

STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

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

by

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TABLE OF CONTENTS (Cont'd.)

Job No. G-I-F	Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River, Prince William Sound, and Upper Susitna River Drainages By: Fred T. Williams Wilson D. Potterville	Page
Abstract	.....	21
Background	.....	22
Recommendations	.....	24
Objectives	.....	26
Techniques Used	.....	26
Findings	.....	26
Population Sampling, Managed Lakes	.....	26
North Jans Lake Rainbow Trout Survival Studies	.....	27
Gulkana River Creel Census	.....	27
Chinook Salmon Escapement	.....	31
Gulkana River Grayling	.....	31
Robe Lake Investigations	.....	37
Port Valdez Stream Surveys	.....	43
Valdez Enhancement	.....	43
Alpetco	.....	43
Habitat Protection Investigations	.....	49
Discussion	.....	49
Literature Cited	.....	51

LIST OF FIGURES

Figure 1.	Map of the Study Area	23
Figure 2.	Gulkana River Creel Census Areas	32
Figure 3.	Age-Length of Gulkana River Grayling	35
Figure 4.	Length Frequency of Gulkana River Arctic Grayling	36
Figure 5.	Comparison of 1974, 1978 and 1979 Robe Lake Dissolved Oxygen Concentrations	38
Figure 6.	Thermal profile of five site locations, Robe Lake	39
Figure 7.	Locations of Study Sites, Robe Lake System	41
Figure 8.	Comparison of Robe Lake Boundaries	42
Figure 9.	Salmon Spawning Streams in Upper Valdez Bay	47
Figure 10.	Alpetco Site	48

LIST OF TABLES

Table 1.	List of Fish Species Discussed in this Report	25
Table 2.	Gill Net Summary, Previously Surveyed Lakes	28
Table 3.	Gulkana River Sport Harvest and Effort Estimates	30
Table 4.	Lengths of Gulkana River Chinook Salmon	33
Table 5.	Residency of Anglers Fishing the Gulkana River	33
Table 6.	Chinook Salmon Aerial Surveys, Upper Copper River Tributaries	34
Table 7.	Length Data from Gulkana River Arctic Grayling	34

TABLE OF CONTENTS (Cont'd.)

	Page
Table 8. Results of Fish Trapping, Robe Lake . . . . .	40
Table 9. Valdez Area Salmon Enumeration Areas . . . . .	44
Table 10. Port of Valdez Salmon Counts . . . . .	45

Job No. G-I-H Inventory and Cataloging of Sport Fish and Sport  
 Fish Waters of the Lower Susitna River and  
 Central Cook Inlet Drainages  
 By: Stanley W. Kubik  
 Kevin Delaney

Abstract . . . . .	52
Background . . . . .	53
Recommendations . . . . .	55
Objectives . . . . .	55
Techniques Used . . . . .	55
Findings . . . . .	56
Experimental Lake Stocking . . . . .	56
Creel Census . . . . .	59
Test Netting . . . . .	59
Deshka River Coho Salmon Creel Census . . . . .	59
Whittier Coho Salmon Creel Census . . . . .	59
West Side Susitna River Chinook Salmon Fishery . . . . .	63
Discussion . . . . .	78
Literature Cited . . . . .	78

LIST OF FIGURES AND TABLES

Table 1. List of Common Names, Scientific Names and Abbreviations	54
Table 2. Fish Stocking in Anchorage Area Lakes . . . . .	57
Figure 1. Lower Susitna River and Central Cook Inlet Drainages . .	58
Table 3. Summary of Elmendorf Air Force Base Lakes Creel Census .	60
Table 4. Rainbow Trout Returned to Creel, by Lake, for Elmendorf Air Force Base Lakes . . . . .	60
Table 5. Test Netting Results, Rainbow Trout, Fort Richardson Lakes . . . . .	61
Table 6. Deshka River Coho Salmon Harvest and Effort Estimates .	61
Table 7. Deshka River Coho Salmon Harvest and Effort Estimates by Week . . . . .	62
Table 8. Whittier Creel Census Summary . . . . .	64
Table 9. Coho Salmon Mean Weights and Lengths, Whittier . . . . .	65
Table 10. Effort and Harvest Data of the Chinook Salmon Sport Fishery on West Side Susitna River Tributaries . . . . .	66
Table 11. Alexander Creek Chinook Salmon Sport Catch and Effort by Week . . . . .	68
Table 12. Deshka River Chinook Salmon Sport Catch and Effort by Week . . . . .	69
Table 13. Lake Creek Chinook Salmon Sport Catch and Effort by Week	70

## RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations  
of Alaska.

Project No.: F-9-12

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

Job No: G-I-F Job Title: Inventory and Cataloging of  
Sport Fish and Sport Fish  
Waters of the Copper River,  
Prince William Sound, and  
Upper Susitna River Drainages.

Period Covered: July 1, 1979 to June 30, 1980.

## ABSTRACT

Test netting was conducted on 12 managed lakes to determine survival and condition of experimentally-stocked fish and the status of wild stocks.

Test fishing with rod and reel was conducted at North Jans Lake to determine survival and growth of experimentally-stocked Swanson River rainbow trout, Salmo gairdneri Richardson, and Ennis-Ship Creek rainbow trout. Seventy-three Swanson River rainbow trout and six Ennis-Ship Creek rainbow trout were caught. The Swanson River fish ranged in fork length from 225 to 365 mm and averaged 324 mm. The six Ennis-Ship Creek rainbow trout ranged in fork length from 370 to 430 mm and average 400 mm. All of the male fish were mature and in spawning condition. None of the female rainbow trout would spawn this year.

The creel census of sport fishing in the Gulkana River was conducted for the fifth year. There was an estimated 7,778 man-days of effort which was a 53.5 percent increase over 1978. There was also a 357 percent increase in the number (1,960) of chinook salmon, Oncorhynchus tshawytscha (Walbaum), caught over 1978. A closure of the commercial salmon fisheries allowed a larger than normal escapement. The sockeye salmon, Oncorhynchus nerka (Walbaum), catch was the lowest (138) since 1975 due to a closure of the sport fishery to protect a low escapement. The subsistence and commercial fishery was also closed. Chinook salmon surveys enumerated 1,052 fish after all the fisheries, which is slightly higher than the 6-year average of 1,023.

Length data were taken from 146 sport-caught Arctic grayling, Thymallus arcticus (Pallas). The fish ranged in fork length from 86 to 420 mm and averaged 273 mm. In 1978, 190 sport-caught Arctic grayling ranged in fork length from 197 to 427 mm and averaged 294 mm.

Fish trapping of coho salmon, Oncorhynchus kisutch (Walbaum), was conducted in Robe Lake during June, July and August 1979. Seventeen sites and depths were trapped a total of 1,355 hours, and 740 threespine stickleback, Gasterosteus aculeatus Linnaeus, and six coho salmon fingerlings were captured.

Valdez salmon escapement surveys in 1979 revealed the highest number (62,028) of pink salmon, Oncorhynchus gorbuscha (Walbaum), recorded. Also counted were 5,037 coho salmon, 2,236 sockeye salmon and 1,417 chum salmon, Oncorhynchus keta (Walbaum).

## BACKGROUND

The Copper River Basin and Upper Susitna River drainage areas are typical of many within the State in that recreational angling opportunity is provided by a number of anadromous species and also by indigenous and stocked lake and stream dwelling fishes.

The stream dwelling species most often taken by sport anglers are Arctic grayling, chinook and sockeye salmon.

The principal lake dwelling species caught by recreational anglers in the Glennallen area are the indigenous species, burbot, lake trout, and Arctic grayling; introduced species taken are coho salmon and rainbow trout.

The majority of angling pressure is on waters adjacent to the highway system. This area, including the Copper Basin, Cordova and Valdez, has over 650 miles of the Alaska Highway System. A map of the study area is presented in Figure 1.

The Cordova area is primarily commercial fishing oriented. Access to this area is only by boat or aircraft. Sport fishing effort in salt water is light and primarily for coho salmon, chinook salmon and halibut. Fresh water angling is directed toward coho salmon, cutthroat trout, Dolly Varden and stocked Arctic grayling. A significant increase in sport fishing effort is not anticipated until access to and within the area improves.

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.

Since the completion of the Trans-Alaska pipeline, there has been a substantial decrease in the human population of the Valdez area. However, the numbers of people permanently retained for maintenance of the pipeline bring the population above pre-pipeline levels. Construction of the Alpetco plant at Valdez is scheduled to begin in 1980 and be completed in 1983. The present population of Valdez is estimated to be 4,500. At the peak of construction in 1982, 2,800 people will be employed by Alpetco, many of which will be new people to the area. This is not as large as the workforce employed at Valdez on the Trans-Alaska pipeline construction, but there will be increased pressure on the sport fishery.

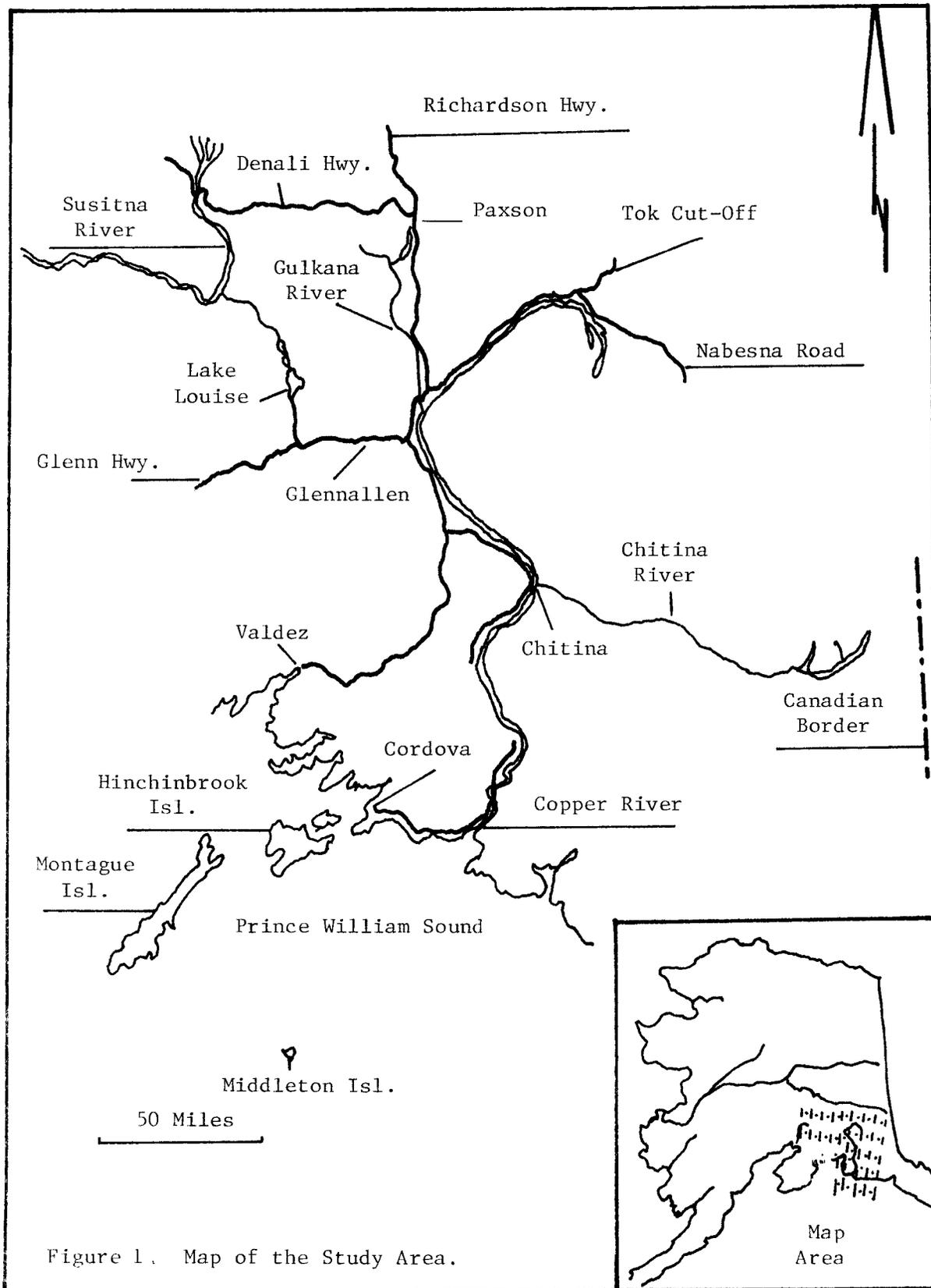


Figure 1. Map of the Study Area.

It is expected that Valdez will continue to grow and become more industrialized in the future. This 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 streams. Spawning and rearing areas for fish may be reduced, polluted and, possibly, ground water supplies will be affected. Presently, the fish stocks are generally in good condition, and there appears to be no need for more restrictive angling regulations at this time. However, with an increase in the human population, more harassment of spawning salmon can be expected and increased monitoring of the fisheries and the environment will be necessary to protect the resource.

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

#### RECOMMENDATIONS

1. The study of anadromous fish stocks in the Upper Copper River drainage and Prince William Sound should be continued to determine timing and magnitude of runs.
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 best suited for individual lakes. This can be done by comparing the percentage survival and the growth of various strains of rainbow trout and coho salmon.
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 and provide more fishing opportunities for the angler.
5. Investigations of grayling in the Gulkana River should be continued to determine age-length composition of sport-caught fish.
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 should be continued.
7. Creel census programs of primary fisheries, such as the Gulkana River and Valdez Bay, should be continued to determine trends in harvest and effort.

Table 1. List of Fish Species Discussed in this Report.

Common Name	Scientific Name and Author	Abbreviation
Pink salmon	<u>Oncorhynchus gorbuscha</u> (Walbaum)	PS
Chinook salmon	<u>Oncorhynchus tshawytscha</u> (Walbaum)	KS
Chum salmon	<u>Oncorhynchus keta</u> (Walbaum)	CS
Coho salmon	<u>Oncorhynchus kisutch</u> (Walbaum)	SS
Sockeye salmon	<u>Oncorhynchus nerka</u> (Walbaum)	RS
Dolly Varden	<u>Salvelinus malma</u> (Walbaum)	DV
Lake trout	<u>Salvelinus namaycush</u> (Walbaum)	LT
Rainbow Trout	<u>Salmo gairdneri</u> (Richardson)	RT
Threespine stickleback	<u>Gasterosteus aculeatus</u> (Linnaeus)	TST
Burbot	<u>Lota lota</u> (Linnaeus)	BB
Sucker	<u>Catostomus catostomus</u> (Forster)	S
Arctic grayling	<u>Thymallus arcticus</u> (Pallas)	GR

## 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 environments, and assist in determining the current status of public access and access needs to the recreational fishing waters within the job area.

## TECHNIQUES USED

Standard techniques described by Williams (1971) were used in lake and stream surveys and for collection of 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.

The Gulkana River was divided into three sections for purposes of creel census, based on accessibility. These sections were (1) lower, from the mouth upstream for a distance of 2 miles; (2) middle, in the vicinity of the Richardson Highway bridge; and (3) upper, from the mouth of Sourdough Creek upstream to the West Fork of the Gulkana River.

During the creel census on the Gulkana River, the fishing day was determined to be between the hours of 8 a.m. and midnight, and was further divided into four separate 4-hour periods. Weekends and holidays were each censused during two randomly chosen 4-hour periods. Two randomly chosen weekdays per week were each censused during one randomly selected 4-hour period. This creel census schedule was applied to all three sections.

During Robe Lake investigations, minnow traps were used to collect juvenile salmon. Dissolved oxygen concentrations were determined using a Hach kit with powder pillows. One liter Imhoff cones were used to determine amounts of settleable matter in streams.

## FINDINGS

### Population Sampling, Managed Lakes

During the grayling egg take conducted at Tolsona Lake in 1979, 206 adult grayling were marked by removing the adipose fin. The fish were allowed to

"mix" in the lake for approximately 1 month before test netting was done (Table 2). Four nets were set and 74 grayling were taken. Seventeen of the grayling caught were marked fish. Although the sample size was small, the results do indicate a low grayling population. The net frequency for grayling was 4.00 in 1977, 2.47 in 1978, and 0.74 in 1979. In only 1 previous year (1967) has the net frequency for grayling been lower (0.14).

This lake has been stocked annually since 1968. It has also served as the grayling egg source since 1965. In 1979, only 220 mature grayling were trapped at Bessie Creek for the grayling egg take. This is the lowest number collected since the egg take operation began. The return of mature grayling to Bessie Creek for spawning purposes in 1979 was expected to be much better than average. Grayling generally mature at Age III in Tolsona Lake and, in 1976, this lake was stocked with over 200,000 fry, which was the heaviest stocking that had ever been made in the lake.

In 1979, test netting was again conducted in Robe Lake. During this netting, two rainbow trout, 222 and 275 mm in fork length, were taken. Records show that rainbow trout were stocked in Robe Lake in 1956, 1958 and 1959, but this is the first record of any being recovered.

#### North Jans Lake Rainbow Trout Survival Studies

North Jans Lake was stocked in October 1977 with 8,000 Swanson River rainbow trout and 4,000 Ennis-Ship Creek rainbow trout. The two strains of fish were marked by fin clips for identification. In September 1978, the lake was test netted and 162 Swanson River rainbow trout and nine Ennis-Ship Creek rainbow trout were collected. Swanson River rainbow trout ranged in fork length from 92 to 331 mm and averaged 222 mm. The Ennis rainbow trout ranged in fork length from 195 to 290 mm and averaged 245 mm.

On May 29, 1979, North Jans Lake was test fished with rod and reel. Twenty-one man-hours of angling produced 73 Swanson River rainbow trout that ranged in fork length from 255 to 365 mm and averaged 324 mm. Six Ennis-Ship Creek rainbow trout were caught that ranged in fork length from 370 to 430 mm and averaged 400 mm.

The 1977 stocking ratio was 1:2 Ennis-Ship Creek to Swanson River stocks. Test netting in 1978 and a sport catch in 1979 revealed a ratio of 1:12 and 1:18, respectively, of Ennis to Swanson fish.

All of the male rainbow trout were mature and in spawning condition. None of the female fish were mature. Male trout were observed schooling at two different locations in the lake. One of the areas had a sand-gravel substrate, while the other had a mud bottom. The trout displayed activities normally associated with spawning.

#### Gulkana River Creel Census

The Gulkana River creel census, conducted from June 11 through August 5, 1979 (Figure 2), was essentially the same as in previous years. The estimated harvest and effort are presented and compared to 1976, 1977 and 1978 data in Table 3.

Table 2. Gill Net Summary, Previously Surveyed Lakes, 1979.

Name	Location	Number of Fish	Species	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Bear Cub	S29 T12N R9E	8	SK	105-215	170	.17	89
		1	WF	100	100	.02	11
Blueberry	S2 T9S R3W	5	RT	240-405	348	.08	100
Connor	S28 T6N R7W	76	GR	160-350	191	1.58	100
Crater	S29 T6W R4N	1	RT	400	400	.02	1
		91	SS	120-395	200	.69	99
George	S20,29 T6N R7W	0					
Hanagita Middle	S12 T8S R10E	24	GR	135-350	250	.57	21
		26	LT	125-700	425	.62	23
		62	WF	170-360	300	1.48	56
Moose	S13,14 T4N R5W	87	GR	125-370	280	1.81	87
		12	SK	215-355	263	.25	12
		1	BB	420	420	.02	1
Robe	S16,17,18 T9S R5W	7	SS	83-205	111	.35	23
		9	RS	500-700	607	.45	29
		13	DV	113-500	249	.65	42
		2	RT	225-275	249	.10	6
Tex Smith	S 27 T4N R6W	10	SS	325-460	410	.07	100
Thompson	S26 T8S R3W	14	GR	190-250	235	.20	100

Table 2 (cont.). Gill Net Summary, Previously Surveyed Lakes, 1979.

Name	Location	Number of Fish	Species	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Tolsona	S24 T4N R5W	74	GR	135-385	277	.74	32
		158	SK	95-490	277	1.58	68
Lake Louise	T6N R7W	111	WF	135-380	303	1.26	90
		7	SK	460-515	489	.08	6
		4	BB	470-550	520	.05	3
		1	LT	560		.01	1

\* Species  
 DV - Dolly Varden      RT - Rainbow Trout      LT - Lake Trout  
 SS - Coho Salmon      SK - Sucker      BB - Burbot  
 GR - Grayling      WF - Whitefish sp.

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

Table 3. Gulkana River Sport Harvest and Effort Estimates, 1976-1979.

	Lower Section			Middle Section			Upper Section			All Sections		
	1977	1978	1979	1977	1978	1979	1977	1978	1979	1977	1978	1979
No. of anglers	780	942	1,182	1,550	1,613	4,232	1,576	2,510	2,364	3,906	5,065	7,778
No. of hours	3,599	5,326	5,937	4,853	5,362	17,920	9,283	16,718		17,735	27,406	
Hours per angler	4.61	5.65	5.02	3.13	3.32	4.23	5.89	6.66		4.54	5.41	
Catch												
Chinook	4	112	256	92	64	1,292	236	253	412	332	429	1,960
Sockeye	224	132	70	236	26	36	538	243	32	998	401	138
Rainbow trout	0	15	0	10	38	40	94	228	100	104	281	140
Grayling	18	57	52	150	101	204	2,802	2,058	1,818		2,216	2,074
Catch per angler												
Chinook	0.005	0.119	0.217	0.059	0.040	0.305	0.150	0.101	0.174	0.085	0.085	0.252
Sockeye	0.287	0.140	0.059	0.152	0.016	0.009	0.341	0.097	0.014	0.256	0.079	0.018
Total Salmon	0.292	0.259	0.276	0.211	0.056	0.314	0.491	0.198	0.188	0.341	0.164	0.270
Catch per angler hour												
Chinook	0.001	0.021	0.043	0.019	0.011	0.072	0.025	0.015		0.019	0.016	
Sockeye	0.062	0.025		0.049	0.004		0.058	0.015		0.056	0.015	
Total salmon	0.063	0.050		0.068	0.014		0.083	0.030		0.075	0.031	

There was a 53.5% increase in anglers from 1978 to 1979, and a 357% increase in the number of chinook salmon taken by sport fishermen. This large increase in the catch was because the commercial fishing season in the Copper River Delta area was closed on May 29 which allowed a much larger escapement of salmon into the Copper River system. The sockeye salmon catch (138) was the lowest since 1975 when only 47 were taken. The escapement of sockeye salmon was very low in 1979 and the Gulkana River was closed to sport fishing for this species on July 28 to allow an adequate escapement.

The largest increase in anglers in any of the sections of river was at the middle portion where 4,232 were recorded in 1979, as compared to 1,613 in 1978. Anglers "discovered" an area of the river approximately 2 miles upstream from the bridge known as the Glennrich Gravel Pit (Figure 2). Fishing for chinook salmon at this site produced a catch rate of 0.09 fish per hour compared to 0.04 fish per hour in the lower section.

Length data from sport-caught chinook salmon shows little change in the length range and average lengths from 1972 to 1979 (Table 4).

In 1978, there were 1,036 angler-days of effort by floaters in the Upper Section. In 1979, there were only 768 days of angler effort by floaters. Floating conditions were excellent throughout the summer and no reason for this decrease is apparent. Float fishermen caught 75% of the total number of grayling taken from the Gulkana (1,618); however, they retained only 340.

Table 5, showing the residency of Gulkana River anglers, indicates little change over 1978.

#### Chinook Salmon Escapement

Chinook salmon escapement data from index streams in the Copper River drainage from 1974 to 1979, are presented in Table 6. Five of the six streams counted showed higher counts in 1979 than in any of the previous 5 years. Commercial salmon fishing on these runs was closed down early which accounts for the higher escapement.

#### Gulkana River Grayling

Table 7 is a comparison of length data of sport-caught grayling taken from the Gulkana River in 1968, 1978 and 1979. These fish were caught by personnel of the ADF&G and all fish were measured regardless of size. It is apparent from this data that there has been little change in the size of grayling in the Gulkana River.

Figure 3 presents age length data from grayling caught in the Gulkana River in 1979. The majority of the catch (63%) was made up of Age III+ and Age IV+ fish.

Length frequencies of 1978 and 1979 sport-caught grayling from the Gulkana River are shown in Figure 4. In 1979, a higher percentage of the 178 to 279 mm and 280 to 330 mm size groups were taken. These are Age I+ and Age IV+ fish.

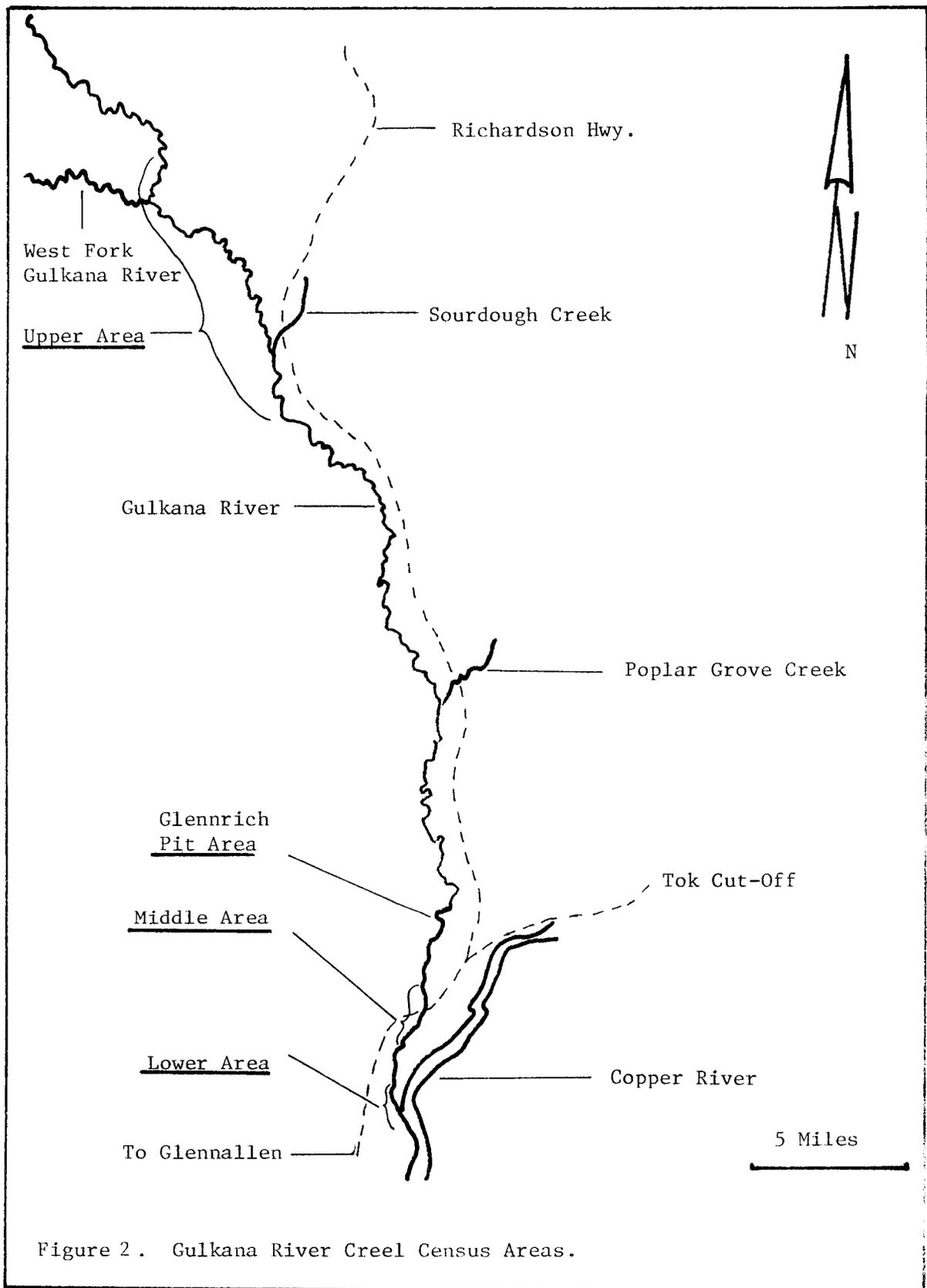


Figure 2 . Gulkana River Creel Census Areas.

Table 4. Lengths of Gulkana River Chinook Salmon, 1972-1979.

Year	Number of Fish	Length Range (mm)	Average Length (mm)
1972	33	770-1,160	1,026
1973	38	665-1,210	1,025
1974	37	650-1,222	1,089
1975	93	724-1,219	1,001
1976	50	673-1,240	1,027
1977	40	667-1,200	988
1978	54	610-1,255	1,006
1979	154	673-1,275	998

Table 5. Residency of Anglers Fishing the Gulkana River in 1976-1979.

	1976	1977	1978	1979
No. Of Alaskan Communities Represented	15	17	24	21
No. of Other States Represented	20	28	27	29
No. of Other Countries Represented	2	5	3	6
Percent of Anglers from Alaska	91	87	89	88
Percent of Anglers from Anchorage	37	33	24	24
Percent of Anglers from Fairbanks	32	20	30	36

Table 6. Chinook Salmon Aerial Surveys, Upper Copper River Tributaries, 1974-1979\*

Stream	1974	1975**	1976	1977	1978	1979
Gulkana River	1,293	740	994	924	1,136	1,052
East Fork Chistochina River	138	71	289	132	137	765
Mendeltna Creek	13	NC	35	73	52	5
Kaina Creek	55	NC	37	91	125	279
Grayling Creek	0	NC	17	NC	92	153
Little Tonsina					285	285

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

\*\* Counting conditions in 1975 were generally poor due to high muddy water during most of the season.

NC No counts made.

Table 7. Length Data from Gulkana River Arctic Grayling, 1968, 1978 and 1979.

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

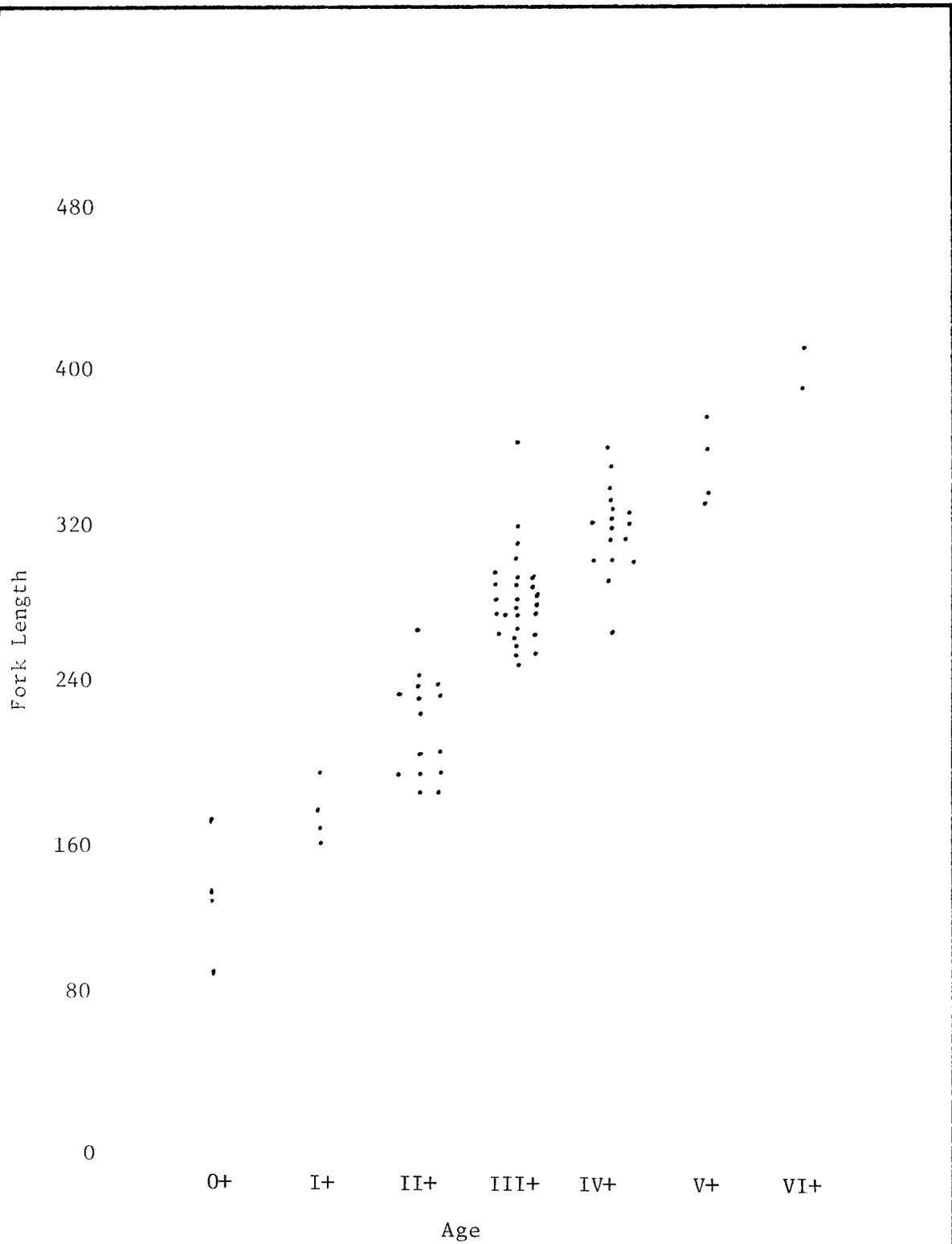


Figure 3. Age-Length of Gulkana River Grayling, 1979.

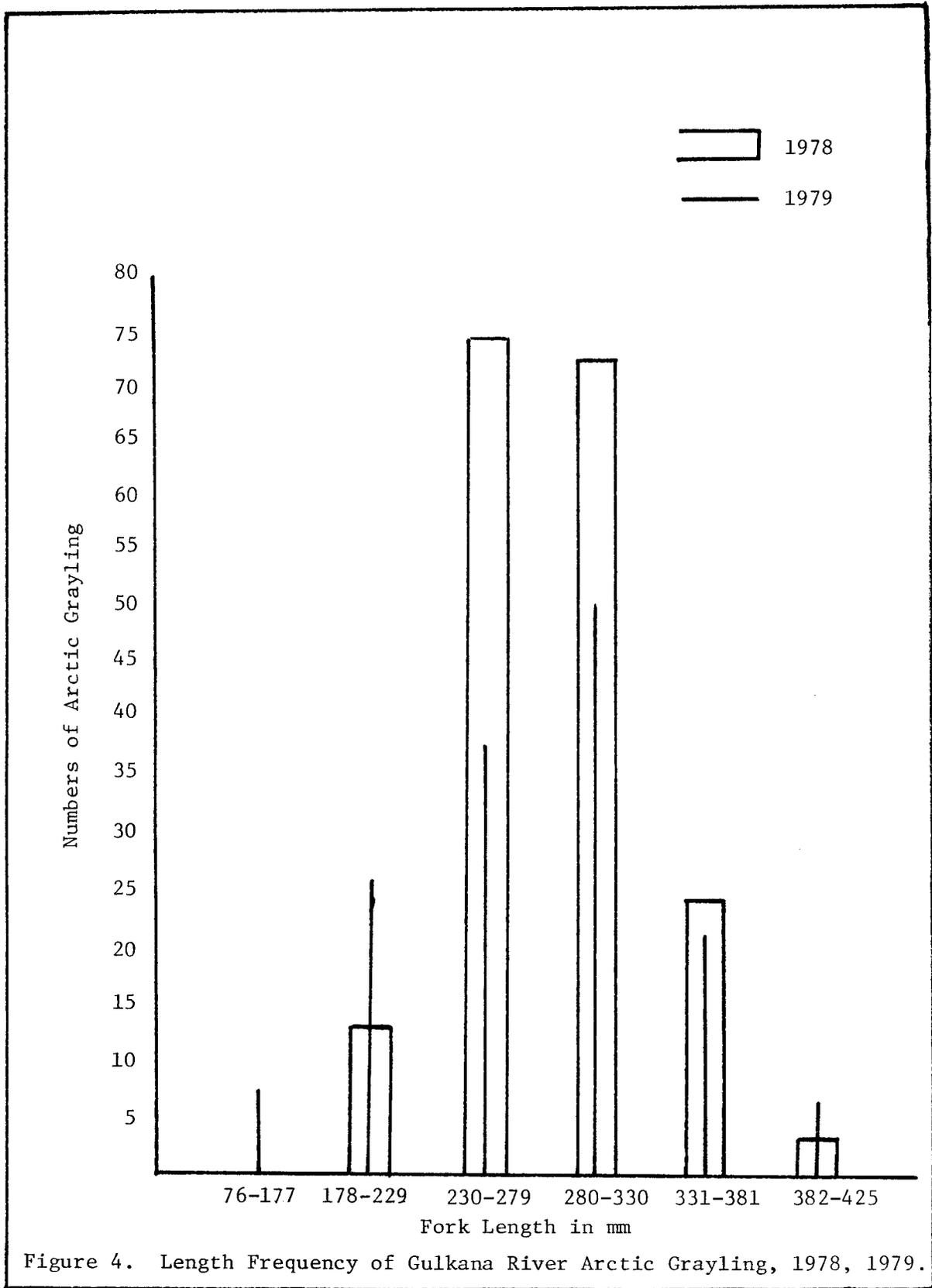


Figure 4. Length Frequency of Gulkana River Arctic Grayling, 1978, 1979.

## Robe Lake Investigations

Robe Lake investigations continued in 1979. Considerable physical and chemical data have been collected on the Robe Lake system during the past years. Previous studies indicated low late winter dissolved oxygen (D.O.) concentrations may be the limiting factor for rearing juvenile salmon. Figure 5 compares March and June dissolved oxygen samples with those taken in January and March of 1974, 1978 and 1979. Heavy snow cover and considerable ice depth in March 1979 was a contributing factor in low dissolved oxygen concentrations. June (ice-free period) D.O.'s were at acceptable levels; this improved D.O. concentration is a result of a better flow-through of oxygenated water and growth of submergent vegetation rather than winter decomposition. Figure 6 compares the thermal profile of five site locations in Robe Lake. This comparison shows a cooler surface water temperature as the flow continues westward out of the lake. Ground water seep from Valdez Glacier through the dike and into Corbin Creek Robe and Brownie Creeks could be influencing the thermal structure. Robe Lake demonstrates a thermal decline corresponding with increased depth.

Minnow trapping was conducted in June, July and August 1979 (Table 8) and test netting was done in June. Trapping sites are shown in Figure 7. Poor results in live trapping and test netting may be attributed to visual trap and net avoidance. There was no winter die-off reported; however, only three coho salmon in each age class 0+ and I+ were live trapped. Twenty hours of test netting captured only seven in these age classes. June live trapping using sterilized sockeye salmon eggs, indicated a paucity of juvenile salmon, so live trapping was conducted again in July using the same bait. With poor capture results in June and July, the August trapping was conducted with two traps set at the same depth in the same site with one trap baited with sterilized sockeye salmon eggs and the other trap baited with corn. Corn produced the only coho salmon captured in August. However, the comparison of sterilized sockeye salmon egg-captured fish, including threespine stickleback, to corn-captured fish was 121 to 147, respectively.

Further considerations of enhancement of Robe Lake included putting a water control gate in the dike between Corbin Creek Glacier and Corbin Creek Robe. This gate would allow manual manipulation of water flow into Corbin Creek Robe from Corbin Creek Glacier when water quality and quantity allowed. One liter Imhoff cones were used to determine settleable matter in both streams. Corbin Creek Glacier carried 0.15% matter, while Corbin Creek Robe was silt free. January de-watering and suspended matter gives support to the decision to maintain the Corbin Creek dike in its present stage. During the summer of 1979, work was conducted on the dike to maintain its integrity. The Corbin Creek dike has arrested the glacial siltation of Robe Lake from Corbin Creek Glacier. However, it has also reduced the flow of the colder Corbin Creek Glacier water into Robe Lake. Loss of the colder water has allowed an accession in peripheral weed growth. Figure 8 compared 1916 Robe Lake boundaries with those of 1952, which is the latest available information. This excessive vegetation growth has reduced the area of the lake by at least one-third.

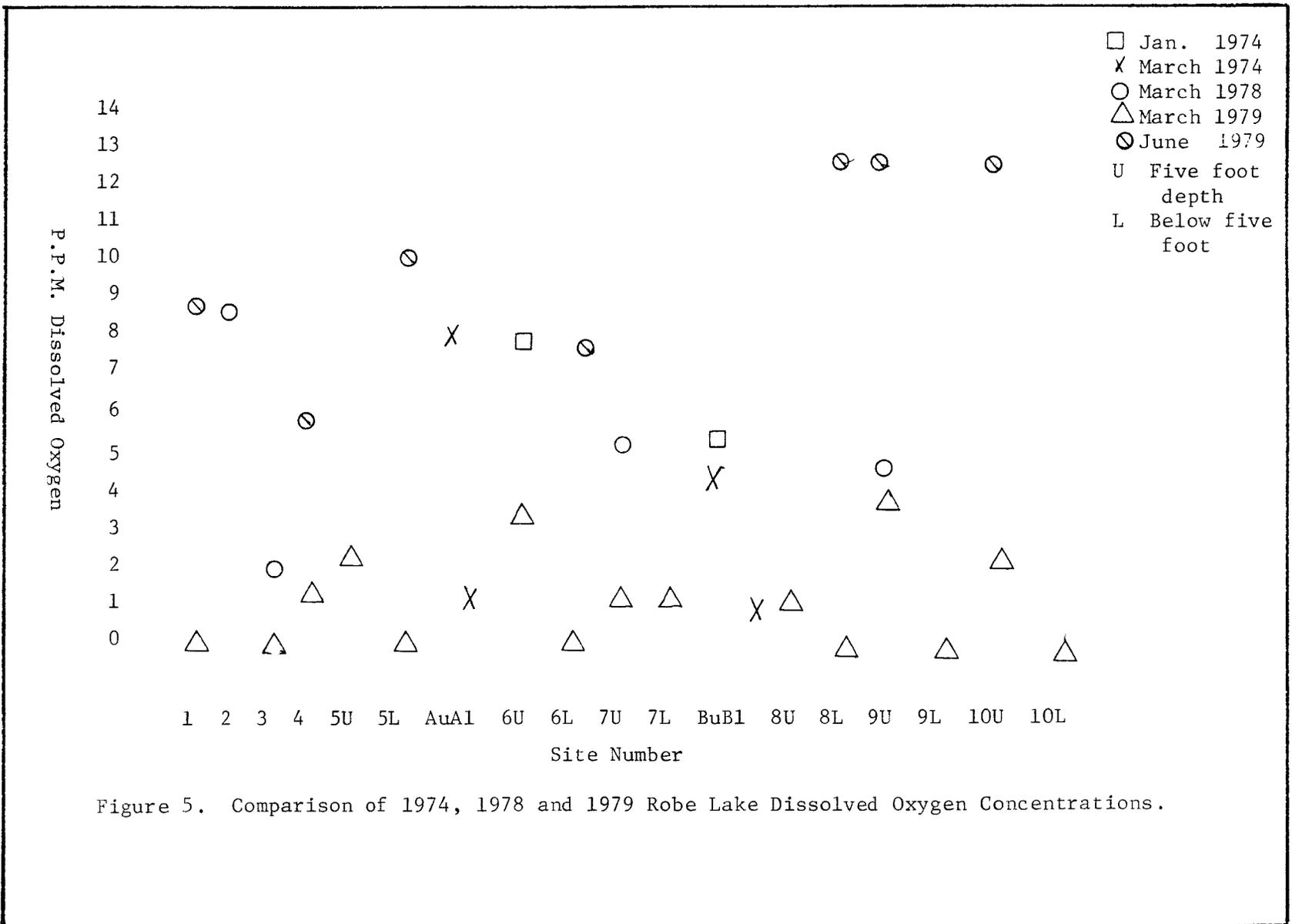


Figure 5. Comparison of 1974, 1978 and 1979 Robe Lake Dissolved Oxygen Concentrations.

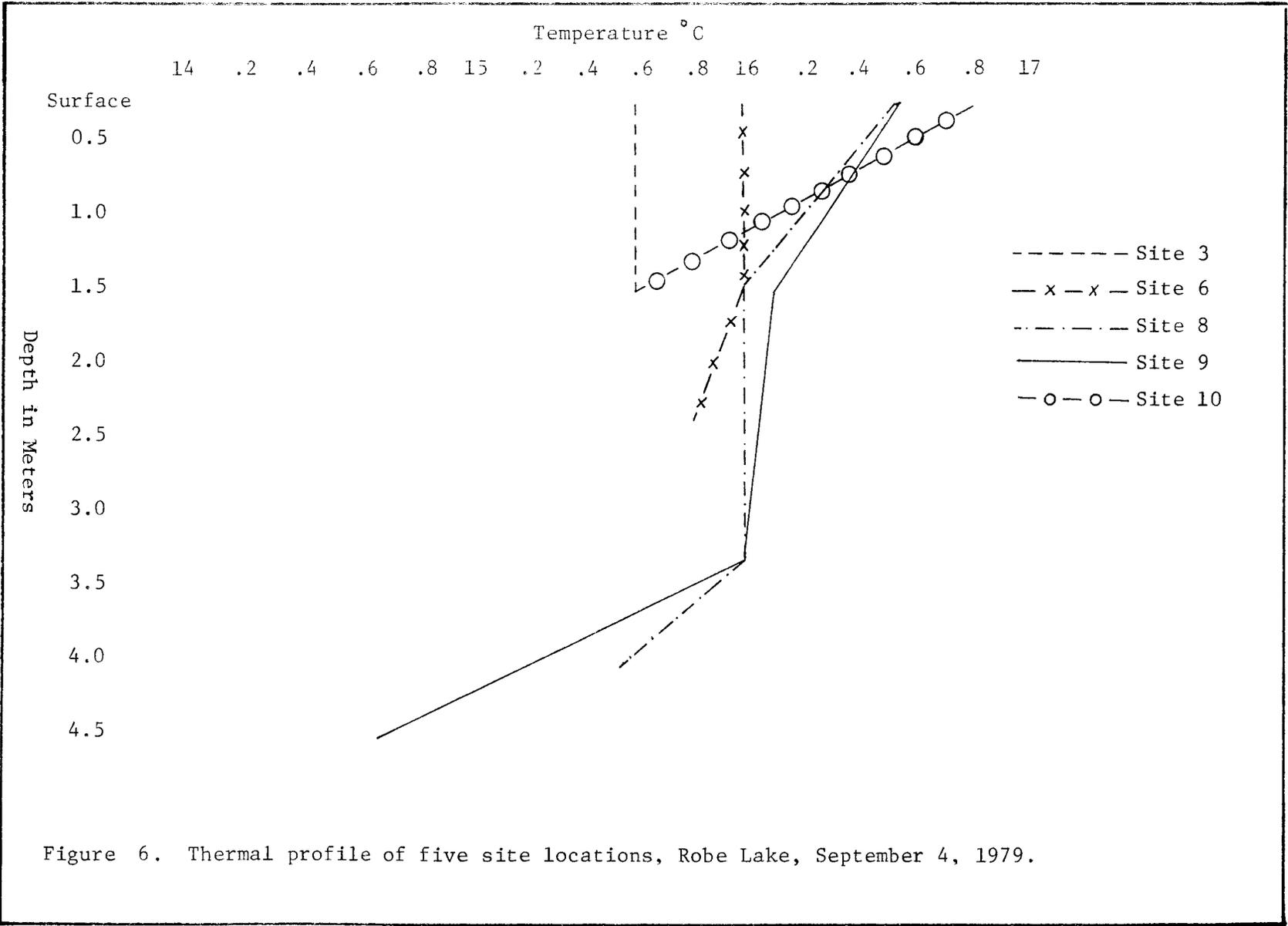


Figure 6. Thermal profile of five site locations, Robe Lake, September 4, 1979.

Table 8. Results of Fish Trapping, Robe Lake, June, July and August 1979.\*

Site Number	Date	Depth (feet)	Coho Salmon	Dolly Varden	Number Stickleback	Hours Effort
1	6/21/79	4'	4	0	67	22.5
2	6/21/79	5'	0	0	34	22.5
3	6/21/79	4'	1	0	49	22.5
4 U	7/26/79	4'	0	0	0	92
	8/7/79	4'	0	0	1	49
L	7/26/79	6'	0	0	0	92
5 U	7/26/79	4'	0	0	5	93
	8/7/79	4'	0	0	1	49
L	7/26/79	7'	0	0	0	93
6 U	8/7/79	4'	0	0	10	49
L	6/21/79	9'	0	0	81	22.5
7 U	7/26/79	4'	0	0	0	93
L	6/21/79	5'	0	0	0	22.5
	7/26/79	9'	0	0	1	93
8 U	7/26/79	5'	0	0	2	93
	8/7/79	5'	1	0	7	49
L	7/26/79	10'	0	0	0	93
9 U	6/21/79	8'	0	0	0	22.5
L	6/21/79	13'	0	0	0	22.5
10 U	7/26/79	4'	0	0	2	94
	8/7/79	4'	0	0	248	49
L	6/21/79	7'	0	0	163	22.5
	7/26/79	7'	0	0	69	94
TOTAL			6	0	740	1,355

\* Minnow trap used, 16" long, 9" diameter, 27" circumference, 3/4" entrance hole.

Set number with alphabetical designation of U is for upper trap and L is for lower trap.

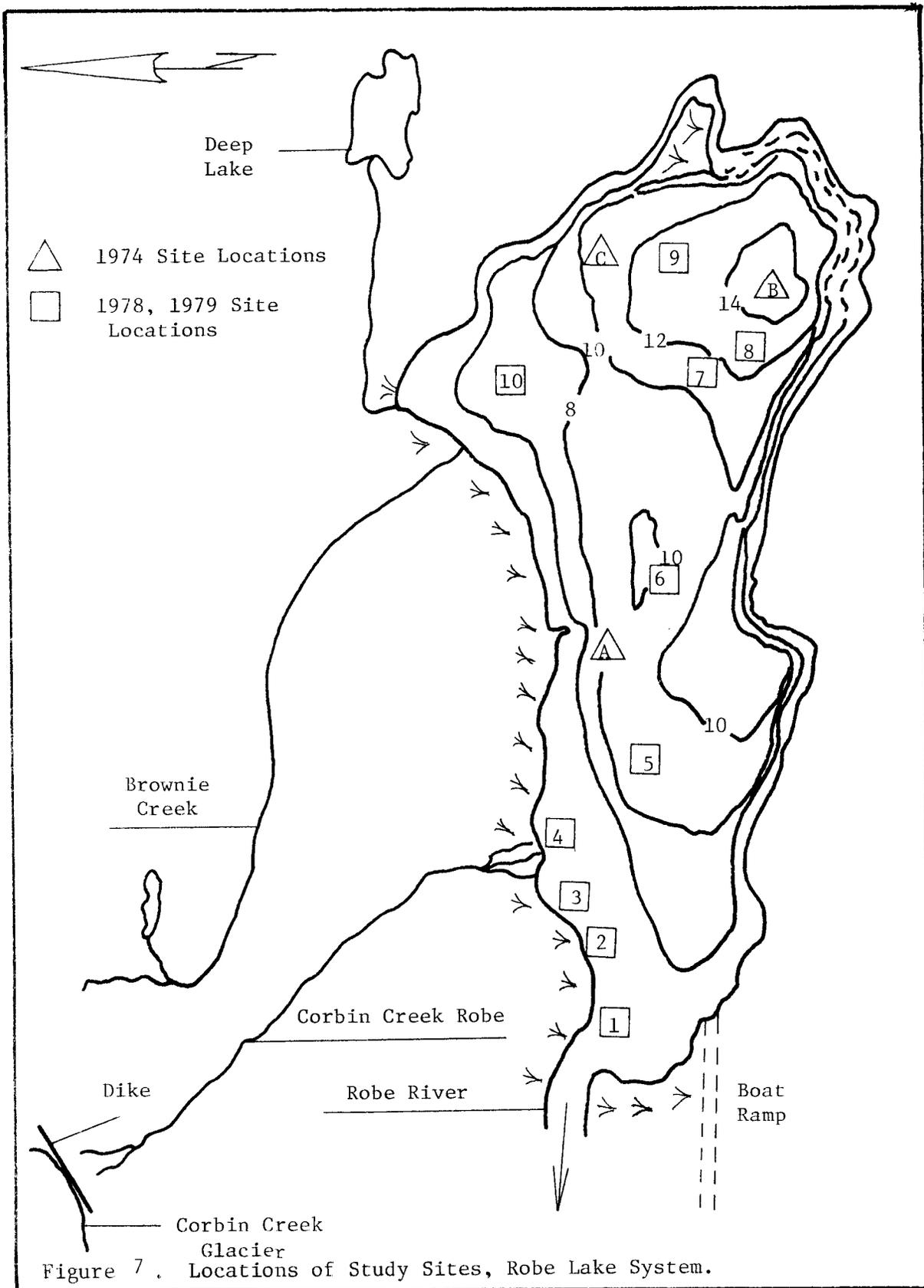
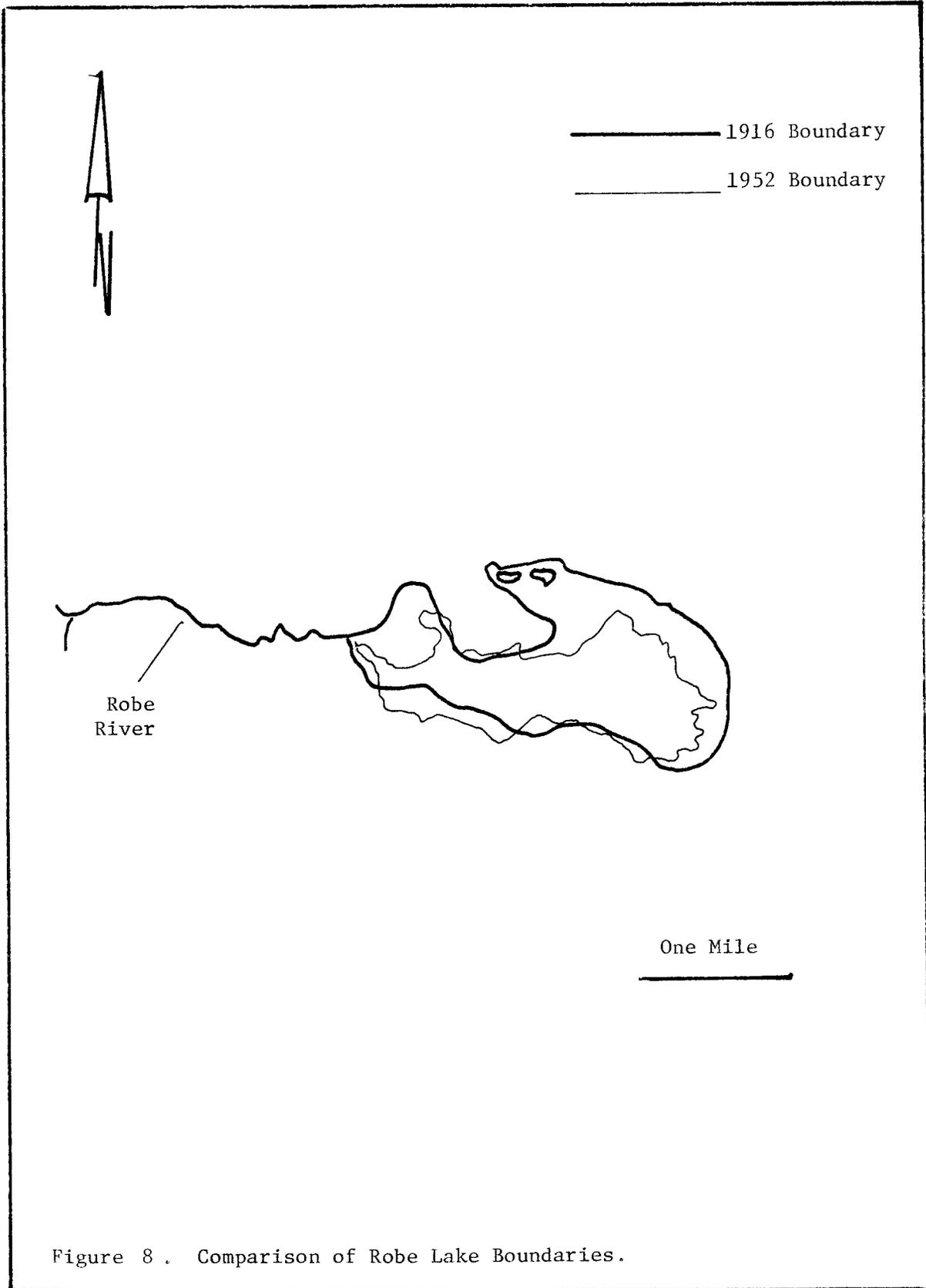


Figure 7. Locations of Study Sites, Robe Lake System.



## Port Valdez Stream Surveys

Foot surveys were conducted in eight index areas to estimate spawning salmon populations. These areas are shown in Figure 9 and data are presented in Table 9.

A summary of salmon escapement counts in index areas is presented in Table 10. High counts of pink salmon in odd years is traditional in Valdez Bay, and 1979 escapement was the highest year on record. Coupled with this high escapement is the fact that the Prince William Sound commercial catch was the highest recorded. Chum, sockeye and coho salmon counts all show the population to be generally satisfactory.

Sockeye salmon are the only one of four species of salmon enumerated in the Valdez area that escape the sport angler. The majority of the sockeye salmon enter the Robe Lake system in late May and early June when sport fishing effort is very low. Brownie Creek, a tributary to Robe Lake, is the principal sockeye salmon spawning stream, with the majority of the rearing being done in the Robe Lake system. Chum salmon enter the sport fishery as an incidental catch or a snag fishery in salt water. Coho salmon consistently lead in angler preference and effort in Prince William Sound. However, pink salmon contribute significantly to the sport fishery. Corbin Creek Robe is the major coho spawning area and the Robe Lake system is the primary rearing area.

## Valdez Enhancement

In 1978, Valdez citizens joined together to form the Valdez Fisheries Development Association. Numerous meetings, discussions and joint Alaska Department of Fish and Game, Division of Sport Fish - Valdez Fisheries Development Association field surveys were conducted.

In 1979, the V.F.D.A. made a decision to construct a private nonprofit hatchery on Anadromous Stream #145 (City Limits Creek)(Figure 9). The facility was constructed during the summer and a permit for a scientific and educational salmon egg take was obtained. The permit was for 360,000 pink salmon and 400,000 chum salmon eggs. A ratio of 3:1 females to males was used and allowance for a 15% pen mortality was included. The Division of Fisheries Rehabilitation and Enhancement personnel assisted in putting away 340,000 chum salmon eggs in the Kitoi-type gravel incubators; other commitments precluded the pink salmon egg take. The 252 adult chum salmon used in this egg take are included in the 1979 City Limits Creek chum salmon escapement counts.

## Alpetco

In 1978, a proposal was made by the Alaska Petrochemical Company to construct a petrochemical plant near Valdez. The site selected is an area approximately 2 miles east of Valdez near Glacier Stream (Figure 10). Because of the site proximity to Robe Lake, Corbin Creek and Brownie Creek, there is considerable potential for damage and possible permanent loss of salmon values. One of the proposed access roads to this site would be very close to Robe Lake and Corbin Creek. This access road would include pipelines for crude oil and also the finished products.

Table 9. Valdez Area Salmon Enumeration Areas.

Anadromous Stream Number	Name	Count Areas
221-60-137	Robe Lake/River System	Robe River Robe Lake Corbin Creek Brownie Creek Deep Creek
221-60-137	Lowe River System	4.5 Mile Pit 6.5 Mile Seep 8.5 Mile 12 Mile 17 Mile
221-60-139	Sewage Lagoon	Entire drainage
221-60-141	Loop Road 1	Entire drainage
221-60-142	Loop Road 2	Entire drainage
21-60-143	Siwash Creek	Entire drainage
221-60-144	Ess Creek	Lower 1/2 of drainage
221-60-145	City Limits (Crooked Creek)	Waterfalls downstream through Slough area
221-60-147	Mineral Creek	Brush (Horsetail) Creek

Table 10. Port of Valdez Salmon Counts, 1973-1979.

	#139 Sewage Lagoon	#137 Lowe River System	#137 Robe Lake System	#141 Loop Road I	#142 Loop Road II	#143 Siwash	#145 City Limits	#147 Mineral Creek System
<u>Pink Salmon</u>								
1973		6,549	15,000	7,000		26,770	1,700	2,235
1974		N/C	N/C	262		8	98	217
1975		15,387	2,461	5,537		33,113	1,262	947
1976		1	0	18		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
<u>Chum Salmon</u>								
1973		1,063	125	N/C		232	1,812	7,111
1974		N/C	N/C	0		16	483	1,454
1975		N/C	N/C	N/C	N/C	N/C	N/C	N/C
1976		270	0	6		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
<u>Coho Salmon</u>								
1973		N/C	4,000	N/R		6	N/R	20
1974		N/C	1,662	N/R		0	N/R	0
1975		1,506	1,533	N/R		0	N/R	16
1976	0	1,310	1,049	0		0	2	66
1977	0	1,363	1,522	N/R	0	N/R	N/R	1
1978	0	1,643	5,091	0	0	0	0	0
1979	0	1,536	3,470	0	0	0	0	31

Table 10 (cont.). Port of Valdez Salmon Counts, 1973-1979.

	#139 Sewage Lagoon	#137 Lowe River System	#137 Robe Lake System	#141 Loop Road I	#142 Loop Road II	#143 Siwash	#145 City Limits	#147 Mineral Creek System
<u>Sockeye Salmon</u>								
1973			1,300					
1974			3,000					
1975		2	10					
1976	0	1					1	2
1977	0		9,188					
1978	0	29	972	0	0	0	0	4
1979	0	16	2,216	0	0	0	0	4

N/C No count taken

N/R No run

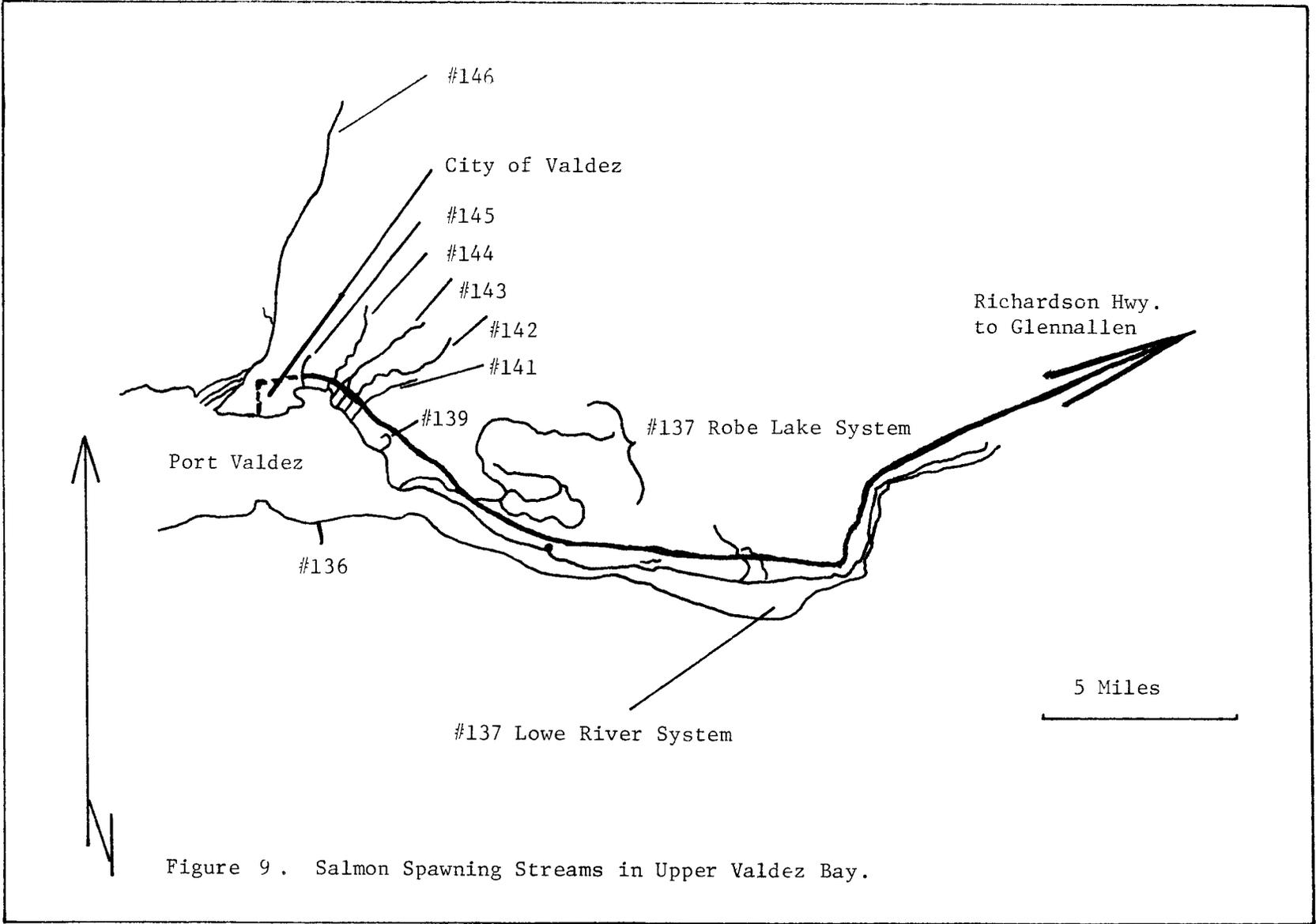
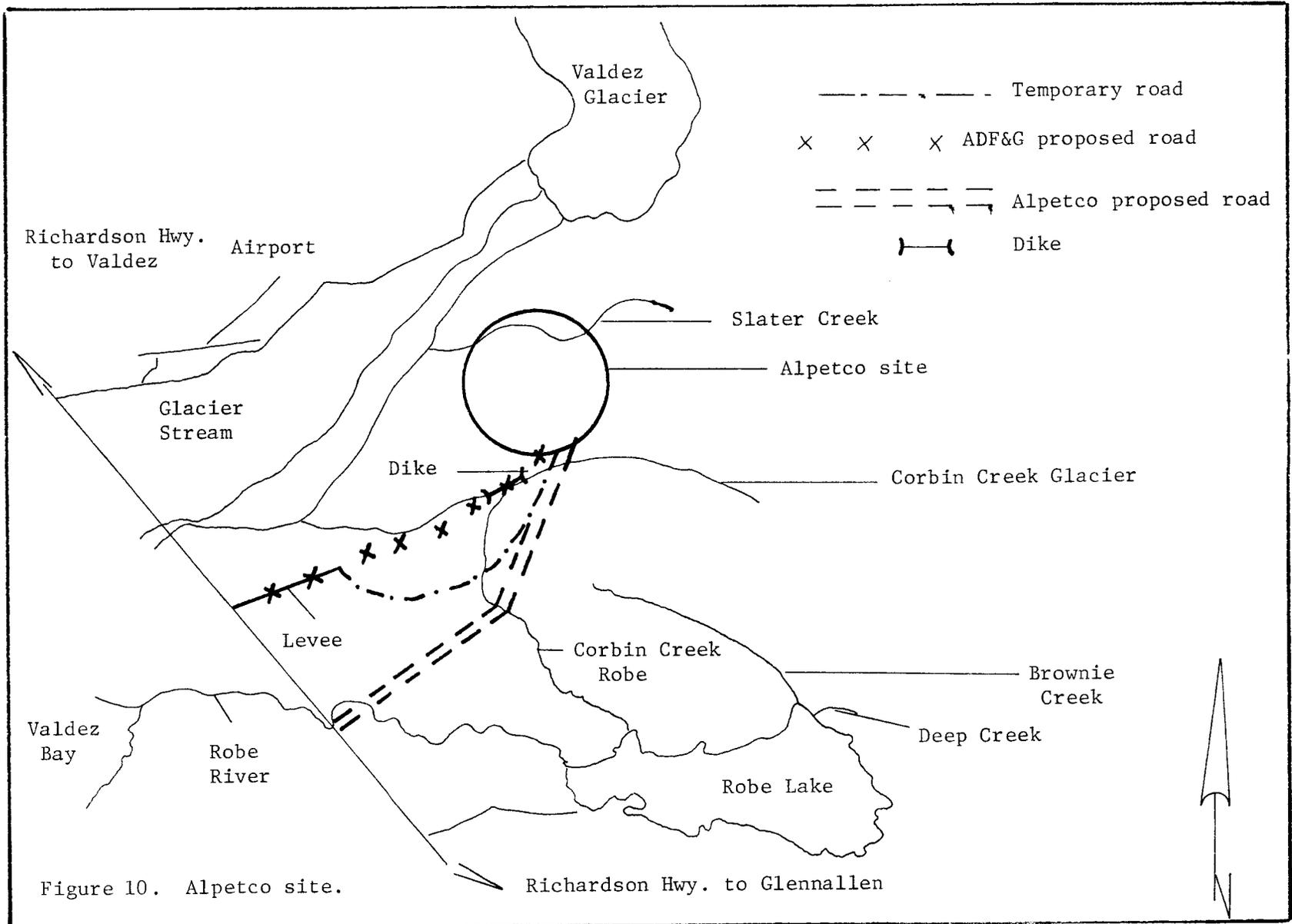


Figure 9 . Salmon Spawning Streams in Upper Valdez Bay.



The Robe Lake system, including Corbin and Brownie Creeks, is the major spawning and rearing area for sockeye and coho salmon in the Valdez region. Spawning and rearing areas for salmon in the upper Valdez Bay area are limited, and industrial and municipal growth threatens to further reduce the size of these areas.

A recommendation has been made that any access road to the Alpetco site should be in the Glacier Stream drainage rather than the Robe Lake drainage. The Glacier Stream drainage has only a small Dolly Varden population and fish losses as a result of a spill would be much less than in any other drainage.

#### Habitat Protection Investigations

During 1979, various construction projects in the area were reviewed and monitored. Recommendations and stipulations were made to prevent losses of fishery populations and habitat.

Preliminary environmental investigations were conducted by private consultants for the proposed petrochemical plant (Alpetco) at Valdez. Results of these studies were included in the Environmental Impact Statement and were reviewed by the Alaska Department of Fish and Game. One of the proposed access roads, and the pipeline route, would cross the Robe River and Corbin Creek. Since Corbin Creek is the major coho salmon spawning area, recommendations were made to reroute the access road and pipeline to alleviate the potential for damage to the fisheries.

Plans for construction of new dock facilities at Valdez were reviewed and recommendations made to protect the fisheries. Dike repairs were made at Corbin Creek, Tex Smith Lake and Tolsona Lake to prevent loss of water and subsequent loss of fisheries habitat.

A telephone cable burying project on the Tok Highway was monitored several times to assure that the several stream crossings were accomplished with minimum damage to the environment.

Highway construction at Thompson Pass and Keystone Canyon was monitored throughout the work season.

Two oil spills were investigated. An oil truck overturned into Summit Lake and several thousand gallons of oil escaped into the lake. Prompt action by cleanup crews prevented serious damage to the environment. No dead fish were observed. A crack in the Alyeska pipeline near the Little Tonsina River allowed an undetermined amount of crude oil to escape. Again, prompt action by cleanup crews prevented the oil from seeping into any streams.

Several State land reclassification plans were reviewed. Recommendations for protection of the fishery resources were made.

#### DISCUSSION

The high ratio of marked grayling to unmarked grayling (approximately 1:4) captured during test netting in Tolsona Lake definitely indicates a low

population. Since Tolsona Lake is the primary source of grayling eggs for Statewide use, this can have some serious implications. In 1979, 519,000 eggs were delivered to the hatchery system; however, only 30,000 fry were available for stocking due to unexplained egg losses.

Stocking procedures in Tolsona Lake have been consistent. The fish are received about the same time each year and distributed around the lake by boat. Annual winter dissolved oxygen determinations are made each year. Winter dissolved oxygen concentrations are generally low in Tolsona Lake; however, since 1976, they have been 4.0 ppm or higher. This is well above the minimum requirements for overwinter survival of grayling.

Live trapping for grayling, using fyke traps, will be conducted in 1980 to collect additional population information.

Rainbow trout were stocked in Robe Lake in 1956, 1958 and 1959. During test netting in 1979, two rainbow trout were captured. This is the first record of any rainbow trout in Robe Lake. It is possible that there was some residual survival from these plantings; however, conditions are too marginal for development of a fishable population.

North Jans Lake was stocked in the fall of 1977 with 8,000 Swanson River and 4,000 Ennis-Ship Creek rainbow trout for a stocking ratio of 1:2 Ennis-Ship Creek to Swanson River stocks. Test netting in 1978 and a sport catch in 1979 revealed a ratio of 1:12 and 1:18, respectively, of Ennis to Swanson fish. This survival verifies the findings of similar experiments in other areas of the State. All of the male rainbow trout taken in 1979 were ripe and displaying spawning characteristics. None of the female trout caught were ripe. It is expected that the females will be mature in 1980. Live trapping will be conducted on this lake in 1980.

Probably the most important information derived from the 1979 creel census is the 53.5% increase in anglers over 1978. It is unlikely that the effort will continue to increase at this same rate, but significant annual increases can be expected. The fishery was able to accommodate the increased effort in 1979 because the commercial fishery on this run of chinook salmon was closed, which significantly increased the escapement into the sport fishery. Despite this larger escapement into the Gulkana River, the count of spawning chinook salmon after the sport fishery was only 1,052. The 6-year average is 1,023 fish. The sport catch of chinook salmon increased to 1,960 which was a 357% increase over 1978. This was due to the larger number of chinook available to the anglers.

It is not expected that closures on commercial chinook salmon fishing will be an annual occurrence. Sport fishermen will not always have large populations of chinook salmon available in the Gulkana River. If fishing effort remains the same or increases, the normal run of chinook salmon into the Gulkana River will not be large enough to accommodate the anglers and provide for an adequate escapement to the spawning grounds. Seasons and fishing methods may have to be adjusted to protect this run. It is recommended that a management allocation plan be considered specifically for Copper River drainage chinook salmon.

Comparing data from 1968, 1978 and 1979 of sport-caught grayling strongly suggests little change in size. The average size of fish caught in 1979 was 21 mm less than in 1978; however, this may not be significant. Sampling should be continued to determine if a reduction in size is developing. Seventy-five percent of the grayling taken by sport fishermen in the Gulkana River were by floaters. They reported catching 1,618 fish and keeping only 340.

Robe Lake investigations were continued in 1979. Dissolved oxygen data show considerable variance from year to year and is probably due to a difference in snow and ice depths. Minnow traps were used in Robe Lake to determine rearing areas used by coho salmon during the summer. Seventeen sites were trapped for a total of 1,355 hours, and 740 stickleback and six coho salmon were caught. This would indicate that much of the lake is not utilized for rearing by coho salmon.

Rearing and migration studies will be conducted on this system in 1980 in cooperation with the Valdez Fisheries Development Association. We will be working closely with the Valdez Fisheries Development Association concerning coho, pink and chum salmon enhancement in the Valdez area. Tentative plans call for using facilities at the proposed Alpetco plant for rearing coho salmon.

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