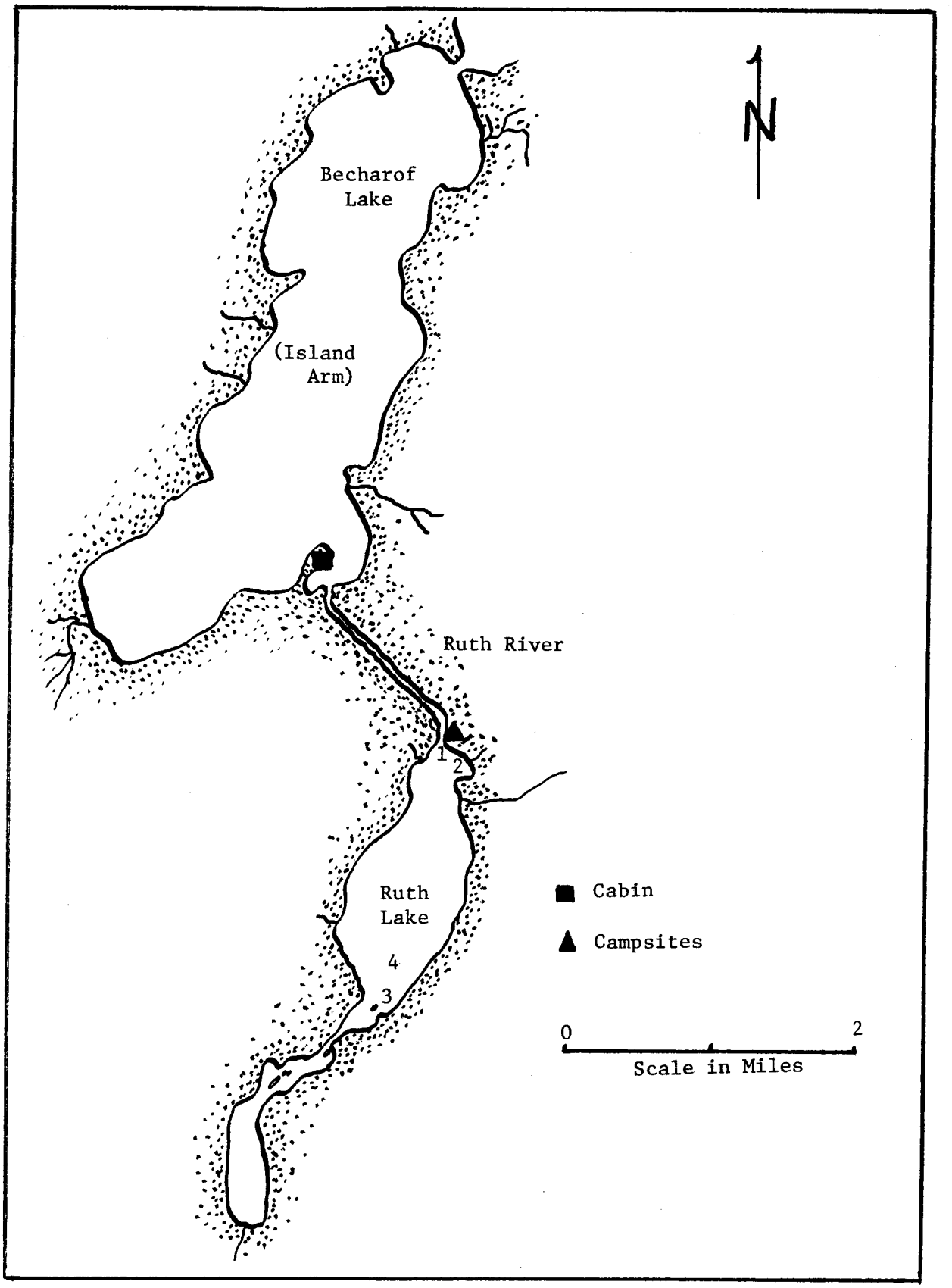


Figure 7. Ruth Lake, Showing Sample Stations, 1980.

stomachs of Arctic char and humpback whitefish. Sockeye salmon fry were observed along shore and removed from the stomachs of several char. The length distribution of the gill net samples appears in Table 9.

Ruth River:

June 6 was spent sampling Ruth River with hook and line. In 7 hours, a catch of four Arctic grayling and several Arctic char or Dolly Varden was achieved (Table 10). Nearly all these fish were caught in the lower one-quarter mile of river. The river level was low and bank cover was scarce, and the fish were in the runs and deeper waters of the lower river.

Lynx Lake and Lynx Creek:

A 4-day survey was conducted on this system between June 30 and July 3 (Figure 8). The objective was to determine species and size distribution of fishes present.

Two days were spent surveying Lynx Lake. Variable mesh monofilament gill nets were set to capture resident fishes present. Cumulatively, in 32 hours of gill net fishing, 46 Arctic char, 40 rainbow trout, 2 Arctic grayling, 2 sockeye salmon smolt and 1 northern pike were caught. Additionally, three sticklebacks, sockeye salmon fry and sculpins were observed in the lake.

The Arctic char captured ranged in fork length from 116 to 464 mm with a mean length of 299 mm (Table 11). The rainbow trout ranged in length from 122 to 371 mm with a mean of 225 mm.

Stomach contents from each of the char and rainbow trout captured were examined. The results of these examinations are presented in Table 12. Gastropods, sockeye salmon fry, Trichoptera larvae and threespine stickleback were the four food items found most commonly in char stomachs. Caddis larvae, coleopterans, caddis adults and mosquitoes were the four items found most commonly in rainbow trout stomachs.

One day was spent sampling Lynx Creek with hook and line. In 13 angler hours, approximately 1 mile of stream was sampled and a catch of 62 rainbow trout, 44 Arctic grayling and 2 Arctic char was achieved. The average catch was 8.3 fish/hour. Length distribution of the catch is presented in Table 13.

The stream appears to provide important rearing and feeding areas for both rainbow trout and Arctic grayling. It is probably also used by both for spawning. Two recently spawned-out rainbow trout were captured in the creek. Evidence (foot prints and lost fishing tackle) indicates it also is utilized by recreational anglers.

Discussion

The entire 1980 spring and summer field season was plagued with bad weather resulting in high, muddy waters and marginal flying conditions. Many

Table 9. Length Frequencies of Gill Net Catch Fish from Ruth Lake on June 5, 1980.

Fork Length (mm)	Char	Humpback Whitefish	Round Whitefish	Sockeye Smolt
100-124	...	...	...	5
125-149	3	...	...	1
150-174	1	...	...	...
175-199	1	...	...	...
200-224	7	...	...	...
225-249	4	...	1	...
250-274	3	...	...	...
275-299	2	...	...	...
300-324	1	...	1	...
325-349	1	...	1	...
350-374	2	...	...	...
375-399	2	...	...	...
400-424	1	...	1	...
425-449	1	1	...	...
450-474	2	1	...	...
475-499	...	1	...	...
500-524	...	...	...	...
525-549	...	...	...	...
550-574	...	...	...	...
575-599	...	...	...	...
600-624	...	...	...	...
625-649	1	...	...	...
Totals	32	3	4	6

Table 10. Length Frequencies of Char and Arctic Grayling Caught on Hook and Line from Ruth River on June 6, 1980.

Fork Length (mm)	Char	Arctic Grayling
350-374	...	...
375-399	2	2
400-424	1	...
425-449	1	1
450-474	2	1
475-499	...	...
500-524	...	...
525-549	1	...
Totals	7	4

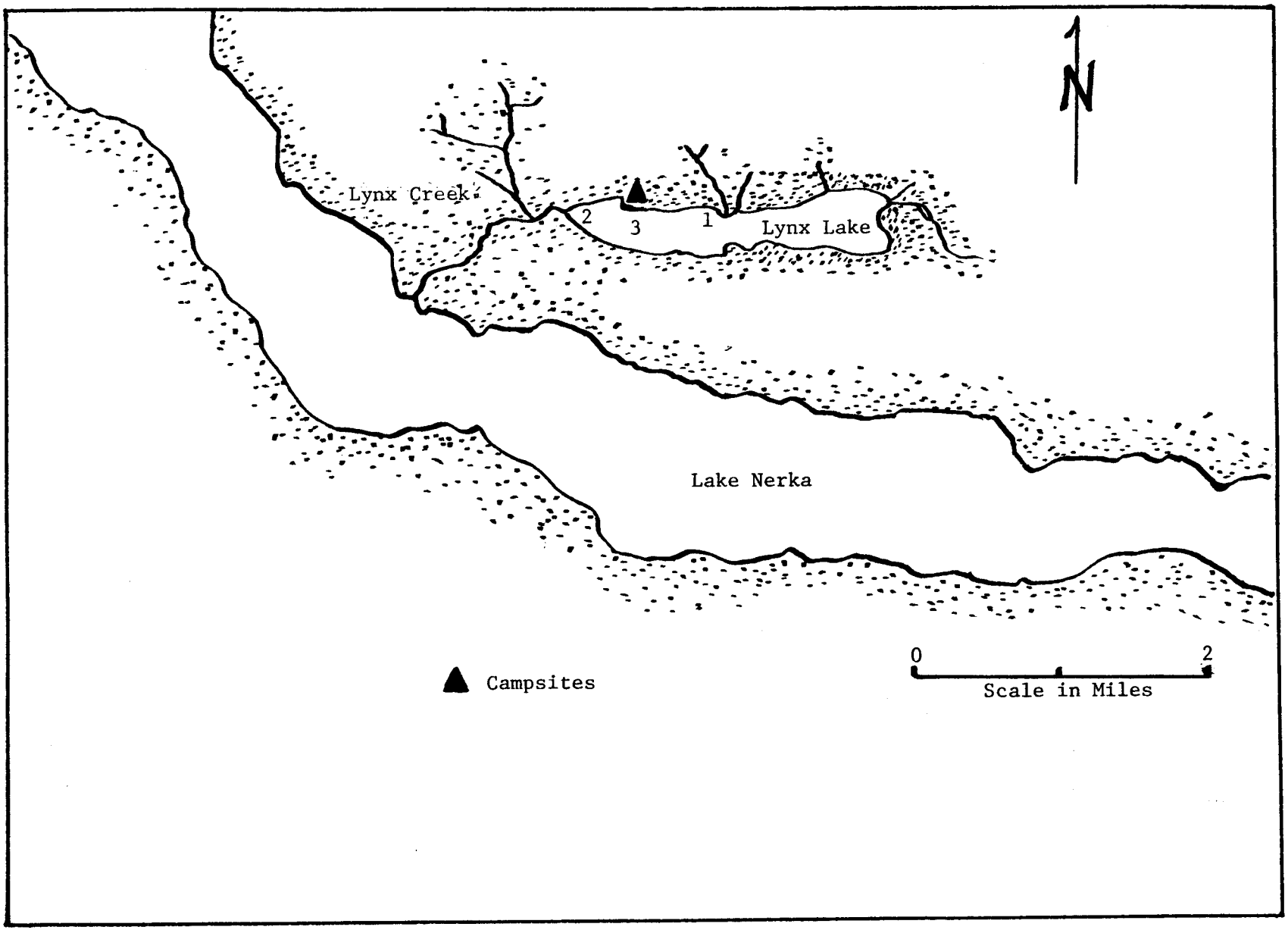


Figure 8. Lynx Lake, Showing Sample Stations, 1980.

Table 11. Length Frequencies of Gill Net Caught Arctic Char and Rainbow Trout from Lynx Lake on July 1, 1980.

Fork Length (mm)	Arctic Char	Rainbow Trout
100-124	5	1
125-149	2	...
150-174	...	6
175-199	1	13
200-224	3	3
225-249	2	5
250-274	3	2
275-299	2	4
300-324	4	1
325-349	6	1
350-374	8	3
375-399	5	...
400-424	3	...
425-449	1	...
450-474	1	...
Totals	46	39

Table 12. Stomach Contents of Gill Net Caught Fish, Lynx Lake July 1, 1980.

Food Item	Arctic Char		Rainbow Trout	
	Number of Stomachs	% of Occurrence	Number of Stomachs	% of Occurrence
Gastropods	11	24	3	8
Sockeye fry*	11	24	1	3
Threespine stickleback	5	11		
Caddis larvae	8	17	20	51
Caddis adults	2	4	7	18
Mosquito adults	...	...	5	13
Coleoptera	...	...	11	28
Hymenoptera	...	...	1	3
Terrestrial insects	...	...	3	8
Leeches	1	2	1	3
Empty	7	15	3	8
Unidentified fish	3	6	...	...
Pelecypods	2	4	1	3

* 11 char had sockeye fry in their stomachs. The number ingested were 13,3, 4, 2, 3, 3, 3, 2, 34, 7, and 1.

One rainbow trout had ingested 6 sockeye fry.

Table 13. Length Frequencies of Fishes Caught on Hook and Line from Lynx Creek on July 2, 1980.

Fork Length (mm)	Rainbow Trout	Arctic Grayling	Arctic Char
100-124	...	...	...
125-149	2	...	...
150-174	10	1	...
175-199	7	8	1
200-224	9	3	...
225-249	11	9	...
250-274	9	10	...
275-299	7	5	1
300-324	3	2	...
325-349	1	2	...
350-374	1	2	...
375-399	1	1	...
400-424	...	1	...
425-449	...	...	...
450-474	1	...	...
475-499	...	...	...
Totals	62	44	2

activities planned were either delayed or cancelled. In addition, a decision was made to transfer one position to Soldotna, Alaska, leaving only one person in the King Salmon Management Area after September 1, 1980.

No creel census for sport-caught chinook salmon in the Naknek River was conducted in 1980 due to funding constraints. The chinook run, although weak at first, increased in early July and lasted into early August. No estimates of spawning chinook salmon were made due to the poor water conditions.

Similarly, the only counts of peak spawning rainbow trout counts were made in Brooks River in the Naknek system and Lower Talarik Creek in the Kvichak drainage. Both counts were near the average when compared to the previous 7 years' data.

The relatively mild winter afforded a good opportunity to census the Upper Naknek River rainbow trout fishery particularly on large prespawning adults. Anglers followed the traditional pattern of releasing large numbers of fish. Overall, just over one rainbow trout per angler was taken for the 61 days of fishing and only 145 rainbow trout spawners were retained.

The 2-day census of Arctic grayling at Lower Ugashik Outlet produced a population structure almost identical to previous years. The mean size was indentical to 1978, and within 5 mm of 1979 year's. Several grayling over 500 mm in fork length were captured this year.

Basic surveys on five systems in the area continued to expand our knowledge of existing and potential sport fishing waters and give basis for better decisions relating to Bristol Bay.

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