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Bill Sheffield, Governor

Annual Performance Report for

INVENTORY AND CATALOGING OF SPORT FISH AND SPORT FISH WATER OF THE COPPER RIVER, PRINCE WILLIAM SOUND, AND UPPER SUSITNA RIVER DRAINAGES

by

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Job Title: Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River, Prince William Sound, and the Upper Susitna River Drainages.

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ABSTRACT

Five lakes in the Copper River drainage were investigated for Arctic grayling, Thymallus arcticus (Pallas), egg-take sites. The numbers of grayling trapped from Elbow, Three Mile and Spring Creek Lakes were inadequate for an egg take. Most of the grayling collected from Little Junction Lake had residual eggs from 1981 and the egg-take resulted in an unacceptable number of dead eggs. Males collected from Junction Lake were in poor condition and the fertilization of eggs was low.

Test-netting was conducted on seven managed lakes in the area to determine the status of fish stocks. An incomplete winter kill of grayling occurred in Arizona Lake. The grayling population in Tolsona Lake as determined by test netting, dropped to 0.33 fish per net hour. Grayling, test-netted from Dadina Lake, ranged in length from 180 to 240 mm in fork length. Scale analysis revealed that these fish ranged from Age III to Age VI. This is a strong indication of a stunted population.

Eleven previously unsurveyed lakes were test netted in 1982. All of these were in an area east of Lake Louise which has been proposed for public land disposal by the Alaska Department of Natural Resources (DNR). Ten of the lakes had fish populations which included grayling, burbot, Lota lota (Linnaeus), lake trout, Salvelinus namaycush (Walbaum), round whitefish, Prosopium cylindraceum (Pallas), and longnose suckers, Catostomus catostomus (Forster).

Eighty-five burbot were collected from Moose Lake. The fish ranged from Age IV to Age VIII. Sixty-seven percent of the total were Age VI. All but six of the burbot collected would spawn during winter 1982-83.

A cooperative study on the migration habits of steelhead trout, Salmo gairdneri Richardson, in the Gulkana River by the Bureau of Land Management, Fish and Wildlife Service and the Alaska Department of Fish and Game, was initiated in 1982. Radio transmitters were implanted in twenty-five steelhead trout, caught by fishwheel in the Copper River in September. As of December 16, 1982, 6 of the steelhead trout moved into the Gulkana River, 7 migrated up the Tazlina River, 4 of the fish remain in the Copper River and 8 cannot be located.

Lengths of 130 round and humpback whitefish, Coregonus pidschian (Gmelin), taken by the sport fishery in the Slana River were recorded. The average fork length of 366 mm was only 9 mm more than the average of fish collected in the 11 previous years. There is no significant difference in the size of whitefish taken since 1969.

Chinook salmon, Oncorhynchus tshawytscha (Walbaum), aerial escapement counts in the Copper River Basin were 1,569 and 1,260 fish for the Gulkana River and East Fork Chistochina River, respectively. These are the highest escapement counts ever recorded. The commercial catch of 49,162 Copper River chinook salmon was also the highest on record.

Stream surveys were again conducted on streams in eastern Port Valdez. The total count of 10,869 adult coho salmon, Oncorhynchus kisutch (Walbaum), was the highest recorded. Only 1,709 pink salmon, Oncorhynchus gorbuscha (Walbaum), were counted which reflects the low even-year returns common to these streams.

In 1982, length data were collected from 307 sport-caught grayling from the Gulkana River. The average 1982 length of grayling was 272 mm, as compared to the weighted average length of 274 mm for 718 grayling collected from 1968 through 1981. The maximum size of grayling taken in the sport fishery has diminished approximately 40 mm in fork length since 1968.

KEY WORDS

Steelhead trout, Gulkana River, Arctic grayling, chinook salmon, Copper River, Valdez, burbot, whitefish, Habitat Protection, coho salmon, telemetry.

BACKGROUND

The Copper River Basin, upper Susitna River drainage and northeast Prince William Sound areas are typical of many within the State because recreational angling opportunity is provided by a number of anadromous species as well as by indigenous, stocked lake, and stream-dwelling fishes.

The majority of angling pressure is on waters adjacent to the highway system. This area, including the Copper River Basin, upper Susitna River Basin, Cordova, eastern Prince William Sound and Valdez, has over 650 miles of the Alaska Highway system within its borders. A map of the study area is presented in Figure 1.

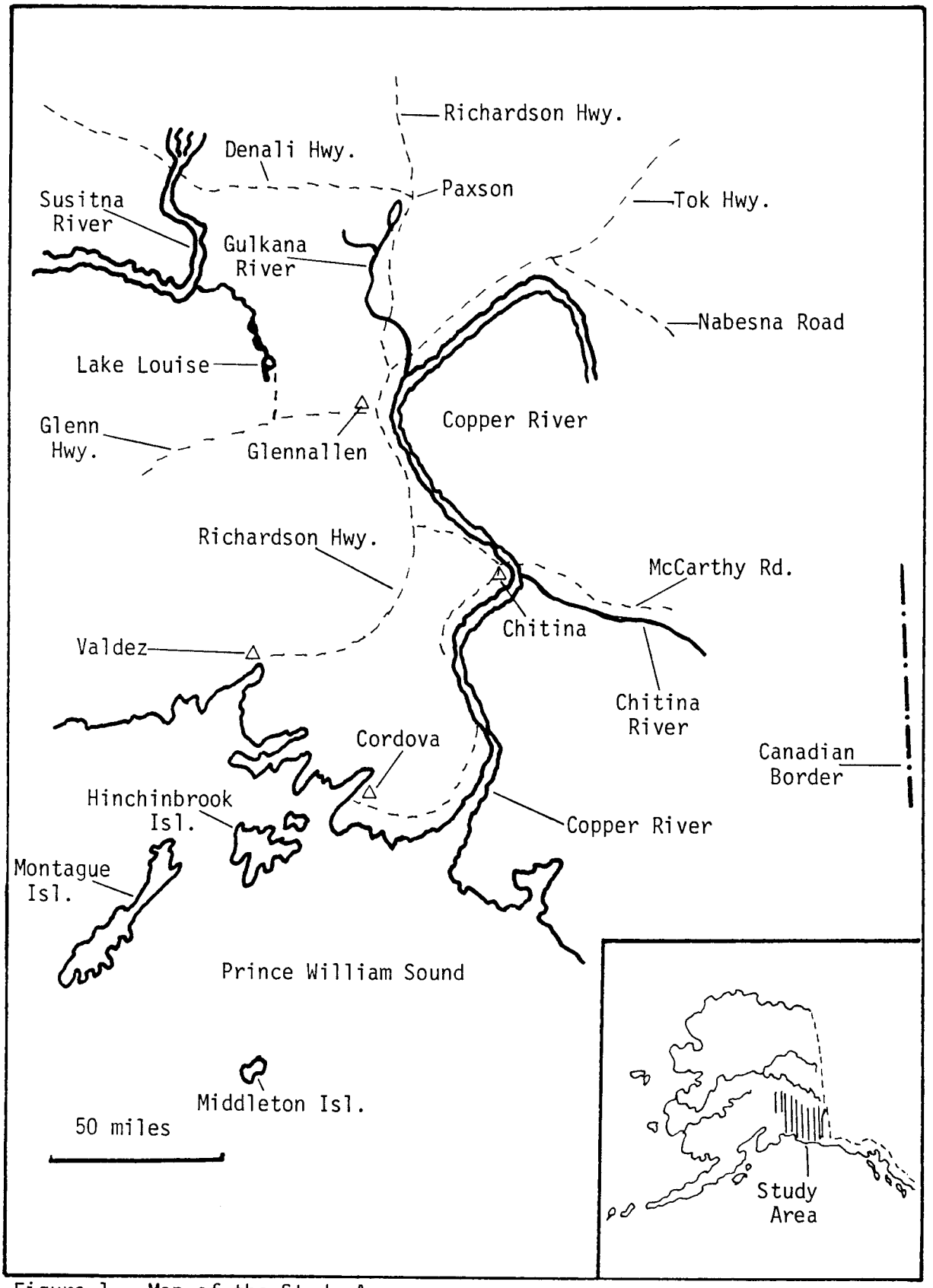

Figure 1. Map of the Study Area.

The principal lake-dwelling species caught by recreational anglers in the Copper River Basin are the indigenous species (burbot, lake trout and Arctic grayling) and the introduced species (coho salmon and rainbow trout). The stream-dwelling species most often taken by sport anglers are: grayling, Dolly Varden, rainbow trout, chinook and sockeye salmon.

Fishing within the Cordova (Prince William Sound) area is primarily commercially oriented. Access to this area is only by boat or aircraft. Sport fishing effort in saltwater is light and primarily for coho salmon, chinook salmon and halibut. Freshwater angling is directed toward coho salmon, cutthroat trout, sockeye salmon, Dolly Varden and stocked grayling.

A significant increase in sport fishing effort is not anticipated until access to and within the area improves, except for the Eyak River where the fishing effort for coho salmon increased 50% during the 1979-1980 period. The limited Cordova area road system (approximately 60 miles in length) affords access to several lakes and streams with grayling, cutthroat trout and coho salmon populations.

Most of the recreational angling opportunities in the Valdez area are provided by saltwater fisheries directed toward anadromous species, including pink salmon, chum salmon, coho salmon, and bottom fish. All freshwater drainages into Valdez Arm are closed to salmon fishing but Dolly Varden are taken in fair numbers.

It is expected Valdez will continue to grow and become more industrialized in the future. The present human population of Valdez is estimated to be 4,000 people. The trend in growth may have a detrimental effect on the fisheries. Suitable land for homes and businesses is limited in the Valdez area, and already there are trailer courts and housing projects adjacent to or bisected by salmon spawning and rearing streams. Spawning and rearing areas for fish may be reduced in area, polluted and, possibly, the ground water supplies adversely affected. Increases in human population often result in additional harassment of spawning salmon, and increased monitoring of the fish stocks may be necessary. Presently the fish stocks are in good condition and there appears to be no need for more restrictive angling regulations at this time. Construction of a private nonprofit hatchery is expected to be operational in 1983 for the production of pink and chum salmon fry and coho salmon smolts.

The land disposal program conducted by DNR has made large tracts of land in the study area available for private ownership. Much of this land borders lakes and streams which support, or have the potential to support fish. Retention of lands for public recreation and access has become a very important facet of fisheries investigation in the area.

Activities reported in the following text are directed to the research and subsequent management needs of these species, as well as toward the attainment of desirable levels of angler utilization. The species of fish discussed in this report are listed in Table 1.

Table 1. List of Common Names, Scientific Names and Abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Pink salmon	Oncorhynchus gorbuscha (Walbaum)	PS
Chinook salmon	Oncorhynchus tshawytscha (Walbaum)	KS
Chum salmon	Oncorhynchus keta (Walbaum)	CS
Coho salmon	Oncorhynchus kisutch (Walbaum)	SS
Sockeye salmon	Oncorhynchus nerka (Walbaum)	RS
Lake trout	Salvelinus namaycush (Walbaum)	LT
Rainbow trout	Salmo gairdneri Richardson	RT
Burbot	Lota lota (Linnaeus)	BB
Longnose sucker	Catostomus catostomus (Forster)	LNS
Arctic grayling	Thymallus arcticus (Pallas)	GR
Round whitefish	Prosopium cylindraceum (Pallas)	WF
Humpback whitefish	Coregonus pidschian (Gmelin)	WF
Slimy sculpin	Cottus cognatus Richardson	SSC
Dolly Varden	Salvelinus malma (Walbaum)	DV
Cutthroat trout	Salmo clarki Richardson	CT
Halibut	Hippoglossus stenolepis (Schmidt)	H
Lamprey	Lampetra tridentatus (Gairdner)	L

RECOMMENDATIONS

1. The study of anadromous fish stocks in the upper Copper River drainage and Prince William Sound should be continued to determine run timing and magnitude.

2. Monitoring of seismic activities, road and bridge construction, pipeline maintenance and other land uses should be continued to afford maximum protection to the fishery resource and habitat.

3. Continued evaluation should be made of experimental fish stocking to determine the species and strains of fish suited for individual lakes. This can be done by comparing the survival and growth of various strains of rainbow trout, coho salmon and grayling.

4. Cataloging and inventory surveys should be continued on a limited basis as required to increase our knowledge of the fisheries resources in the area, provide more fishing opportunities for the angler and use as a guide in recommending lands to be reserved for public recreation.

5. Investigations of grayling in the Gulkana River should be continued to determine age-length composition of sport-caught fish and any deterioration of the fishery.

6. Investigations of waters in the Valdez area should continue as required to determine the feasibility of proposed rehabilitation and/or enhancement programs of salmon stocks. Cooperative work with the Valdez Fisheries Development Association (VFDA) should be continued.

7. A creel census of coho salmon anglers on Eyak River should be conducted. According to the Statewide Harvest Study, fishing effort increased 50% from 1979 to 1980. Escapement counts should be correlated with creel census data.

8. A creel census program should be initiated for the Valdez area when funds are available. Preferably, the census should be conducted during an odd year, since the pink and chum salmon runs are much larger in those years. The last two creel census programs were conducted during even (low run) years.

9. Monitoring of the whitefish fishery in the Slana River should be continued to determine size composition of the catch and any apparent changes in condition of the resource.

10. Limnological studies on selected lakes in the area should be continued to complement the studies of stocked fish survival and growth, and to determine the potential for successful establishment of additional sport fisheries.

11. The cooperative study of steelhead trout in the Copper River/ Gulkana River drainage should be continued to determine spawning and rearing areas, relative abundance, stock identification and migratory timing.

OBJECTIVES

1. To determine the magnitude of various fish stocks and develop plans for their enhancement.

2. To determine stocking measures, formulate recommendations for the management of area waters and direct the course of future studies.

3. To determine the environmental characteristics of the existing and potential recreational fishing waters of the job area and, where practical, obtain estimates of the sport fish harvest and angler participation rates.

4. To determine the effects of proposed construction programs on fisheries and fisheries environment and assist in determining the current status of public access and access needs to the recreational fishing waters.

TECHNIQUES USED

Standard techniques described by Williams (1971) were used in lake and stream surveys and for collecting fish samples. Each test netting was conducted for a minimum of 16 hours, including an overnight period. Salmon enumerations were made from aircraft and on foot. All measurements of fish length were from snout to fork of tail. Fyke nets were also used for fish collection.

Both conventional fishing gear as well as spears were used to collect grayling from the Gulkana River and whitefish from the Slana River for age and growth studies. During the steelhead trout investigations, MS 222 was used for anesthetizing the fish. High frequency radio transmitters (150 MH_Z), designed by Telonics, Inc., were used. Twenty-three of the transmitters used measured 3/4 inch in diameter and 2-1/2 inches long. These have a 10 inch antenna that extends out of the transmitter but is within the body cavity of the fish. Two other transmitters were used that were 3/4 inch in diameter and 5 and 6 inches long, respectively. The antenna were sealed in with the transmitters. A Telonics receiver was used when searching for the transmitter signals. Fishwheels were used to capture the steelhead trout.

Winter dissolved oxygen concentrations were determined by using a standard Hach field kit. Water temperatures were taken with a Heath Kit Thermo Spotter.

FINDINGS

Grayling Egg-Take Investigations

During May 1982, five lakes in the area were investigated for their potential as grayling egg take sites. The lakes were Junction, Little Junction, Elbow, Three-Mile and Spring Creek. Fyke nets and gill nets were used to

capture fish. The lakes were fished during and immediately after breakup. These lakes were selected because of accessibility and suitable grayling populations based on test netting and trapping.

During fyke net-trapping in Junction Lake, 1,174 grayling were caught; however, all but 167 were Age I fish. In 1981, 316 adult grayling were trapped with fyke nets. Only 41 female grayling were used for taking eggs because the male fish were in poor condition and had very little milt. Some of the fish were held in the live cars for 7 days, which may have contributed to the deterioration of the males. Because of the poor condition of the males, the fertilization rate of the eggs was very low.

One hundred twenty-six of the 167 mature grayling taken had been marked by removal of a fin in 1981. The total number marked in 1981 was 309. The recovery of 42% of the grayling marked in 1981 indicates the trapping methods were quite effective in Junction Lake. As many as five fyke nets were fished in this 18-acre lake simultaneously. Seventy-five percent of the grayling trapped in 1982, excluding Age I fish, were marked fish. This would indicate a low population of adult fish in the lake. The lake is located adjacent to the Lake Louise Road and receives relatively heavy fishing pressure.

Junction Lake has been stocked with grayling almost every year since 1966, except 1978-1980 when no grayling fry were available. It is apparent that lakes of this size, which are very accessible to anglers, must be stocked on an annual basis to maintain an acceptable population. This lake will not be trapped again until 1984 and 1985 when the grayling stocked in 1981 will be mature. A total of 230,000 eggs were taken from Junction Lake but, because of poor fertilization, were eventually destroyed.

Little Junction Lake was barren of fish when it was first stocked with grayling in 1978. This 5-acre lake is located about 1/4 mile south of the Glenn Highway and has no inlets or outlets. Fyke traps were used in the lake and 531 Age IV grayling were caught. Most of the females had apparently matured in 1981, and these eggs, plus the 1982 eggs, were still in the fish. Also some of the females had developed "egg plugs" which made it very difficult to strip the fish. Because of these two factors many of the eggs stripped were dead. The males were in poor condition and very little milt could be extracted. An estimated 232,000 eggs were secured from the grayling but because of the large number of dead eggs the entire lot was destroyed. It is not uncommon to find fish carrying more than one year's production of eggs, but this is the first time Sport Fish biologists (Williams, pers. comm.) have encountered this situation with almost every female grayling.

The bottom is composed of several feet of mud and detritus. There are no exposed gravel areas. The lack of any potential spawning areas may have been a contributing factor in egg retention. This lake will probably not be used for an experimental egg take site again.

Elbow Lake, adjacent to the Lake Louise Road, was fished 1 night with two fyke nets. The nets caught 171 Age I grayling. No adult grayling were taken. A small outlet is present and some spawning and fish interchange

may take place downstream. No future trapping was conducted. This lake was last stocked in 1978.

Three Mile Lake is 20 acres in size and located adjacent to the Edgerton Cut-Off near Chitina. Test-netting in 1978 and 1981 caught grayling at a rate of 3.54 and 3.31 fish per hour, respectively. Because this indicated a relatively high abundance of grayling, the lake was selected as an experimental egg take site. Two fyke traps were fished for 4 days and caught only 63 grayling and 27 rainbow trout. The trapping was discontinued because of the low catch.

Spring Creek Lake was selected for an experimental grayling egg take investigation in 1982. Because the lake is located 1.5 miles from the Glenn Highway, it receives very little fishing pressure. Two fyke nets were fished for 84 hours and only five grayling were taken. An experimental gill net was then fished overnight and caught 10 grayling. Trapping was then discontinued.

Netting and trapping in the five lakes were conducted just as the ice was going out. In some cases, drifting ice did interfere with trapping operations. Experience has shown that this is the time when grayling move into tributaries or move in schools around the shoreline seeking spawning areas. The most commonly used tool for determining relative fish populations is the experimental variable mesh gill net. The variables inherent in the utilization of gill nets are obvious, and it is the most expedient method available. Visual observations of fish are also a valuable tool but the data are only good for a particular time in history. Because of these factors, many of the grayling egg take investigations are necessary on a trial-and-error basis.

Population Sampling--Managed Lakes

Test netting was conducted on seven managed lakes in the area to determine the condition of fish stocks (Table 2). Arizona Lake was test-netted in 1982 following reports of a winter kill. Anglers reported seeing numerous dead grayling in the lake after ice-out. Unfortunately these reports were made 2 weeks after the dead fish were seen. Visual observations were conducted and only two dead grayling were found, however, birds and mammals could have cleaned up any concentration of dead fish. Test-netting caught only four grayling for a net frequency of 0.08 fish per hour. Test-netting conducted as long ago as 1971 caught grayling at a much higher rate. Winter dissolved oxygen concentrations in Arizona Lake are relatively low and one other winter kill was recorded in the winter of 1970-1971. The lake will be restocked since it is a popular fishing site in this area. The last time the lake was stocked was in 1977 and evidence of natural reproduction has been established from test net catches since then. Stocking of the lake will accelerate the process of establishing a fishable grayling population.

Test-netting in Tolsona Lake indicates a decline in the grayling population since 1979 when the net frequency dropped below 1.0 fish per net hour. In 1982, the test net frequency was 0.33. Grayling were last stocked in 1981 and should have shown up in the test net catches. Winter 1981-82 dissolved

Table 2. Gill Net Summary of Previously Surveyed Lakes, Copper River Drainage, 1982.

Name	Location	Number of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Arizona	T8N R7W S11	4	GR	230-250	240	.08	100
Buffalo	T3N R7W S23	54	RT	115-220	173	1.13	100
Dadina	T1N R3E S25 & 26	149	GR	180-240	207	7.45	100
Gillespie	T12N R1W S30	83	GR	***	***	2.13	84
		11	LNS			.28	11
		3	WF			.08	3
		2	BB			.05	2
Moose	T4N R5W S13 & 14	103	GR	160-355	224	2.15	57
		74	LNS	90-400	282	1.54	41
		2	RT	255-350	303	.04	01
		1	BB	550	550	.02	1
Spring Creek Lakes	T12N R1W S4	10	GR	***	***	.50	100
Tolsona	T4N R5W S24	16	GR	200-360	230	.33	19
		70	LNS	210-445	360	1.46	81

* Species
GR - Grayling
RT - Rainbow
LNS - Longnose sucker
WF - Whitefish
BB - Burbot

** Frequency is the number of fish per net hour.

*** Data not collected.

oxygen tests revealed a concentration of 4.0 ppm which is above the 1963-1981 range of 3.0 ppm. Very few grayling were observed on the spawning grounds in Bessie Creek, the only permanent inlet.

Gillespie Lake was test netted in 1982 to secure grayling for pathological examination. The net frequency was 2.13, which is very similar to the 2.4 fish per net hour obtained in 1961. Gillespie Lake probably does not overwinter fish because it is shallow (10 feet) and winter DO's are below 1.0 ppm. Grayling apparently move upstream into Gillespie Creek and Gillespie Lake from Spring Creek and the Gakona River. If manpower and time permits, a trap will be installed in Gillespie Creek next spring as part of an experimental grayling egg take.

Moose Lake, tributary to Tolsona Lake, has been test-netted 19 times during the summer since 1960. Excluding the test-netting following the winter kill in 1971 when no grayling were taken, the catch per net hour has ranged from 0.21 to 5.54 grayling and averaged 2.12. In 1982, the net frequency for grayling was 2.15. Eggs were taken from grayling captured in Our Creek (primary inlet stream) in 1968 and 1969 (Williams, 1970). Grayling egg takes were discontinued after that because few adult grayling were trapped in the creek. In 1981, the trap in Our Creek was fished for 6 days and only 35 grayling were captured. If conditions permit this trap will be operated in 1983, plus a trap in the outlet and fyke nets at two locations along the lake shore. The test-netting indicates a good population of grayling in the lake.

Dadina Lake was test-netted in 1982 and 149 grayling were caught. These fish ranged in fork length from 180 to 240 mm and averaged 207 mm. The net frequency was 7.45 fish per net hour. An examination of 15 females revealed they were all mature. A cursory examination of several scale samples from grayling ranging in fork length from 190-230 mm indicated the grayling were Age III to Age VI. In comparison, 230 mm grayling from the Gulkana River would be Age II.

The high frequency, visual observations and condition of the fish strongly suggest an overpopulation situation of Dadina Lake. Although the lake has no permanent inlets, temporary ones may run long enough in the spring to allow for egg deposition and hatching. Also there may be some beach spawning.

Population Sampling--New Lakes

In 1981, the Alaska Department of Natural Resources (DNR) nominated two townships (46,080 acres) of public land east of Lake Louise for transfer to private ownership. There are a large number of lakes in the area, but, survey data were available only a few of them. An aerial survey was conducted in 1982 to determine which lakes appeared to have potential for supporting fish populations. Following this, 11 lakes were chosen for on-the-ground investigations which included population sampling.

Ten of the 11 lakes surveyed had populations of grayling, burbot, whitefish and longnose suckers (Table 3). Only one lake was barren of fish. Roberta Lake also had lake trout present.

Table 3. Gill Net Summary of Previously Unsurveyed Lakes, Copper River Drainage, 1982.

Name	Location	Number of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Lake Louise East #1 (Roberta)	T6N R6W S3	115	GR	110-370		2.47	92
		9	LT	420-700		0.19	7
		1	BB	750		0.02	1
Lake Louise East #2	T6N R6W S3	2	GR	420	420	0.04	50
		2	BB	400-480	440	0.04	50
Lake Louise East #3	T7N R6W S34	0					
Lake Louise East #4 (Micki)	T7N R6W S28	55	WF	230-290		1.12	42
		41	GR	120-330		0.84	31
		33	LNS	160-430		0.67	25
		3	BB	210-650		0.06	2
Lake Louise East #5	T7N R6W S33	44	GR	120-275		1.02	54
		35	WF	275-430		0.81	43
		2	BB	390-410	400	0.05	2
		1	LNS	240		0.02	1
Lake Louise East #6	T7N R6W S28	18	GR	140-300		0.47	38
		15	LNS	185-510		0.39	32
		13	WF	200-420		0.34	28
		1	BB	420		0.02	2
Lake Louise East #7	T7N R6W S17	45	LNS	330-430		1.07	71
		9	WF	165-290		0.21	15
		7	GR	130-195		0.16	11
		2	BB			0.05	3

Table 3 (cont.). Gill Net Summary of Previously Unsurveyed Lakes, Copper River Drainage, 1982.

Name	Location	Number of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Lake Louise East #8	T7N R6W S9	50	WF	115-260		1.31	78
		13	LNS	300-440		0.34	20
		1	BB	360		0.03	2
Lake Louise East #9	T7N R6W S7	43	WF	190-300		1.02	66
		12	LNS	110-430		0.29	18
		9	GR	130-260		0.21	14
		1	BB	---		0.02	2
Lake Louise East #10	T7N R6W S3	35	WF	210-270		0.88	58
		13	LNS	200-450		0.33	22
		8	GR	175-220		0.20	13
		4	BB	230-470		0.10	7
Lake Louise East #11	T7N R7W S1	54	LNS	360-470		1.32	52
		42	WF	170-380		1.02	40
		6	GR	210-300		0.15	6
		2	BB	500		0.05	2

* Species
WF = Whitefish
BB = Burbot
GR = Grayling
LT = Lake trout
LNS = Sucker

** Frequency is the number of fish per net hour.

The lakes range in size from 30 to 150 surface acres, and in depth from 14 to 38 feet in depth (Table 4). These are typical muskeg type lakes and most of them have at least 50% shoal area (depths less than 15 feet).

After the surveys were completed, public use sites and access trails for this area were requested from DNR prior to public disposal. These lakes are 3 to 7 miles from Lake Louise and are presently accessible only by aircraft or ATV's.

Burbot--Moose Lake

Moose Lake, located approximately 1 1/2 miles north of Mile 179 Glenn Highway, has supported a population of burbot and grayling since at least 1960. In 1964 and 1965, rainbow trout and coho salmon were introduced. The lake has a surface area of 320 acres and a maximum depth of 24 feet.

Sport fishing effort on Moose Lake has been moderate to light in comparison to other lakes in the area. This may be because summer access requires approximately 1 mile of walking. During the winter this lake is accessible by snowmachine and four-wheel drive vehicle. Winter fishing for burbot has been light until 1982, when approximately 75 set lines were observed during a field trip. During November 1982, 85 burbot were collected from Moose Lake using set lines baited with pieces of whitefish. The fish were measured, sexed and aged. The results of otolith examinations are shown in Table 5.

The 85 burbot caught and measured in 1982 from Moose Lake averaged 588 mm in length. In 1968, 21 burbot taken from Moose Lake averaged 496 mm and 75% were Age V (Williams, 1969). In 1982, Age V fish made up only 15% of the catch. The majority (67%) of those taken in 1982 were Age VI fish.

During the winter of 1970-71, there was a heavy winter kill of fish in Moose and Tolsona lakes. Sport fishing efforts on Moose Lake dropped to a very low level following the winter kill. No burbot were caught in test nets from Moose Lake until 1978. Sport fishing efforts during the winter from 1975 through 1980 were not successful for burbot. The winter kill of fish in Tolsona Lake in 1970-71 was not nearly as severe, and burbot have been taken with test nets and sport fishing since that time. Moose and Tolsona lakes are connected by a 1,500-foot stream which normally flows all summer. Occasionally burbot are seen in the stream but apparently recruitment of burbot into Moose Lake from Tolsona Lake is not extensive.

From the data collected in 1968, it was determined that most burbot were sexually mature by Age V. Eighty-three burbot caught in 1982 were examined for sexual maturity, and the condition of the gonads indicated that 77 of the 83 burbot would spawn in the late winter of 1983. The six fish that were immature were Age IV (N = 1), Age V (N = 2) and Age VI (N = 3).

Assuming that the otoliths were correctly interpreted, there is a considerable difference in the growth rate of individual fish within an age class.

The 13 Age V burbot varied in length 115 mm and the 57 Age VI fish varied 175 mm in length. The Age V burbot collected from Moose Lake in 1968 varied 155 mm in length.

Table 4. Physical and Biological Data from Previously Unsurveyed Lakes in the Copper River Drainage 1982.

Lake	Surface Area Acres	Maximum Depth (ft.)	Percent of Shoal Area	Fish Species* Present	Location by Drainage
Lake Louise East #1 (Roberta)	120	38	55	LT, GR, BB	Tolsona Creek
Lake Louise East #2	80	25	70	GR, BB	Tolsona Creek
Lake Louise East #3	30	15	95	None	Tolsona Creek
Lake Louise East #4 (Micki)	150	30	75	GR, WF, BB, LNS	Tolsona Creek
Lake Louise East #5	70	30	25	GR, WF, BB, LNS	Tolsona Creek
Lake Louise East #6	30	38	20	GR, WF, BB, LNS	Tolsona Creek
Lake Louise East #7	40	25	70	GR, WF, BB, LNS	Tolsona Creek
Lake Louise East #8	80	25	70	BB, WF, LNS	Tolsona Creek
Lake Louise East #9	70	25	50	GR, WF, BB, LNS	Tolsona Creek
Lake Louise East #10	80	25	40	GR, WF, BB, LNS	Tolsona Creek
Lake Louise East #11	90	14	100	GR, WF, BB LNS	Tolsona Creek

* Species
BB = Burbot
GR = Grayling
WF = Whitefish
LT = Lake trout
LNS = Longnose sucker

Table 5. Age-Length of Moose Lake Burbot, November 1982.

No. of Fish	Age	Length Range (mm)	Ave. Length (mm)	% of Catch
3	IV	490-520	498	4
13	V	465-580	534	15
57	VI	490-665	573	67
2	VII	625-770	698	2
10	VIII	690-840	753	12

During test-fishing for burbot in 1982, 30 set lines were used and checked every 24 hours. Approximately 75% of the lines had fish each time they were checked. This high catch rate indicates a good population of burbot in the lake.

Moose Lake has never been noted for producing large, older fish. In 1968, only one burbot out of the 21 examined was older than Age V and, in 1982, only 14% (N = 12) of the burbot collected were older than Age VI. Thirty-eight sport-caught burbot from Hudson Lake in 1974 (Williams, 1975) ranged from Age VII to Age XVI and averaged slightly older than Age X. At the same time, the sport-caught burbot from Moose Lake averaged Age VI+.

The reason for the larger fish in Hudson Lake is unknown. Both lakes have grayling and suckers present; however, Hudson Lake also supports a whitefish population. Hudson Lake is deeper (51 feet) and larger (640 acres) than Moose Lake. Winter dissolved oxygen determinations are higher in Hudson Lake. Since 1964, there have been seven different winters when dissolved oxygen concentrations in Moose Lake have been less than 3.0 ppm. It is conceivable that partial winter kills of fish in Moose Lake occur more frequently than previously thought and go undetected.

Steelhead Study - Gulkana River

An interagency agreement between U.S. Department of Interior's Fish and Wildlife Service and U.S. Bureau of Land Management initiated a study of steelhead trout in the Gulkana River, a tributary to the Copper River. The Division of Sport Fish, Alaska Department of Fish and Game was consulted and asked to participate in all phases of this study.

In September 1982, three fishwheels with live boxes were deployed in the Copper River for the purpose of capturing steelhead trout. Fishwheel No. I was located 12 miles below the confluence of the Gulkana and Copper Rivers, while fishwheel No. II was an additional 1 mile downstream. Fishwheel No. III was 20 miles downstream of the confluence of the Gulkana and Copper Rivers and approximately 4 miles below the confluence of the Tazlina and Copper Rivers (Figure 2). An attempt was made to drift a section of small mesh gill net through sections of the Gulkana River. High winds and low water hampered the netting and this procedure was terminated.

The fishwheels fished for 20 days resulting in the capture of 32 steelhead trout plus coho, sockeye and chinook salmon, Arctic grayling, burbot, longnose sucker and Pacific lamprey. Between September 10 and September 29, 25 steelhead were anesthetized and surgically implanted with high frequency radio transmitters (150 MH_Z). Telonics, Inc., of Mesa, Arizona designed the transmitters which are to emit signals at different frequencies for up to 1 year. At the time of the intraperitoneal implant, transmitters were checked from shore. Tracking efforts with a Telonics scanning receiver and directional antenna have been conducted from a jet boat and airplane. Aircraft flights were made weekly during the first month and monthly after that to determine the location of the fish. Boat tracking was terminated because of cost.

For record keeping purposes, the mouth of the Gulkana River is Mile 0 from the confluence of the Copper and Gulkana Rivers (Gulkana + or - mileage),

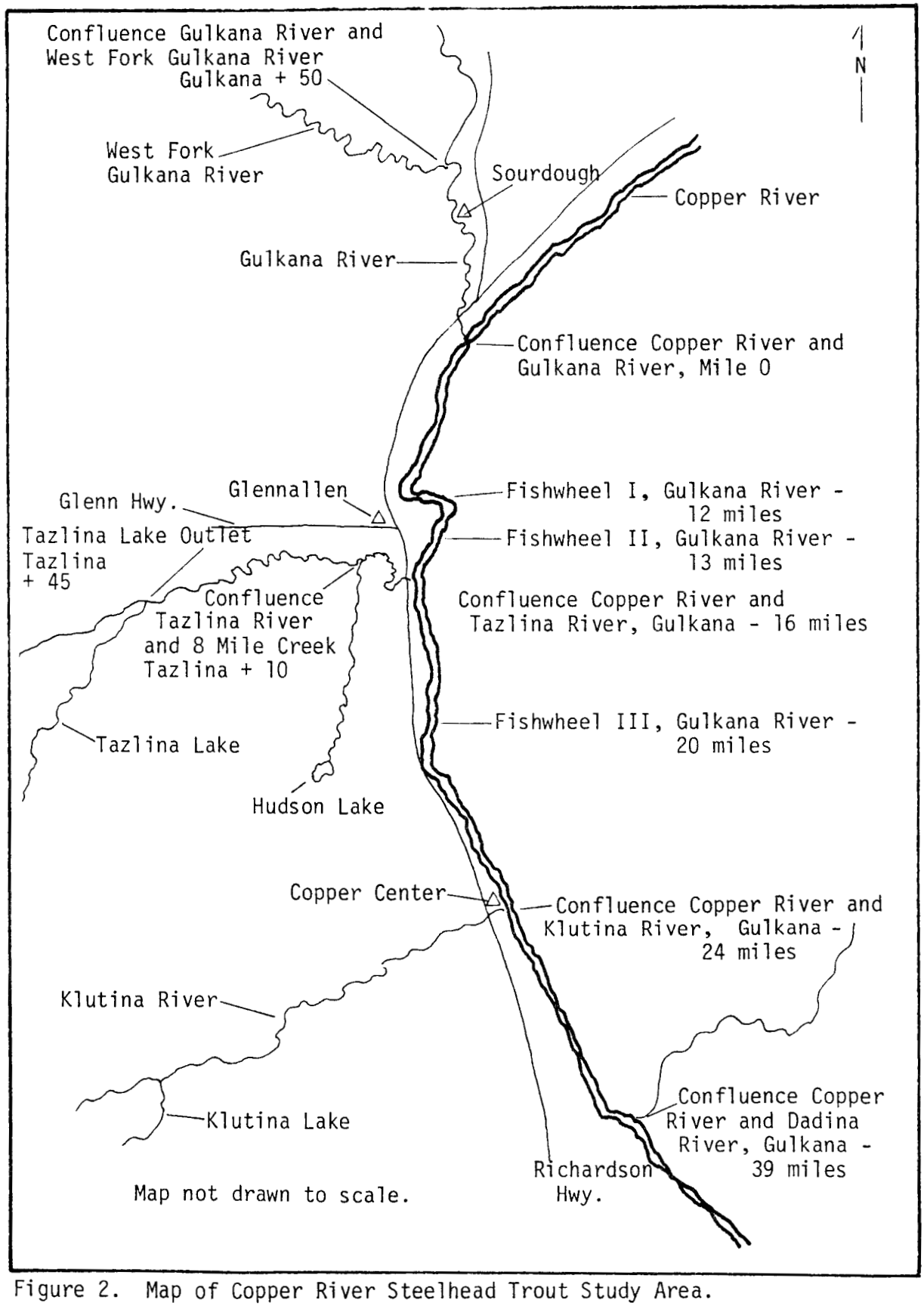

Figure 2. Map of Copper River Steelhead Trout Study Area.

while the confluence of the Tazlina and Copper Rivers is Mile 0 for the Tazlina system (Tazlina + or - mileage). To date, four steelhead remain in the Copper River. Six steelhead have moved upstream into the Gulkana River and seven have moved into the Tazlina River system. It is notable to observe all seven fish in the Tazlina system were originally captured in Fishwheel III. Eight radio-tagged fish have been lost. This lost signal is attributed to movement into unmonitored waters or transmitter deficiency. Fish No. 13 (Table 6) has moved upstream in the Tazlina River 10 miles to Eight Mile Creek, then upstream 1 mile in Eight Mile Creek. Historically, steelhead trout were fished in Eight Mile Creek (Johns, pers. comm., 1982) so this geographic movement was not unexpected. However, timing is notable because it is the only fish movement out of a major river system into a tributary to date. Steelhead #10 and #14 moved up the Tazlina River and entered Tazlina Lake, then dropped back downstream into its outlet area. Fish #17 has moved upstream, the farthest in the Gulkana River system, and is holding at the confluence with the West Fork of the Gulkana River.

At tagging time, scale samples (N= 29) were collected for aging. The European technique of recording ages was used; ages are presented in Table 7.

The population consists of four age classes including three age classes of repeat spawners. The dominant age class of sampled Copper River steelhead are Age 3.2 fish, of which 82% are females. This dominance of Age 3.2 female steelhead is in accordance with findings in the Anchor River Steelhead Trout Study (Wallis, pers. comm., 1983). Sex of Age 3.2 fish is unknown and one is a repeat spawning male. Thirty-one percent of the sampled population had regenerated nucleus, therefore freshwater age is unknown.

Slana River Whitefish Fishery

Whitefish samples have been collected from the Slana River since 1964. Traditionally whitefish are speared at night using lanterns for visibility. This spear fishery occurs during October when the glacial waters clear and the fish begin to spawn. The population consists of both round and humpback whitefish. There is no apparent size differential between the species, therefore they are classified together.

Access to the Slana River changed from public to private ownership in 1980 as a result of the Alaska Native Lands Claim Settlement Act. Prior to 1980, this fishery enjoyed considerable sport fish participation; however, effort has declined. Previous high usage of the Slana River fishery generated fears of excess harvest, but during 2 nights of spear fishing in 1982 only 10 other sport anglers were observed. Fishing conditions were good both nights and numerous fish were observed.

In 1982, the average length of 366 mm is an increase of only 9 mm over the previous 11-year sampling average. A length comparison of sport-speared whitefish taken from the Slana River near Mentasta from 1964 through 1982 is shown in Table 8. The data indicate that the fishery is still in good condition and present harvest rates are not detrimental.

Table 6. Copper River Drainage Steelhead Trout Radio Tag and Migration Data, 1982.

Fish No.	Fork Length (mm)	Sex	ADF&G Soldotna Green Peterson Disc Tag #	Radio Frequency	Capture/Release Date	Fishwheel Capture/Release Site*	Tracking Results on 12/16**
1	690	F	A-077	150.207	9/10	II	Signal lost
2	770	M	A-073	150.396	9/11	III	Tazlina +10
3	690	F	A-082	151.812	9/11	II	Signal lost
4	750	F	A-199	151.823	9/11	II	Gulkana + 4.5
5	660	F	A-090	151.833	9/12	II	Gulkana + 11.5
6	710	F	A-092	151.714	9/14	I	Signal lost
7	735	F	A-192	150.226	9/14	II	Gulkana + 44 1/4
8	680	F	A-197	150.326	9/18	III	Signal lost
9	685	M	A-195	150.346	9/18	III	Gulkana - 16.5
10	640	F	A-193	150.913	9/19	III	Tazlina + 45
11	620	Unk.	A-194	150.943	9/19	III	Gulkana - 18.5
12	720	Unk.	A-162	151.369	9/20	III	Tazlina + 8.5
13	546	M	A-163	151.464	9/20	III	8 Mile + 1
14	750	F	A-164	151.408	9/20	III	Tazlina + 46
15	655	F	A-165	151.388	9/20	III	Tazlina + 26.5
16	700	F	A-166	150-934	9/20	III	Tazlina + 21
17	743	F	A-183	151.429	9/21	II	Gulkana + 49.5
18	650	F	A-196	151.453	9/27	I	Signal lost
19	695	F	A-167	151.417	9/27	I	Signal lost
20	700	F	A-168	151.473	9/27	I	Gulkana + 13.5
21	760	M	A-169	151.379	9/27	I	Gulkana + 28.5
22	810	F	A-170	151.483	9/27	I	Gulkana - 34
23	665	F	A-173	150.923	9/29	II	Gulkana - 32.5
24***	635	M	A-179	150.456	9/29	III	Signal lost
25****	645	M	A-172	150.514	9/29	III	Signal lost

* See Figure 2.
** Most current field observation.
*** 5" experimental radio.
**** 6" experimental radio.

Table 7. Summary of Age Composition and Lengths of Copper River Drainage Steelhead Trout Tagged in 1982.

Age Class	Number	Fork Length (mm) Mean	Range
First Time Spawners			
Males:			
3.1	1	645	0
4.1	1	635	0
Females:			
3.2	13	691	620-750
3.3	1	690	0
Sex Unknown			
3.2	2	699	699
Repeat Spawners			
Males:			
3.1S	1	810	0
Unknown Sex			
3.1S1	1	720	0
First Time Spawners Unknown Ages Caused by Regenerated Nucleus			
Male:			
R.1	1	546	0
R.2	1	760	0
Females:			
R.2	3	683	655-700
Sex Unknown:			
R.1	2	Unknown	0
R.2	1	Unknown	0
Repeat Spawners Unknown Ages Caused by Regenerated Nucleus			
Males:			
R.1S	1	770	0

Table 8. Length Data of Slana River Whitefish*.

Date	No.	Fork Length Length Range	Average
10/22/64	28	292 - 348 11.5" - 13.7"	320 mm 12.6"
10/19/69	55	235 - 446 9.25" - 17.5"	353 mm 14"
10/12/72	50	320 - 430 12.5" - 17"	368 mm 14.5"
10/16/74	12	242 - 413 9.5" - 16"	380 mm 16.25"
10/21/75	101	283 - 423 11" - 16.5"	346 mm 13.5"
10/13/76	102	250 - 430 10" - 17"	347 mm 13.5"
10/14/77	25	330 - 470 13" - 18.5"	370 mm 14.5"
10/10/78	13	311 - 381 12" - 15"	359 mm 14"
10/19/79	41	270 - 395 10.5" - 15.5"	349 mm 13.75"
10/13/80 10/25/80	144	280 - 490 11" - 19"	368 mm 14.5"
10/02/81 10/16/81 (5 sample nights)	262	340 - 480 13 3/8" - 18 3/4"	370 mm 14.5"
10/08/82 10/18/82	130	285 - 425 11" - 16.6"	366 14.25"

* These measurements were taken from fish harvested by sport fishermen using spears. The dates listed are not necessarily those when the fish were most abundant.

Chinook Salmon Escapement

Weather and water conditions during 1982 were generally favorable for aerial salmon surveys in the Copper River Basin. Table 9 shows the counts of index streams and a comparison to previously collected data.

The 1982 counts definitely showed an increase in the number of adult chinook salmon returning to the spawning areas. The commercial catch of Copper River chinook salmon was 49,162 in 1982, which was the highest ever recorded. The count made of East Fork Chistochina River, 1,260, was almost twice as high as any previously recorded. The Gulkana River count was also the highest recorded.

Three of the index streams shown in Table 9 are not subject to sport fishing harvest because of inaccessibility or regulation. Until about 5 years ago the Gulkana River was the only index stream that was utilized by sport fishermen in pursuit of chinook salmon. Now fishermen regularly fly to the mouth of Mendeltna Creek and Kaina Creek. Both of these streams normally have small runs of salmon, and an increase in fishing could be detrimental to the run. Some of the 70 chinook salmon recorded at the mouth of Mendeltna Creek may have been harvested by anglers since only five fish were seen upstream during a later flight.

The number of fish counted depends on timing, weather conditions, magnitude of the run, type of stream and water conditions. Sometimes several counts are made on a stream during the summer. The numbers shown in Table 9 represent the highest individual count that was made. The counts are made by biologists from the Divisions of Commercial Fisheries and Sport Fish.

Port Valdez Stream Surveys

Annual salmon surveys of streams in eastern Valdez Bay were continued (Table 10 and Figure 3). July counts of pink, chum and sockeye salmon and September and October counts of coho salmon are presented for 1982 and compared to the last 8 years of data in Table 11. Pink salmon counts again reflect low even-year returns. The Robe Lake system has consistently been the highest producer of coho salmon in the Valdez area, except in 1981 when more salmon were counted in the Lowe River system. In 1982, the Robe Lake system count of spawning coho salmon, 8,573, was the highest ever recorded. The majority of these fish were in Corbin Creek which had a count of 7,040. Corbin Creek served as a coho salmon donor site for the Valdez Fisheries Development Association (VFDA) which took 100,000 eggs for hatchery use.

Because of budget restraits, it was not possible to enumerate all of the chum salmon spawning streams. Chum salmon counts were either made incidental to other species enumeration or by the VFDA. Counts made by the VFDA of chum salmon in City Limits Creek (221-60-11450) were high; however, the observers reported that heavy flooding washed the fish out of the stream and they never returned.

Several small streams on the south side of Valdez Bay that were enumerated and reported in 1981, were again counted in 1982. Incomplete counts show

Table 9. Chinook Salmon Aerial Surveys, Upper Copper River Tributaries, 1976-1982*.

Stream	1976	1977	1978	1979	1980**	1981**	1982
Gulkana River	994	924	1,136	1,052	696	N/C	1,569
East Fork Chistochina River	289	132	137	765	575	120	1,260
Mendeltna Creek	35	73	52	5	3	87	70***
Kaina Creek	37	91	125	279	247	191	200
Grayling Creek	17	N/C	92	153	66	107	124
Little Tonsina	98	35	285	285	70	191	440

* The figures are actual counts and not estimates. These data are considered as minimum escapement figures.

** Counting conditions in 1980 and 1981 were generally poor due to high, muddy water during most of the season. Poor water and weather conditions made a count of the Gulkana River impossible in 1981.

*** Counted at the mouth of Mendeltna Creek. In a later flight only five were seen above the mouth.

N/C No counts made.

Table 10. Valdez Area Salmon Enumeration Streams.

	Anadromous Stream Number	Name	Count Areas
1.	221-60-11360	Solomon Gulch	Waterfalls downstream. Includes Solomon Gulch hydro-electric power plant tailrace area.
2.	221-60-11364	Dayville Flats intertidal pools	Entire drainage
3.	221-60-11366	Dayville Flats intertidal pools	Entire drainage
4.	221-60-11368	Abercrombie	Entire drainage
5.	221-60-11380	Robe River	Entire drainage
6.	221-60-11380-0010	Robe Lake	Outlet area
7.	221-60-11380-2095	Corbin Creek	Entire drainage
8.	221-60-11380-2105	Brownie Creek	Entire drainage
9.	Number pending	Deep Creek	Mouth area
10.	221-60-11370	Lowe River System	Selected areas
11.	221-60-11370-2145	4.5 Mile Pit	Outlet and outlet stream
12.	221-60-11370-2165	6.5 Mile Seep	Entire drainage
13.	221-60-11370-2219-3011	8.5 Mile	Entire drainage
14.	221-60-11370-2219	12 Mile	Alpine Woods streams Fire station area streams Sandvick pool
15.	221-60-11370-2317	17 Mile	Entire drainage
16.	221-60-11390	Sewage Lagoon	Entire drainage
17.	221-60-11410	Loop Road 1	Entire drainage
18.	221-60-11420	Loop Road 2	Entire drainge
19.	221-60-11430	Siwash Creek	Entire drainage
20.	221-60-11440	Ess Creek	Lower 1/2 of drainage
21.	221-60-11450	City Limits (Crooked Creek)	Waterfalls downstream through Slough area
22.	221-60-11470	Mineral Creek	Brush (Horsetail) Creek, Blondau Creek

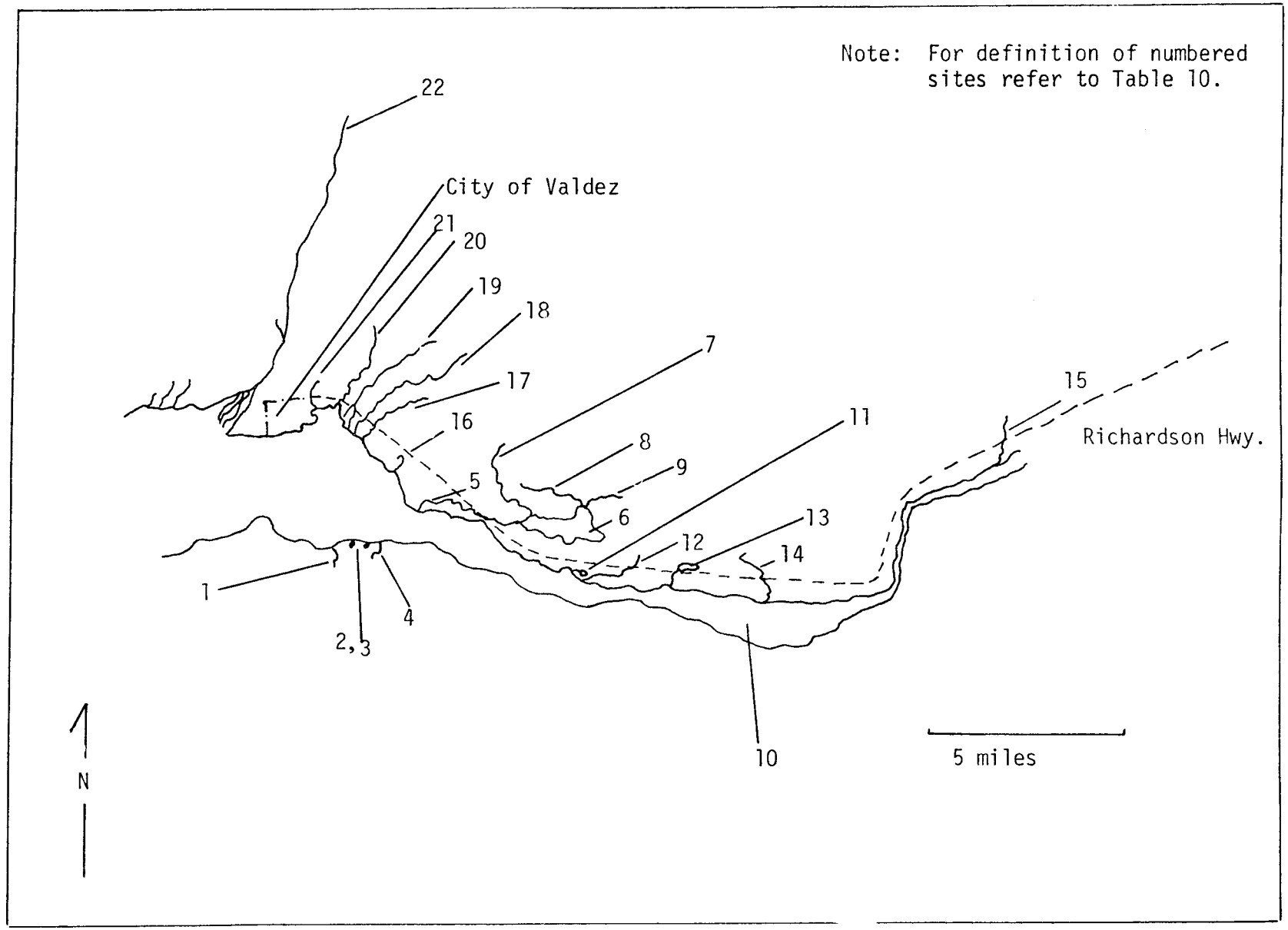

Figure 3. Salmon spawning streams, upper Valdez Bay.

Table 11. Port of Valdez Salmon Counts, 1974-1982.

	#11390 Sewage Lagoon	#11370 Lowe River System	#11380 Robe Lake System	#11410 Loop Road I	#11420 Loop Road II	#11430 Siwash	#11450 City Limits	#11470 Mineral Creek System
Pink Salmon								
1974	N/C	N/C	N/C	262	N/C	8	98	217
1975	N/C	15,387	2,461	5,537	N/C	33,113	1,262	947
1976	N/C	1	0	18	N/C	5	5	8
1977	1,418	1,441	330	18,718	4,101	22,120	2,714	179
1978	0	0	2	66	0	0	10	0
1979	1,657	1,770	1,546	16,246	6,012	29,232	5,512	53
1980	43	4	454	790	3	214	178	0
1981	2,868	6,500	1,557	18,400	10,593	31,045	3,870	418
1982	49	15	382	449	7	729	78	0
Chum Salmon								
1974	N/C	N/C	N/C	0	N/C	16	483	1,454
1975	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C
1976	N/C	270	0	6	N/C	2	1,080	564
1977	0	0	0	0	0	0	0	0
1978	0	1	0	0	0	0	111	68
1979	0	1	11	0	0	2	1,277	126
1980	0	190	0	5	0	0	2,186	140
1981	0	114	16	3	0	1	3,000	158
1982	0	5	125	N/C	N/C	3	5,622	N/C

Table 11 (cont.). Port of Valdez Salmon Counts, 1974-1982.

	#11390 Sewage Lagoon	#11370 Lowe River System	#11380 Robe Lake System	#11410 Loop Road I	#11420 Loop Road II	#11430 Siwash	#11450 City Limits	#11470 Mineral Creek System
Coho Salmon								
1974	N/A	N/C	1,662	0	N/A	0	0	0
1975	N/A	1,506	1,533	0	N/A	0	0	16
1976	N/A	1,310	1,049	0	N/A	0	0	66
1977	0	1,363	1,522	0	N/A	0	0	1
1978	0	1,643	5,091	0	N/A	0	0	0
1979	0	1,536	3,470	0	0	0	0	31
1980	0	1,329	5,467	1	0	0	2	2
1981	0	4,516	3,125	0	0	0	0	84
1982	N/C	2,296	8,573	N/C	N/C	N/C	N/C	N/C
Red Salmon								
1974	N/C	N/C	3,000	N/C	N/C	N/C	N/C	N/C
1975	N/C	2	10	N/C	N/C	N/C	N/C	N/C
1976	0	1	N/C	N/C	N/C	N/C	1	2
1977	0	N/C	9,188	N/C	N/C	N/C	N/C	N/C
1978	0	29	972	0	0	0	0	4
1979	0	16	2,216	0	0	0	0	4
1980	0	0	993	0	0	0	0	7
1981	0	20	229	0	0	0	0	0
1982	N/C	46	6,673	N/C	N/C	N/C	N/C	N/C

N/C = No count taken.

164 pink salmon in Solomon Gulch, 18 in Dayville Road streams and 100 in Allison Creek. Abercrombie Creek was too silty to count.

Seventy-five coho salmon were counted in the Solomon Gulch hydro-electric plant tail race (Williams and Potterville, 1981) which began operating in January 1982.

Gulkana River Arctic Grayling

Arctic grayling are found throughout the Gulkana River system and are exceptionally abundant in the main stem between Canyon Rapids and Paxson Lake (Figure 4). This high population of grayling has created the second most productive grayling fishery in Alaska with an estimated harvest of 9,158 in 1981 (Mills, 1982). This is a 22% increase in harvest over 1978.

Anglers floating the Gulkana River from Paxson Lake to Sourdough catch the majority of the grayling and return most of them to the water. Four commercial float operators and an increasing number of private parties using the river further emphasize the need for continued monitoring of the fishery.

All of the grayling used in this study are taken with sport gear. The fish are measured from snout to fork of tail, and random scale samples are collected for aging purposes. Length data from fish collected during two float trips made in 1982 are shown in Table 12 and compared to past data. The length of fish collected during the 6 years has varied from 100 mm to 307 mm and the annual average fork lengths varied from 268 mm to 294 mm.

The weighted average fork length for the 718 grayling collected from 1968 through 1981 is 274 mm. The weighted average fork length for the 1,025 fish measured through 1982 is also 274 mm. The average fork length for grayling collected in 1982 is 272 mm and indicates very little change in the size composition of the fish caught from previous years. The other significant factor shown in Table 12 is the maximum size range of the grayling diminished approximately 40 mm in 1982 in comparison to 1968.

Figure 5 shows the percent of the various size groups of grayling in the catch. The 1982 data reaffirm previous finds that size group 230-279 (Age III) and 280-330 (Age IV) make up the majority of the catch.

Habitat Protection Investigations

Reconstruction of the Richardson Highway from Mile 6-14 has been in the planning stage by the Alaska Department of Transportation for several years. The plans include rerouting portions of several salmon spawning streams and a narrowing of the Lowe River channel in Keystone Canyon near Valdez. The Department has been involved in several field trips and has reviewed plans concerning this project. The major area of concern is in Keystone Canyon where narrowing the stream channel could create velocity barriers for migrating coho salmon and Dolly Varden. The final decision concerning routing and type of construction in the canyon section has not been resolved.

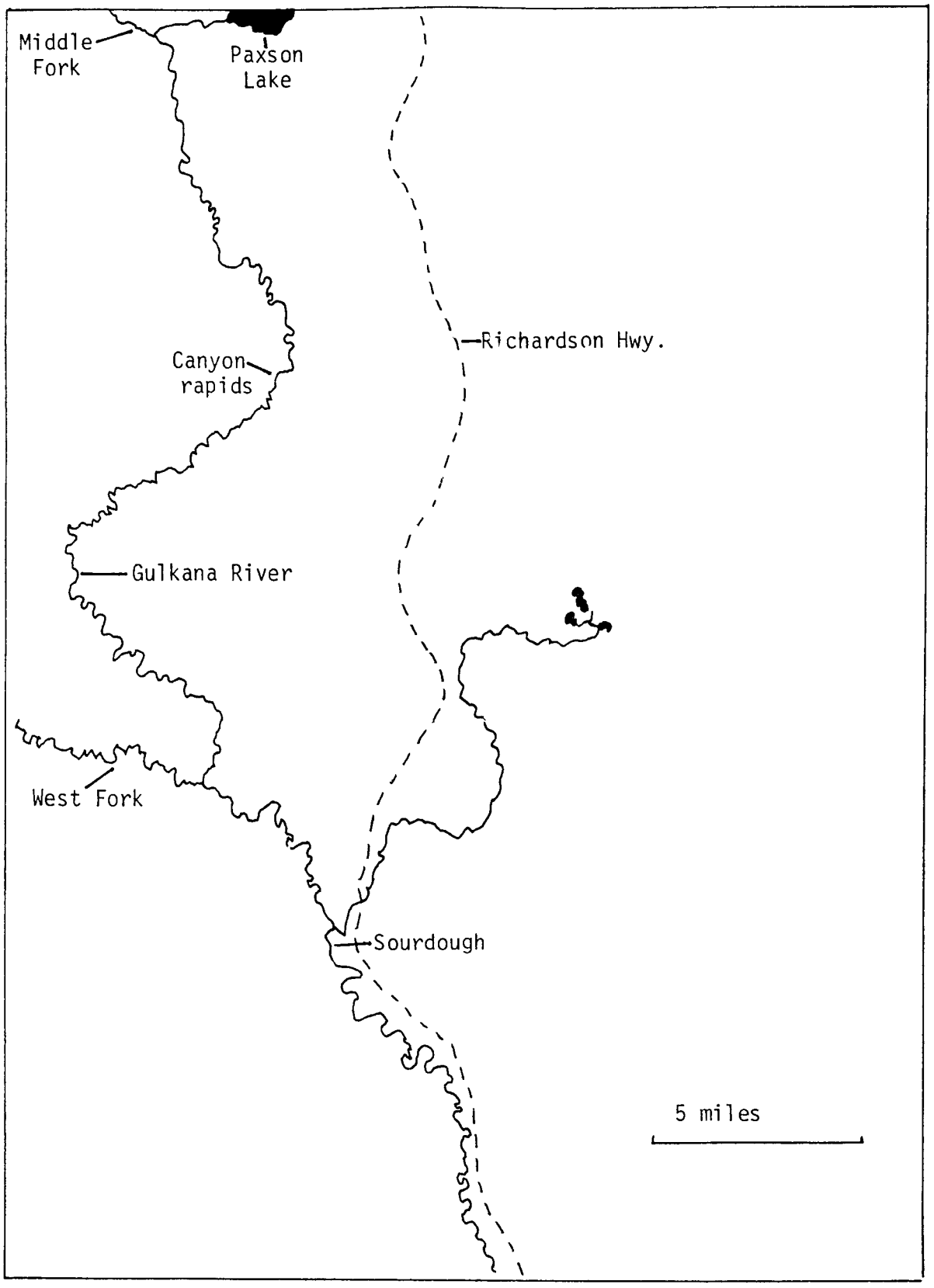

Figure 4. Gulkana River.

Table 12. Length Data From Gulkana River Arctic Grayling, 1968, and 1978-1982.

Year	Number of Fish	Length Range (mm)	Average Length (mm)
1968	100	177-425	290
1978	190	177-425	294
1979	146	86-420	273
1980	137	95-400	268
1981	145	190-390	287
1982	307	130-385	272

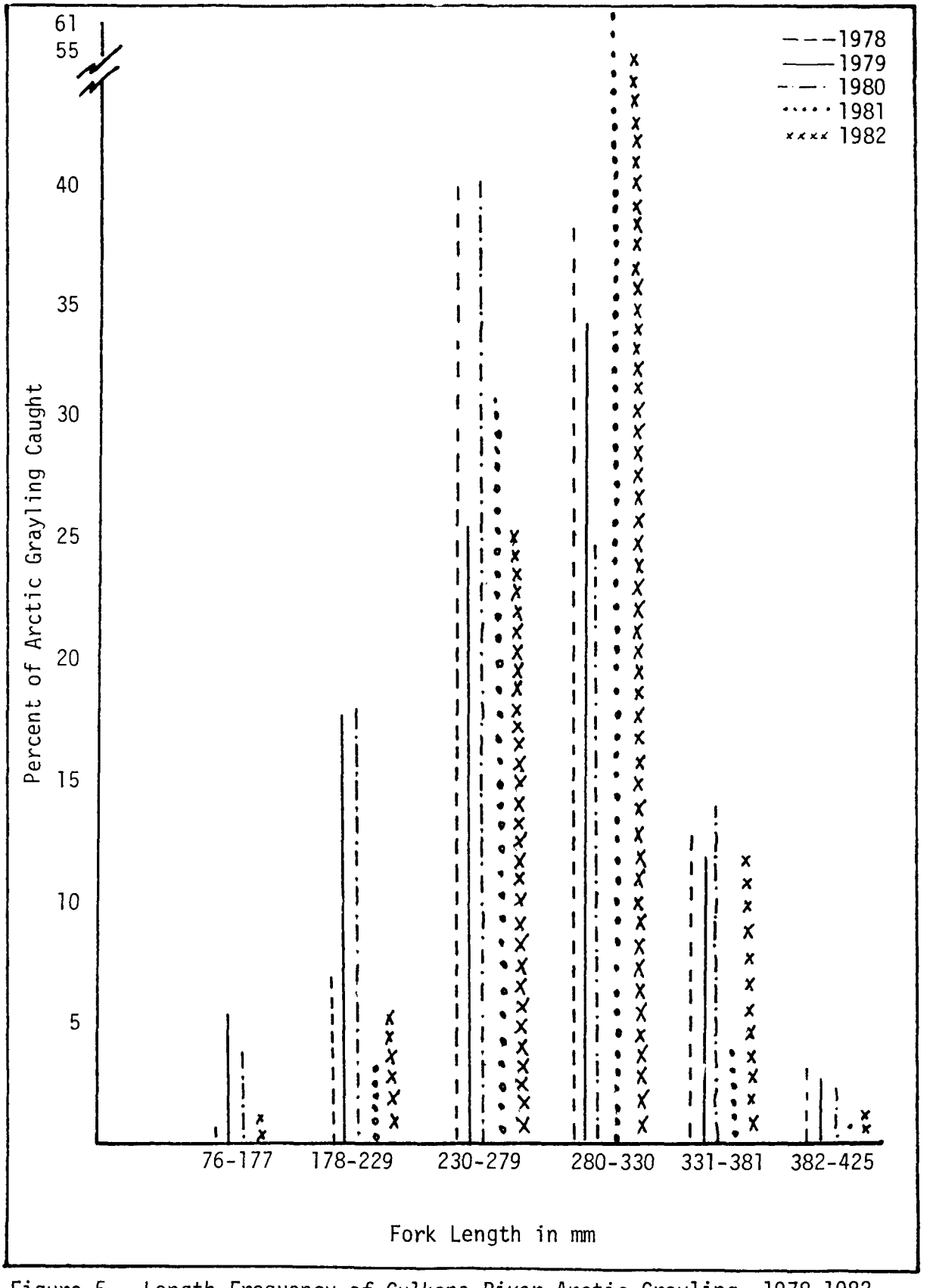

Figure 5. Length Frequency of Gulkana River Arctic Grayling, 1978-1982.

The Alaska Department of Transportation is also planning realignment and new highway construction near Mile 17 Richardson Highway. Part of the realignment will situate the new road bed through a beaver dam impoundment. Seventeen Mile Creek is used by coho salmon and Dolly Varden for spawning and rearing. The beaver dam impoundment is especially important for rearing of coho salmon. Discussions and field inspections concerning this project have been conducted for at least 3 years. The present plans will require mitigation by construction of new spawning and rearing areas.

In Valdez, Mineral Creek is an important migration route, spawning and rearing area for chum, pink, sockeye and coho salmon. During 1982, the City began construction of a bridge across this stream. The construction involved several channel diversions and crossings with heavy equipment. This required several field inspections by the Department to ensure adherence to the permit stipulations.

During the past year there have been several construction projects within the City of Valdez which required field inspection to prepare permit stipulations and ensure compliance. Their projects included installation of a water line, construction of an outdoor recreational complex, dock construction, levee repair and road repairs.

The State embarked on a large land disposal program several years ago. During 1982, several portions of land within the study area were nominated for this program.

Extensive field work was conducted in the area 5 miles east of Lake Louise where two townships (46,080 acres) will be eventually open for private ownership. There are many lakes in this area and, in 1982, an aerial survey was conducted to determine which ones appeared to have potential for sport fisheries. As a result of this survey, 11 of the lakes were actually checked on the ground. Standard survey procedures (Williams, 1971) were followed during these field investigations. Access trails were marked and public recreational sites were nominated.

Land disposal proposals for several other parts of the study area were reviewed and recommendations were made for public use sites and access. The selection of land parcels for public use is extremely important to ensure access for hunting, fishing and other forms of outdoor recreation.

The State is presently engaged in a navigability suit with the United States government concerning several streams and lakes in the State. One of the waters under consideration is the Gulkana River. A great deal of research and compilation was done by Sport Fish biologists to furnish use records to the DNR concerning the Gulkana River. This question of navigability of certain lakes and streams is extremely important for the future of sport fishing and other forms of recreation in Alaska.

A highway linking Cordova with the Alaska road system has been under study and construction since at least 1949. The highway would follow the route of the abandoned Copper River and Northwestern Railroad from Cordova. The route would essentially parallel the Copper River to the mouth of the

Tasnuna River. From there, the road would proceed up the Tasnuna River Valley and join with the Richardson Highway near Thompson Pass.

In May 1982, a 2-day boat trip was made from Copper Center to Miles Lake on the Copper River. The purpose of the trip was to make a cursory survey of the major tributary streams to the Copper River. Several of these streams would be crossed by the proposed Copper River Highway from Cordova.

Almost all of the streams showed signs of high fluctuations and heavy scouring. Some of the streams are glacier-fed and were silty and murky. Many of the smaller streams had falls or other velocity barriers within a short distance of the Copper River.

Time constraints precluded any extensive fish collection and the only species encountered were grayling. There are reports of cutthroat trout, pink, coho, sockeye and chinook salmon and Dolly Varden present in these streams.

Fish habitat along the proposed Copper River Highway appears to be limited. If this road is constructed, some restaints on limits, seasons and bag limits may be necessary to protect the resource.

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