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STATE OF ALASKA

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1963 - 1964

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-5

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME

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INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-5, "Sport Fish Investigations of Alaska."

The project is composed of 25 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. Of these, eight jobs are designed to continue the cataloging and inventory of the numerous State waters in an attempt to prepare an index of the recreational waters. Four jobs are designed for specific sport fishery creel census while the remainder of the jobs are more specific in nature. These include independent studies on king salmon, silver salmon, grayling, Dolly Varden, a statewide access evaluation program, egg take program and a residual toxaphene study. The information gathered from the combined studies will provide the necessary background data for a better understanding of local management problems and assist in the development of future investigational studies.

The subject matter contained within these reports is often fragmentary in nature. The findings may not be conclusive and the interpretations contained therein are subject to re-evaluation as the work progresses.

JOB COMPLETION REPORT

RESEARCH PROJECT SEGMENT

STATE: ALASKA Name: Sport Fish Investigations
of Alaska.

Project No: F-5-R-5 Title: Inventory and Cataloging of
the Sport Fish and Sport Fish
Waters in the Interior of
Alaska.

Job No: 13-A

Period Covered: October 15, 1963 to June 30, 1964.

Abstract:

Inventory and cataloging activities were conducted on lakes and streams in the Fairbanks vicinity and along the Alaska and Richardson Highways. Reconnaissance surveys were made along the Elliott and Nenana Highways.

A total of 15 lakes and 14 streams were surveyed during the report period. Test netting was conducted on 15 lakes for fish population analysis.

A creel census program was operated on the Salcha and Unalakleet Rivers, and catch results analyzed.

A transplant of adult lake trout from two "fly-in" lakes into Harding Lake was accomplished. Information was obtained on methods of handling and aerial transplanting.

Dissolved oxygen determinations were made on 11 bodies of water to determine suitability for introductions of game fish.

The Interior Alaska Inventory and Cataloging position was held by Howard Metsker, Sport Fish Biologist, prior to his leaving the Department in August 1963. The position was then unoccupied until October 15, when it was filled by Larry Heckert, Sport Fish Biologist.

Recommendations:

It is recommended that:

1. Inventory and cataloging of Interior Alaska waters be continued, with increased emphasis on waters in outlying areas.
2. A program be initiated to systematically test net the waters currently stocked to further implement fishery management.
3. Salmon surveys be increased in the Tanana River Drainage to determine the magnitude of existing salmon runs and the potential for expanded sport fisheries.
4. A second transplant of adult lake trout be made into Harding Lake to supplement the 1963 stocking.
5. Comprehensive creel checks be continued on the Salcha and Unalakleet River salmon fisheries.
6. A source of grayling and lake trout eggs for hatching be located in an area presently free of intensive angling pressure.

Objectives:

1. To conduct lake and stream surveys and evaluate the extent, the potential, and the current use of the waters readily available to the area's angler.
2. To investigate possible sources for providing a supply of grayling, lake trout, and sheefish eggs for experimental hatching and rearing.
3. To evaluate multiple water use development projects for proper protection of the sport fish resources.
4. To determine the relative need for future management investigations and to direct the course of such studies.

Techniques Used:

Standard survey techniques were employed to collect information on the lakes and streams investigated. Physical

characteristics such as spawning areas, bottom types, depth, acreages, water temperatures, and stream barriers were evaluated in the physical surveys.

Experimental gill nets with graduated mesh were used to determine the resident and anadromous fishes present and to collect age and growth data. Salmon distribution and number were further assessed by aerial observation and creel census.

Lakes were assessed for potential sport fish value, and recreational and public use sites were noted. This information was forwarded to the access biologist for processing.

Information collected from lake and stream surveys was made available to the area management biologist, and recommendations were made relating to fishery management.

Findings:

Lake Trout Transplant

Harding Lake is located 44 miles southeast of Fairbanks along the Richardson Highway. The surface acreage is approximately 2,600; the maximum depth is 148 feet. Mean depth of the lake is approximately 70 feet.

The increasing population of the Fairbanks area and the subsequent summer recreational use of Harding Lake necessitates the introduction of a desirable fish species capable of competing with the existing northern pike population. A biological survey of the lake indicated an experimental lake trout transplant was feasible.

A plant of approximately one dozen adult lake trout was reportedly released into Harding Lake in 1939 by the Fish and Wildlife Service. This initial plant was apparently partially successful, as one lake trout was taken in 566 hours of test netting in 1960.

From Two-Bit and Boulder Lakes, two "fly-in" lakes located in the Alaska Range, 252 lake trout were transplanted into Harding Lake. Two-Bit and Boulder Lakes are five minutes flying time east and south of Fielding Lake, which in turn is located at Mile Post 226 on the Richardson Highway. The fish

were transplanted with the aid of a military helicopter between July 9 and 12, 1963, immediately following "ice breakup."

Two-Bit Lake, 180 surface acres in size, is located at an approximate elevation of 3,200 feet. It was fished with 10 experimental gill nets, 1/2-inch to 4-inch mesh size, and by hook and line. Four live boxes, 3' x 3' x 6', were used to retain the live fish.

Immediate net mortality was 46 fish with 33 succumbing later as an after-effect of being caught in the gill nets and from handling (TABLE 1). The gill nets were checked at approximately two-hour intervals to prevent excessive fish mortality.

TABLE 1. Catch results of ten 125-foot experimental gill nets fished in Two-Bit Lake, Alaska, 1963.

<u>Date</u>	<u>Hours Fished</u>	<u>Total Net Hours</u>	<u>Total No. of Fish Taken</u>	<u>Observed Gill Net Mortality</u>	<u>Observed Live Box Mortality</u>	<u>Total Live Fish</u>
7/9	3p.m.-11p.m.	8	33	7	4	22
7/10	5p.m.-1p.m.	20	122	13	8	101
7/11	8a.m.-6a.m.	22	70	16	9	45
7/12	6a.m.-2p.m.	<u>20</u>	<u>49</u>	<u>10</u>	<u>12</u>	<u>27</u>
TOTALS		70	274	46	33	195

Of the 79 dead fish obtained in Two-Bit Lake, 25 were checked as to their length, weight, age and sex composition (TABLE 2).

TABLE 2. Lengths, Weights, Age and Sex of Lake Trout Taken from Two-Bit Lake, Alaska.

<u>Length</u>	<u>Weight</u>	<u>Age</u>	<u>Sex</u>	<u>Length</u>	<u>Weight</u>	<u>Age</u>	<u>Sex</u>
17.2	2.0	16	F	15.5	1.3	16	M
16.6	1.8	17	F	15.5	1.5	14	F
16.0	1.5	Regen.	M	15.3	1.4	13	F
16.0	1.5	16	F	15.1	1.5	13	F
16.2	1.8	16	M	14.8	1.2	13	F
16.1	1.4	15	F	14.6	1.1	14	F
15.8	1.5	16	M	14.5	1.0	13	F

TABLE 2. Continued

<u>Length</u>	<u>Weight</u>	<u>Age</u>	<u>Sex</u>	<u>Length</u>	<u>Weight</u>	<u>Age</u>	<u>Sex</u>
14.5	1.1	13	F	12.8	0.8	12	F
14.4	1.1	12	M	12.2	0.7	Regen.	F
14.4	1.1	13	M	11.8	0.6	10	M
14.4	1.2	15	F	7.1	0.07	7	F
14.0	1.2	Regen.	M	6.8	0.06	7	M
12.8	0.7	13	M				

Boulder Lake is approximately 1,500 surface acres in size, and has a maximum depth of 200 feet. It is situated in the Alaska Range at an elevation of approximately 4,000 feet. During a period of 56 hours, 75 fish were caught by hook and line, five of which died in the holding pens prior to shipment. Fish taken ranged in fork length from 14.8 to 32 inches and weighed from 1.12 to 13.8 pounds. Length, weight and age of six lake trout taken from Boulder Lake are listed in TABLE 3.

TABLE 3. Length, Weight and Age of Lake Trout Taken From Boulder Lake, Alaska.

<u>Length to Nearest 1/10 Inch</u>	<u>Weight</u>	<u>Age</u>
14.8	1.12	16
18.3	1.70	16
19.2	2.60	17
20.0	2.80	17
21.0	2.50	18
22.0	3.76	Regenerate

A model H-21 helicopter was provided by the military for transporting the lake trout. A 250 gallon fish distribution tank, 46 inches wide, 26 inches high, and 60 inches long was used. The H-21 helicopter is capable of lifting and transporting approximately one ton under normal conditions; however, because of altitude, weight restrictions were necessary. The cumulative weight of the tank, water, fish, accompanying biologist and normal helicopter crew totaled 1,700 to 1,800 pounds. This was considered a maximum load under the existing conditions.

The first load consisted of 100 lake trout from Two-Bit Lake. Approximately 80 gallons of 46°F. lake water were placed in the tank. Plastic trash cans with a capacity of 12 gallons each were used for hauling fish from the nets to the holding pens, and again to the aircraft. Bottled oxygen was injected into the tank at eight pounds pressure through six small aquarium carbon stones. Flying time from Two-Bit to Harding Lake was approximately 1 hour and 35 minutes. Transporting temperatures were held at 48°F. by the use of ice, and allowed to rise to 56°F just before the destination was reached. The surface temperature of Harding Lake at the time of the lake trout introduction was 69°F. Due to mechanical injury incurred during the capturing and holding period, 10 fish were known to have died from the 100 introduced in the first load.

The second plant constituted the remaining fish from Two-Bit Lake and all fish captured in Boulder Lake. The same procedures used in the first load were used in the second. The only notable difference was the 40°F. water taken from Boulder Lake to fill the tank.

Due to an increased number of fish (165) and weight, less initial water (60 gallons) was used. Additional 40°F. water, approximately 50 gallons, was added at a lower altitude from Donnley Creek, located approximately 40 minutes away from Two-Bit Lake. Total flying time from Boulder to Harding Lake was one hour and 20 minutes. In order to compensate for the reduced amount of water, 0.3 gallons per fish, oxygen pressure was held at a constant 12 pounds. After additional water was added, pressures were held between 8 and 12 pounds. Transportation temperature was 49°F. and tank water was raised to 65°F. before the introduction of fish into the 69°F. (surface temperature) waters of Harding Lake.

Upon entering Harding Lake, 5 of the 165 fish carried in the tank showed immediate signs of distress and 3 are known to have died.

The experimental transplant was deemed a success from the standpoint of information and data obtained on methods of capture and handling of adult lake trout.

Salcha River Fishery

The Salcha River was opened to angling in 1963 from the mouth upstream to Redmond Creek, a distance of about 25 miles.

To determine the effect of a sport fishery on existing salmon runs, and king salmon stocks in particular, a comprehensive creel census program was conducted from July 13 to August 4 and the fishery was closely monitored by a Department representative.

The 275 anglers checked fished a total of 2,052 hours for an accumulative catch of 24 kings, 65 chums, and 1,294 grayling. The average fish catch per hour was 0.67. The peak of king and chum salmon runs was approximately July 24 and August 1 respectively. Grayling fishing was excellent throughout the season and contributed greatly to the angler catch. The majority of angler effort was directed at the taking of grayling, and the number of anglers fishing exclusively for salmon were in the minority.

The high popularity of the Salcha River fishery was due largely to its easy accessibility for both military and civilian anglers. Participation by approximately 8,200 military personnel stationed in the Fairbanks area was high and, of significance are the 108 military anglers checked at the creel census station.

The Salcha River fishery is a valuable addition to the interior Alaska area in terms of angling and recreation. A summation of the creel census data is depicted in TABLE 4.

TABLE 4. Salcha River Creel Census, July 13 to August 4.

<u>No. of Anglers</u>	<u>No. of Kings</u>	<u>No. of Chum</u>	<u>No. of Grayling</u>	<u>Total Fish</u>	<u>Total Angler Hours</u>	<u>Fish Per Hour</u>
275	24	65	1,294	1,383	2,052	0.67

Angler Composition

<u>Military Personnel</u>	<u>Nonresident</u>	<u>Resident</u>
108*	46	121

* Number includes both resident and nonresident.

Unalakleet River Military Fishing Camps

The two military sport fishing camps on the lower Unalakleet River operated for a combined total of 145 days during 1963. The Fort Wainwright and Eielson Air Force Base camps opened June 1 and 19 respectively, and closed August 30. Both camps were inoperative from August 6 to 16 due to extreme flood conditions in the lower Unalakleet area.

The approximate location of the Fort Wainwright and Eielson AFB recreational camps is stream mile six and seven respectively, upstream from the village of Unalakleet. Air miles from Fairbanks are approximately 400.

Facilities and operation of both camps were similar. Squad tents were utilized for sleeping quarters, cooking and mess operations, fish cleaning and wrapping, and storage of equipment. Each camp had several boats available for the anglers, and refrigeration equipment was present so fish could be frozen and preserved. Transportation to and from the camp was by military aircraft, at no cost to the individual angler. Each camp operated two flights a week, resulting in a three to four day trip per angler.

A total of 556 military anglers fished 16,398 hours for a total salmon catch of 2,542. Average salmon taken by an individual angler per trip was 3.8 at the Eielson AFB camp and 5.2 at Fort Wainwright. Approximate peaks of individual salmon runs were: kings, July 1; chums, July 23, and silvers, August 30. Dolly Varden and grayling were taken in good numbers throughout the season. Catch data from both Unalakleet sport fishing camps is depicted in TABLE 5.

The approximately 16,000 hours fished by military anglers at the two Unalakleet camps indicates these camps are a valuable fishery to the military angler of interior Alaska.

Lake and Stream Surveys

During the 1963 season 15 lakes were test netted for population samples, 7 being in conjunction with initial lake surveys. The remaining eight lakes gill netted were those presently stocked and managed, and were sampled for population analysis only. Results of these net samples are depicted in TABLE 6.

TABLE 5. Creel Census Summary of Unalakleet River Military Sport Fishing Camps.

	<u>EIELSON A.F.B.</u>			<u>FT. WAINWRIGHT</u>
	<u>No.</u>	<u>Av. Weight</u>	<u>Av. Length</u>	<u>No.</u>
Total Anglers	277			279
Days Camp Operated	64			81
Total Angler Hours	8,168			8,230
Total Salmon Catch	1,075			1,467
Total Fish Catch	2,856			3,704
Chum Salmon	576	7.5#	24"	574
King Salmon	174	18.0#	26"	67
Silver Salmon	325	8.25#	24"	168
Pink Salmon	0			658
Dolly Varden	1,079	1.5#	16"	1,623
Grayling	702	1.0#	14"	345
Whitefish	0			269
Salmon Per Angler	3.8			5.2
Fish Per Angler	10.3			13.2

TABLE 6. Test Netting, 1963.

Name	Date	Number	Species	Length Range in Inches	Length Mean in Inches	Fre- quency*	Per Cent Comp.
Birch Lake	6/9/63	4	NP	9.0-22.0	14.8	.19	100
	7/17/63	3	NP	17.2-29.5	21.3	.12	37.5
		5	WF	8.9-16.6	12.0	.21	62.5
	7/18/63	2	NP	15.0-18.4	16.6	.08	8.0
Craig Lake		23	WF	8.4-17.5	12.5	.95	92.0
	6/2/63	8	SS	7.0-10.0	8.3	.48	42.1
		11	RB	6.0-11.0	8.2	.66	57.9
Donna Lake	7/19/63	25	RB	6.0- 8.5	7.3	1.06	100
Falls Cr. Lake	6/17/63	No fish taken					
Floyd Lake	8/11/63	No fish taken					
Forrest Lake	8/8/63	No fish taken					
Jan Lake	6/14/63	53	RB	5.3-15.7	10.3	1.43	100
Lisa Lake	6/15/63	No fish taken					
	8/7/63	10	RB	7.7- 9.4	8.7	.26	100
Lost Lake	6/9/63	No fish taken					
Monte Lake	7/20/63	50	LT	8.7-16.6	14.6	2.38	100
Robertson Lake #2	8/9/63	No fish taken					
Swan Lake	8/11/63	No fish taken					
"T" Lake	7/19/63	8	NP	12.9-32.0	23.6	.33	47.06
		9	WF	12.2-15.0	14.1	.37	52.94
Unnamed (5 Mi. S of Northway)	8/13/63	No fish taken					
Unnamed (W. of Craig Lake)	6/16/63	No fish taken					

* No. of fish caught per hour in 125' Experimental Gill Net.

NP - Northern Pike; WF - Whitefish; SS - Silver Salmon; RB - Rainbow; LT - Lake Trout

TABLE 7. Lakes Surveyed Under Project F-5-R-5.

Name	Location	Legal Description	
		Longitude	Latitude
Big Lake	Fort Greely	145°52'30"	63°51'30"
Dog Lake	10 Miles S. of Northway	141°47'	62°54'
Fish Lake	Mile 1254, Alaska Hwy.	143°17'	63°27'
Floyd Lake	S.W. of Mi. 1254, Alaska Hwy.	141°50'	62°55'
Forrest Lake	Robertson River	144°01'30"	63°28'30"
Left O.P. Lake	Delta Junction	145°54'30"	63°51'15"
Little Donna Lake	Mile 1391, Alaska Hwy.	144°55'45"	63°46'45"
Little Lisa Lake	Mile 1381.5, Alaska Hwy.	144°41'30"	63°42'30"
Long Lake	Robertson River	144°11'	63°30'
Meadow Rd. Lake	Delta Junction	145°52'	63°52'30"
Monte Lake	Robertson River	144°00'	63°35'
Robertson Lake #2	Mile 1348, Alaska Hwy.	143°50'	63°30'15"
Swan Lake	S.W. of Mile 1254, Alaska Hwy.	141°55'	62°35'
"T" Lake	Billy Creek (Near Tok)	143°53'	63°48'
Unnamed (W. of Craig Lake)	Craig Lake Group	143°43'	63°44'

TABLE 8. Streams Surveyed Under Project F-5-R-5.

<u>Name</u>	<u>Longitude</u>	<u>Latitude</u>	<u>Quadrangle</u>	<u>Remarks</u>
Bear Creek	143°57'	63°39'30"	Tanacross C-6	Tanana R. Trib.
Berry Creek	144°23'	63°42'	Mt. Hayes C-1	Tanana R. Trib.
Bridge Creek	148°16'	65°28'	Livengood B-3	Tolvana R. Trib.
Chena River	147°54'30"	64°47'45"	Fairbanks D-2	Tanana R. Trib.
Chief Creek	143°57'	63°39'30"	Tanacross C-6	Tanana R. Trib.
Clearwater Cr.	143°12'	63°09'	Tanacross A-5	Tanana R. Trib.
Dome Creek	147°44'15"	65°04'30"	Livengood A-2	Chatanika R. Trib.
Dry Creek	144°34'	63°42'	Mt. Haines C-2	Tanana R. Trib.
Globe Creek	148°24'	65°15'	Livengood B-3	Tatalina R. Trib.
L. Goldstream Cr.	148°53'30"	64°59'	Fairbanks D-4	Chatanika R. Trib.
Sams Creek	144°18'45"	63°42'	Mt. Hayes C-1	Tanana R. Trib.
Sears Creek	144°28'	63°41'30"	Mt. Hayes C-1	Tanana R. Trib.
Washington Creek	149°02'30"	65°04'	Livengood A-5	Tatalina R. Trib.
Willow Creek	147°44'30"	65°05'30"	Livengood A-2	Chatanika R. Trib.

TABLE 9. Lakes Tested for Dissolved Oxygen.

<u>NAMES</u>	<u>DATE</u>	<u>STA.</u> <u>NO.</u>	<u>SNOW</u> <u>DEPTH</u>	<u>ICE</u> <u>DEPTH</u>	<u>SAMPLE</u> <u>DEPTH</u>	<u>O₂</u> <u>PPM</u>	<u>pH</u>
Dog Lake	8/12/63	1	-	-	Surface	9.0	-
		2	-	-	15'	8.5	-
Lisa Lake	4/16/63	1	24"	66"	30'	4.4	6.9
Little Lisa Lake	4/16/63	1	24"	54"	7'	0.9	6.6
Monterey Lake	3/4/63	1	8"	36"	8'	1.5	-
Robertson Lake #2	8/8/63	1	-	-	Surface	5.5	10.0
		2	-	-	12'	4.5	10.0
16.4 Mile Lake	3/9/63	1	27"	26"	Surface	2.0	6.0
		2	-	-	12'	2.0	6.0
Lost Lake	2/7/64	1	0	30"	Surface	7.6	-
		2	-	-	10'	6.8	-
		3	-	-	20'	0.1	-
Alaska R.R. Pit #4	2/11/64	1	8"	26"	Surface	4.1	-
		2	-	-	7'	4.5	-
Sergeant's Pond	2/19/64	1	14"	27"	Surface	8.7	-
		2	-	-	14'	5.0	-
Birch Hill Pond #1	2/19/64	1	15"	26"	Surface	0	-
		2	-	-	15'	0	-
Birch Hill Pond #2	2/19/64	1	16"	28"	Surface	0	-
		2	-	-	18'	0	-

Initial surveys were conducted on 15 interior Alaska lakes. The new waters surveyed were located in the area southeast of Fairbanks and adjacent to the Alaska and Richardson Highways. Accessibility into several of these lakes is limited to airplanes. Names and locations of these waters are shown in TABLE 7.

Cursory surveys were conducted on 14 streams in the general Fairbanks vicinity. The streams investigated are accessible from the Alaska, the Nenana, and the Elliott Highways. Names and locations of these waters are delineated in TABLE 8.

The 11 waters represented in TABLE 9 were those tested for dissolved oxygen content. Water samples taken from under the ice were chemically analyzed to determine if winter oxygen levels were sufficient for introduction of new fish populations. Nine of these waters were found varying from marginal to excellent, while two were found entirely devoid of oxygen and completely unsuitable for fish life.

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Date: March 19, 1964

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