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STATE OF ALASKA  
Keith H. Miller, Governor



ANNUAL REPORT OF PROGRESS, 1968 - 1969  
FEDERAL AID IN FISH RESTORATION PROJECT F-9-1  
SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME  
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Division of Sport Fish

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THE STATE OF ALASKA  
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INTRODUCTION

This report of progress involves the findings and work accomplished under the State of Alaska, Federal Aid in Fish Restoration, Project F-9-1, "Sport Fish Investigations of Alaska".

The work conducted during this reporting period constitutes effort on nine separate studies which are crucial in evaluating the sport fishing resources of the State. Recreational demands have necessitated broadening our knowledge of the fishery. All 20 jobs were of continuing nature enabling the Department to keep abreast of present and future impacts on certain fish species. Specifically, the work included work on inventory and cataloging of the sport fish and sport fish waters of the State, sport fishery creel census and access. Special emphasis was given to Dolly Varden, silver salmon, anadromous fish, grayling, salmon, sheefish, pike, and char. The information gathered has provided supporting documentation for better fish management and a basis for necessary future investigations.

The subject matter contained in these reports may be inconclusive. The findings and interpretation are subject to re-evaluation as the work progresses.

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## RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations of Alaska.  
Project No.: F-9-1 Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters of the Copper River, Prince William Sound, and the Upper Susitna River Drainages.  
Job No.: 14-A

Period Covered: July 1, 1968 to June 30, 1969.

## ABSTRACT

Thirteen lakes were test netted to determine the success of experimental fish stocking.

Test netting and preliminary survey work was conducted on ten lakes to determine their sport fishery potential.

Rainbow trout were found in the Gulkana River from Paxson Lake downstream to a point ten miles above Sourdough Creek.

An egg take conducted at Our Creek, tributary to Moose Lake, produced 1,087,000 grayling eggs for experimental hatching, rearing and stocking.

Creel census and age-length studies were initiated on burbot harvested by winter anglers from Susitna, Tolsona and Moose Lakes.

Commercial whitefish fishing operations were monitored to determine size and numbers of fish taken and numbers and species of incidentally caught fish.

Evaluation of experimental stocking of rainbow trout in 30 area lakes since 1959 showed the successful establishment of that species in 17 lakes.

Silver salmon introduced experimentally in ten lakes were found to be established in six.

Winter dissolved oxygen concentration tests were conducted on 15 lakes.

Creel census conducted at Valdez revealed that anglers took silver salmon at a rate of 0.14 fish per hour and at a rate of 0.31 per hour for all salmon species.

An access trail for public and Department use was constructed to connect the spawning camp at Our Creek with the Glenn Highway.

Recommendations on culvert placement were made on three Alaska Department of Highways projects.

A recommendation was made and accepted for the inclusion of a boat launching facility to be included in the construction of the Copper River bridge near Chitina.

#### RECOMMENDATIONS

1. That present job objectives be continued with expansion of cataloging and inventory surveys of off-highway waters within the job area.
2. That cataloging and inventory of lakes and streams along the Chitina-McCarthy trail be expanded in view of the pending construction of a bridge across the Copper River which would allow automobile access to the area.
3. That the program of winter dissolved oxygen determinations in selected lakes be continued to determine minimum oxygen requirements for various species of game fish.
4. That continued effort should be directed toward increasing the recreational use of fisheries during the winter months through a concerted educational and informational program.
5. That creel census information and data on burbot age-length relationships should be continued.

#### OBJECTIVES

1. To assess and record 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.
2. To determine the current status and public availability of the recreational fishing waters within the job area. To assist as required in the investigations of public access studies and make recommendations for segregation of recreational fishing access sites.
3. To evaluate multiple water-use, development projects (public and private) and the effects on the area's streams and lakes for the proper protection of the resource.
4. To locate sport fish egg sources and to make egg takes as required for experimental hatching and stocking.
5. To evaluate application of sport fish restoration and stocking measures and to formulate recommendations for the management of area waters and direct the course of future studies.
6. To investigate, evaluate and develop plans for the enhancement of freshwater and anadromous fish stocks.

## TECHNIQUES USED

Fish populations were sampled with 125 X six-foot variable mesh (3/4 to 2-inch bar measure) nylon, sinker type, gill nets.

All fish were measured to fork length in millimeters.

A Hach (Model OX-2-P) kit was used for determining dissolved oxygen.

## FINDINGS

### Population Sampling - Managed Lakes

Jans Lake was test netted in 1966 and found to be barren of fish life. In 1967, 30,000 fingerling silver salmon, Oncorhynchus kisutch, were introduced into the lake. Test netting conducted in 1968 produced 63 silver salmon for a net-hour frequency of 1.1 (Table 1). These silver salmon ranged in fork length from 155 to 195 mm and averaged 170 mm. It is expected that these fish will reach a desirable size for the fly-in angler by the summer of 1969.

Caribou Lake, located near the Denali Highway, has been planted with rainbow trout, Salmo gairdneri, three times since 1961. Efforts to substantiate survival of these plants by test netting have been unsuccessful until 1968 when four rainbow trout were taken. One individual trout, 440 mm in fork length, was found to be of the 1962 stocking. Fish growth in this lake is extremely slow due to the relatively high altitude (3,600 feet), the subsequent short growing season and cold water temperatures.

Copper Lake was test netted in 1968 as part of a more intensive survey. The presence of kokanee, Oncorhynchus nerka, was established when 19 were taken in sample nets. Netted kokanee ranged in fork length from 249 to 334 mm and averaged 313 mm. All sampled kokanee were age IV and V males and were approaching sexual maturity. Copper Lake also serves as a spawning and rearing area for red salmon that migrate upstream from Prince William Sound. In addition, there are good populations of lake trout, Salvelinus namaycush; grayling, Thymallus arcticus; and whitefish, Coregonus clupeaformis.

Kettle Lake, located along the Nabesna Road, was stocked in 1967 with fingerling lake trout. Test netting in 1968 produced one lake trout 107 mm in length. The lake previously supported only longnose suckers, Catostomus sp.

Caribou Lake was stocked with rainbow trout in 1965 and 1966; and in 1967 with silver salmon. Test netting established the presence of both species. Rainbow trout taken were from the 1966 plant and averaged 36 mm longer than the silver salmon (average length 130 mm) which were stocked in 1967. Caribou Lake is adjacent to the Lake Louise road and is readily accessible to the angler.

Mirror Lake, located on the Glenn Highway, was stocked in 1966 with rainbow trout. Test netting in 1967 (Williams, 1968) produced no evidence of survival; however, in 1968 two rainbow trout were taken that averaged 290 mm in length. Past records show that in 1958 this lake had an excel-

lent rainbow trout population. No rainbow trout were stocked between 1959 and 1966. There are no spawning areas available for salmonids, and this fishery is dependent on regular stocking.

Crosswind Lake was test netted in conjunction with whitefish studies. The average length of whitefish taken (358 mm) is identical to the average length of whitefish taken by a commercial fisherman who operated at the lake during late 1968. The commercial fisherman was using nets with a stretch mesh of 2.5 inches, while those used in test netting are of variable mesh size.

Elbow Lake, adjacent to the Lake Louise road, was stocked with silver salmon in 1967. Five silver salmon, which averaged 127 mm in length, were taken during 1968.

Tolsona Lake was test netted to continue prior data collected on grayling. The highest frequency of grayling per net hour recorded was 4.27 in 1966. In 1967 this frequency had declined to 0.14 grayling per net hour. Test netting in 1968 indicated a small increase to 0.5 fish per net hour. In contrast, the number of longnose suckers per net hour rose from 0.0 in 1963 to 1.8 in 1968. The significant drop in grayling per net hour coincides with the decrease in numbers of grayling trapped at Bessie Creek.

Moose Lake has been test netted annually since 1960. The highest number of grayling per net hour was 5.03 in 1966 (Williams, 1967). The 1967 net frequency declined to 2.40 and in 1968 it remained the same. Tag recoveries showed that 12 percent of the sampled grayling had migrated from Tolsona Lake.

#### Population Sampling - New Lakes

Big Echo and Little Echo Lakes, located near the Copper River Highway in the Cordova area, were surveyed as possible grayling habitat. These lakes are very small (two surface acres each) and can be reached by automobile and a short hike. Big Echo and Little Echo Lakes were stocked with grayling fry as past plantings of grayling in two other lakes in the Cordova area have proved successful and are quite popular with local anglers. Small Dolly Varden, Salvelinus malma, and silver salmon were found in Big Echo Lake (Table 2), while Little Echo was barren of fish life.

Hallie Lake, located at Mile 9, Denali Highway, was test netted and found to be devoid of fish. This lake has no outlet, is 45 feet maximum depth, and has a surface area of 20 acres. Natural fish food is abundant, and it will be stocked with salmonids in 1969.

Suslota Lake, a fly-in fishery located at the head of Suslota Creek, was partially surveyed. This lake has a surface area of 330 acres and is reported to have lake trout, although none were taken in the test netting. Because of its remote location, fishing pressure is very light.

Elsie Lake lies three miles east of Lake Louise and is not accessible by road. The lake has a surface area of 250 acres and is part of the Tolsona Creek drainage. There are no records of utilization of this lake by fishermen, although it does support a good population of grayling.

TABLE 1 - Test Gill-Net Summaries, Managed Lakes, 1968.

Name	Location		No. of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent	
								Composition	Composition
Caribou (Lk Louise)	Lat. 62 12' 50"N		18	GR	111-248	155	.90		46
	Long. 146 31'W		17	RB	157-175	166	.85		44
			4	SS	124-138	130	.20		10
Caribou (Denali)	Lat. 63 5'N		4	RB	440-518	469	.01		100
	Long. 145 48'								
Copper	Lat. 62 25'N		54	WF	132-384	184	1.50		51
	Long. 143 30'		22	LT	150-838	446	.61		26
			19	KK	249-334	313	.53		17.5
			4	GR	129-387	294	.11		2.8
			2	BB	365-379	372	.05		1.9
			1	RS	621	621	.03		.8
Crosswind	Lat. 62 20'		158	WF	145-530	358	1.80		61
	Long. 146		88	GR	134-393	238	1.00		34
			11	LT	470-760	555	.12		5
Elbow	Lat. 62 12' 15"N		5	SS	122-135	127	.25		50
	Long. 146 30' 30"W		5	GR	145-264	222	.25		50
Jans	S 20, 21, T6N, R6W		63	SS	155-195	170	1.10		100
Junction	S 33, T4N, R6W		29	GR	243-290	265	1.60		100
Kettle	Mi 22 Nabesna Rd		7	LNS	100-210	148	.88		88
			1	LT	107	107	.13		12

TABLE 1 (Cont.) - Test Gill-Net Summaries, Managed Lakes, 1968.

Name	Location	No. of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
Mirror	Lat. 146 38' N	15	GR	170-394	328	.32	83
	Long. 62 2' W	2	RB	277-303	290	.04	11
		1	LNS	410	410	.02	6
Moose	Lat. 62 9'	82	GF	125-355	279	2.40	.49
	Long. 146 6'	78	LNS			2.20	.47
		7	BB			.20	.04
Pippin	Lat. 145 10'	14	GR	173-193	181	.66	100
	Long. 61 45'						
Tex Smith	Lat. 62 6'	11	RB	117-470	377	.65	100
	Long. 146 17' 30"						
Tolsona	Lat. 62 7'	56	LNS	104-455	256	1.80	60
	Long. 146 4'	18	SS	285-375	340	.60	19
		17	GR	115-195	135	.50	18
		3	BB			.10	3

\*GR - Grayling                   WF - Whitefish  
 SS - Silver Salmon           RS - Red Salmon  
 BB - Burbot                   KK - Kokanee  
 LNS - Longnose Sucker       LT - Lake Trout

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

TABLE 2 - Test Gill-Net Summaries, New Lakes, 1968.

Name	Location		No. of Fish	Species*	Length Range (mm)	Mean Length (mm)	Frequency**	Percent Composition
	Lat.	Long.						
Big Echo	Lat. 60 29' N		6	DV	132-360	170	.38	86
	Long. 145 19' W		1	SS	140	140	.06	14
Little Echo	Lat. 60 29' 15" N		-	No Fish -	---	---	---	---
	Long. 145 19' W							
Dadina	Lat. 62 50' 30" N		-	No Fish -	---	---	---	---
	Long. 144 47' W							
Hallie	Lat. 63 5' N		-	No Fish -	---	---	---	---
	Long. 145 41' W							
Suslota	Lat. 62 42' 30" N		30	LNS			1.70	60
	Long. 144 34'		9	GR	190-385	257	.53	18
			8	WF	234-472	427	.47	16
			3	RS			.17	6
Mile 157 (1)	R 6W T 4N S 31		-	No Fish -	---	---	---	---
Mile 157 (2)	R 6W T 4N S 31		-	No Fish -	---	---	---	---
Mile 157 (3)	R 6W T 4N S 31		-	No Fish -	---	---	---	---
Mile 159	R 6W T 4N S 32SE 1/4		-	No Fish -	---	---	---	---
Elsie	R 6W T 6N S 29		28	GR	120-305	250	.47	53
			25	LNS			.42	47
*DV - Dolly Varden		SS - Silver Salmon			LNS-Longnose Sucker			
GR - Grayling		RS - Red Salmon			WF - Whitefish			

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

Mile 157 Lakes are located adjacent to the Glenn Highway. These three lakes are small, shallow and have no fisheries potential.

Mile 159 Lake, located one-fourth mile south of Lake Louise Junction, has a maximum depth of 13 feet. The lake has no visible outlet or inlet and is barren of fish. Dissolved oxygen determinations will be conducted to determine if management would be feasible.

#### Gulkana River System

A float trip was made during mid-July on the Gulkana River from Paxson Lake to Sourdough Creek. Rainbow trout were found from the lake outlet to a point approximately 15 miles below the rapids. The greatest concentration of rainbow trout was found at the rapids, which is about the midpoint between the lake and Sourdough Creek. The rainbow trout at the rapids ranged in fork length from 140 to 439 mm. Stomach contents of 10 rainbow trout were examined and contained 90 percent red salmon fry. Grayling taken in the same area also took red salmon fry in large numbers.

The presence of red salmon in the Crosswind Lake drainage (tributary to West Fork, Gulkana River) was substantiated when two salmon tags were recovered from Crosswind Lake. These salmon were originally tagged in Wood's Canyon on the Copper River.

#### Grayling Egg Take

Our Creek, tributary to Moose Lake, was selected as the site for securing grayling eggs and is described by Williams (1968). A total of 1,087,000 grayling eggs were obtained for experimental hatchery rearing and stocking.

An average of 4,056 eggs were stripped from 268 female grayling. These fish averaged 276 mm in length.

Bessie Creek, the site of the 1967 egg take, was not used since various factors indicated the run would be small. A trap installed in the creek substantiated this forecast. In 1968, 204 grayling were counted through Bessie Creek, as compared to 671 in 1967, 2,645 in 1966, and 3,000 in 1965 (Williams, 1966, 1967 and 1968).

#### Burbot Harvest Studies

Winter angling for burbot, Lota lota, has become increasingly popular during the past three years due to the increased use of snow machines and a concerted information and education effort. There is a lack of basic information on burbot in Alaska, and it was decided to collect data on this fish whenever and wherever available. Data was obtained from 85 burbot collected from Susitna, Tolsona, and Moose Lakes. Measurements, stomach contents, sex, and condition of gonads were recorded. Otoliths were removed for aging purposes.

A comparison of burbot lengths taken from Tolsona, Moose, and Susitna Lakes by winter angling is presented in Table 3. Age and length data obtained from Moose and Tolsona Lakes burbot is shown in Table 4.

TABLE 3 - Length Comparison of Burbot from Susitna, Moose and Tolsona Lakes, 1967-68 and 1968-69.

<u>Lake</u>	<u>Winter</u>	<u>No.</u>	<u>Length Range (mm)</u>	<u>Average Length (mm)</u>
Tolsona	1967-68	23	371-724	641
Tolsona	1968-69	20	455-720	539
Moose	1968-69	21	440-594	496
Susitna	1967-68	21	575-950	695

Fish were measured as they were caught, and the same methods of fishing were used on all lakes. It is interesting to note that the average size of burbot taken from Tolsona Lake was 102 mm less in the winter of 1968-69 than during the winter of 1967-68. Burbot from Susitna Lake are considerably larger than from the other two lakes.

TABLE 4 - Age-Length of Burbot from Moose and Tolsona Lakes, 1968-69.

	<u>Tolsona Lake</u>	<u>Moose Lake</u>
No. Age IV	4	4
Av. Fork Length	502 mm	455 mm
Length Range	455-543 mm	448-470 mm
No. Age V	12	15
Av. Fork Length	522 mm	504 mm
Length Range	485-554 mm	440-595 mm
No. Age VI	3	1
Av. Fork Length	593 mm	532 mm
Length Range	538-660 mm	---
No. Age VII	1	---
Av. Fork Length	720 mm	---

In Table 4, 19 of the burbot were mature females, 19 were mature males, and two were classed as immature.

Some difficulty was encountered in reading burbot otoliths. Several clearing agents and techniques were used, but most were unsuccessful with older fish. Otoliths from burbot up to five years old can generally be read shortly after removal from the fish, using no clearing agent other than water.

Stomach contents were examined for food habit studies. Four burbot from Moose Lake contained vegetation and mollusks, Pisidium sp., One burbot from Tolsona Lake and three from Susitna Lake were found to contain fish remains identified as other burbot and whitefish.

The smallest mature burbot examined was a female from Moose Lake that was 440 mm in length. Although the data collected is limited, it appears that burbot may mature by, or at, age V in the lakes sampled.

Ice fishing for burbot is different from other types of winter angling in that the fisherman is not required to remain at his lines constantly. In practice, the fisherman sets several baited lines and then retires to a warm spot. The lines are checked periodically as necessary. Commonly, the lines will be checked late in the evening and then left until the following morning.

This type of fishing is difficult to monitor with conventional creel census techniques. Regulations for burbot fishing are liberal, with no daily bag limit applicable. The volunteer reporting method is the most practical under these circumstances.

During the period of October, 1968, through February, 1969, a volunteer creel census was operated at Tolsona Lake. Guests at the lodge were asked to report their burbot catches. Four hundred and eighty-nine burbot were reported during this period. The average catch per angler was eight fish. The lodge owner reported that, based on his observations and the lodge register, less than half of the anglers reported their catches.

#### Whitefish

Whitefish studies were limited to monitoring commercial fishing activities at Louise and Crosswind Lakes. The lone commercial operator at Lake Louise made three unsuccessful attempts to take whitefish and then abandoned the venture.

Commercial fishing activities for whitefish at Crosswind Lake were conducted in March and October by a single operator. During March, this fisherman reported taking 390 pounds of whitefish and no other species. Other fishing produced 6,693 pounds of whitefish, 13 lake trout and "several" grayling. Thirty-six whitefish taken by this commercial fisherman in 1968 had an average weight of 1.03 pounds. The fish ranged in weight from 0.74 to 1.34 pounds.

A summary of whitefish lengths is presented in Table 5 for the years 1960 through 1968 for Crosswind Lake.

TABLE 5 - Lengths of Whitefish Taken From Crosswind Lake, 1960 to 1968.

<u>Year</u>	<u>Source</u>	<u>No.</u>	<u>Length Range*</u> <u>(mm)</u>	<u>Average</u> <u>Length (mm)</u>	<u>Lake Trout</u>
1960	F & G	93	203-470	322	30
1965	Zimbicki	87	305-422	353	0
1966	F & G	94	208-442	330	1
1968	F & G	158	145-530	358	11
1968	Johnson	88	329-441	326	6
1968	Johnson	36	321-410	358	0

\*All fish listed in this table were measured by F. & G. personnel.

TABLE 6 - Experimental Fish Stocking, Copper River Drainage.

Lake	Date of Plant	No. of Fish	First Year Size		Remarks
			Length Range (mm)	Av. Length (mm)	
Crater	6/65	21	196-246	224	
Caribou (Denali)	6/62	2	length not recorded	---	Age V size 518 mm
Caribou (Lake Louise)	7/66	17	157-175	166	
Gergie	8/60	2	207-217	212	
Blueberry	8/56	5	length not recorded	---	Age III size 289 mm Av.
Moore	8/60	2	149-209	176	
Mirror	7/66	2	length not recorded	---	Age II size 290 mm Av.
One Mile	8/64	1	---	---	
Summit #1	8/54	--	length not recorded	---	
Summit #2	8/54	--	length not recorded	---	
Tex Smith	8/53	--	length not recorded	---	
Three Mile	9/60	21	171-229	198	
Two Mile	9/60	11	150-209	179	
City Res. #1	--	63	length not recorded	---	
City Res. #2	--	63	length not recorded	---	
Crater (Cordova)	8/54	--	length not recorded	---	
Scout	8/53	--	length not recorded	---	
Jan's	7/67	63	155-195	170	
Caribou	6/67	4	124-138	130	
Elbow	6/67	5	122-135	127	
Three Mile	9/60	3	---	179	
Moose	9/62	6	length not recorded	---	Age II size 213-413 Av. 300 mm.
Tolsona	7/62	4	232-309	270	

TABLE 7 - Winter Dissolved Oxygen Determinations, 1968.

Date	Lake	Ice (in.)	Snow (in.)	Depth of Sample (ft.)	Oxygen (ppm)	Maximum Depth (ft.)	Fish Present*
4/15	Moose	36	11	5	4.0	30	GR, SS, BB
4/15	Tolsona	38	10	5	1.5	14	GR, SS, BB
4/15	Pippin	34	4	5	1.0	14	GR
4/15	Kenny	37	1	5	3.5	13	Planted 1968
4/17	Mirror	23	26	5	3.5	12	RB, GR
4/19	Arizona	32	10	5	3.0	19	Planted 1968
4/22	151 Mile	36	12	5	.5	14	None
4/22	Meiers	36	12	5	4.5	26	GR
4/22	Nita	36	9	5	8.5	45	GR, WF, BB
4/22	Dick	35	18	5	5.5	32	GR
4/24	Elbow	27	15	5	7.0	17	GR, SS
4/24	Caribou	26	12	5	1.0	25	GR, RB, BB, SS
4/15	Junction	24	20	5	3.5	19	GR
4/15	Crater	29	11	5	7.5	17	RB
4/22	June	34	8	5	8.0	20	GR, WF, BB

\*GR - Grayling  
 SS - Silver Salmon  
 BB - Burbot  
 RB - Rainbow Trout  
 WF - Whitefish

### Experimental Fish Stocking

Rainbow trout have been stocked in the Glennallen area since 1953; and silver salmon since 1959. Available records show that 30 lakes were stocked with rainbow trout. Seventeen of the lakes now have established rainbow trout populations. At least 12 of the lakes have no spawning areas for salmonids and must be sustained by periodic stocking.

All of the rainbow trout stocking was done in late June, July, August, or early September, with the majority of the plantings made in July.

Table 6 shows the successful plants and some representative first-year growths of rainbow trout and silver salmon.

Rainbow trout have been established in eight lakes having maximum depths of less than 20 feet. Summit Lake #1, located on Thompson Pass, is only nine feet deep and subject to extreme ice conditions.

Conversely, seven lakes that were stocked unsuccessfully with rainbow trout have depths exceeding 20 feet. Two outstanding examples are Nita Lake, with a maximum depth of 45 feet, and Dick Lake, which is 32 feet deep. Both lakes have high winter dissolved oxygen concentrations which compare favorably with concentrations in lakes which have established rainbow trout populations (Table 7).

Since their initial introduction in 1960, silver salmon have been stocked in ten lakes and subsequently established in six of these lakes. Tolsona and Elbow Lakes have maximum depths of 14 and 17 feet, respectively. The remaining four have maximum depths exceeding 24 feet (Table 7). All of the four unsuccessful silver salmon lakes have depths exceeding 20 feet.

Three of the successful silver salmon lakes have no visible inlets or outlets. All four of the unsuccessful lakes (Burnt, June, Meiers, and Nita) have inlets and outlets and good levels of winter dissolved oxygen concentrations with concentrations comparable to Moose and Tolsona Lakes (Williams, 1966, 1967 and 1968).

Ice thickness varies considerably with the type of winter, and no correlation with survival or mortality has been substantiated.

It seems apparent from the data collected that, in addition to other factors, depths and dissolved oxygen concentrations have a strong influence on the success of experimental stockings of salmonids. Not the least of these factors is the condition of the fry and fingerling when stocked. Many plants were made without personal observation by the area biologist, and comments concerning condition of planted fish would only be conjecture.

The influence of indigenous species of fish on experimentally stocked salmonids is not clear. Lakes such as Gergie, Mirror, Caribou, Elbow, Three-Mile, Moose, and Tolsona all support grayling, whitefish and burbot populations in association with salmonids. Burnt, June and Nita Lakes support these same native species, but salmonid introductions have failed.

### Valdez Creel Census

Creel census was conducted four weekends in the month of August. At this time, a local silver salmon derby attracts many sport fishermen to Valdez Bay. Anglers were contacted at the small boat harbor as they completed fishing and also from the military recreation camp (Table 8).

TABLE 8 - Creel Census, Valdez Bay, 1968.

<u>Source</u>	<u>Period</u>	<u>Total*** Anglers</u>	<u>Anglers Per Hr.</u>	<u>SS Per Hr.*</u>	<u>All Salmon Per Hr.</u>	<u>Total SS</u>	<u>Total Other Salmon**</u>	<u>Total All Salmon</u>
Military	May June July	75	4.5	.12	.6	43	160	203
Military	Aug.	47	4.8	.13	.61	27	53	80
F & G	Aug.	430	4.5	.14	.25	274	223	497
Combined		552	4.6	.14	.31	344	436	780

\*SS - Silver salmon

\*\*Other - Pink salmon, Oncorhynchus gorbuscha, and chum salmon, O. keta.

\*\*\*Total - Total number of anglers checked.

During the 1966 silver salmon fishery the catch rate was 0.4 fish per hour, and in 1967 it was 1.1 per hour. The creel census conducted each August at Valdez is not intended to be complete. Insufficient manpower makes this unfeasible, but sufficient fishermen are contacted each year to provide management index trends in fishing pressure and fishing success.

#### Cooperative Access Studies

A 3/4-mile long access trail was constructed which connects the grayling spawning site at the upper end of Moose Lake with a seismograph trail. This seismic trail intersects the Glenn Highway at Mile 167.7. This combination of trails will serve the Department and fishermen in the event that the present access at Mile 180 Glenn Highway is ever closed by private holdings.

Ten new roadside signs were installed along the Denali Highway denoting fishing areas and distances from the road.

Recommendations for culvert placement were made on three highway construction projects, and actual placement of the culverts were supervised to assure optimum protection to game fishes.

Recommendations were submitted concerning the addition of a boat launching facility near the site of a new bridge to be constructed across the Copper River near Chitina.

An agreement was made with the Alaska Department of Highways for the construction of a pull-out and installation of signs at Mile 165.9 Glenn Highway. The trail to Lost Cabin Lake originates at this point. The construction of the pull-out will be included in the road construction presently underway in that area and will be financed by Federal Highway Funds.

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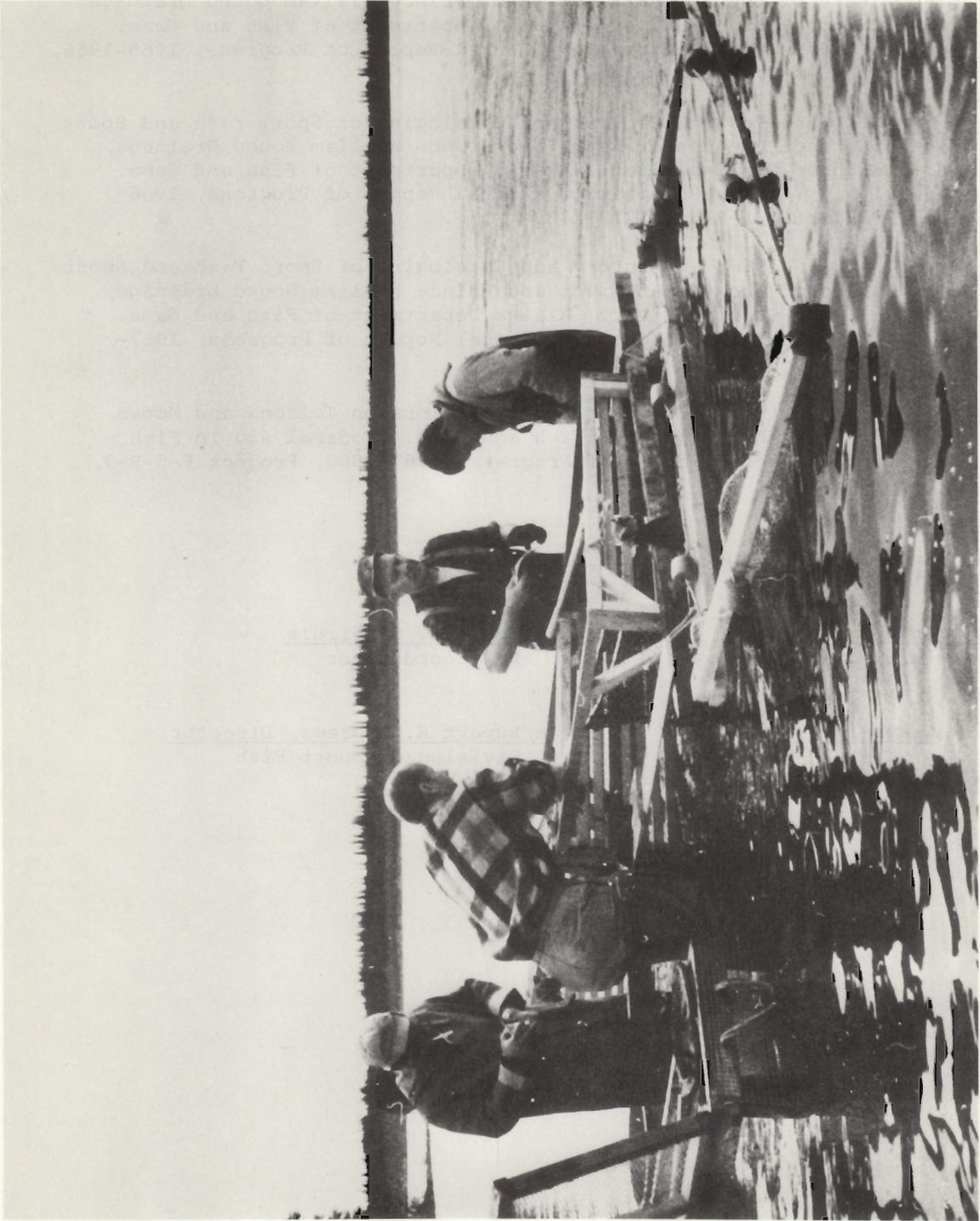
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Grayling investigation study in Interior Alaska.