

Volume 6

1964-1965

SH
11
.A73
A4
V.6

ARLIS

Alaska Resources

STATE OF ALASKA

Library & Information Services

Anchorage, Alaska

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1964 - 1965

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-6

SPORT FISH INVESTIGATIONS OF ALASKA

ALASKA DEPARTMENT OF FISH AND GAME
Walter Kirkness, Commissioner

E. S. Marvich, Deputy Commissioner

Alex H. McRea, Director
Sport Fish Division

Louis S. Bandirola, Coordinator

3 3755 000 46597 1

INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-6, "Sport Fish Investigations of Alaska."

The project during this report period is composed of 23 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. Of these, eight jobs are designed to pursue the cataloging and inventory of the numerous State waters in an attempt to index the potential recreational fisheries. Four jobs are designed for collection of specific sport fisheries 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 and an egg take program.

A report concerning the residual effects of toxaphene accumulates the findings of a three-year study. The report presented here terminates this segment and is a final report. The information gathered from the combined studies will provide the necessary background data for a better understanding of local management problems and will 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-6 Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters on the Kenai Peninsula, Cook Inlet-Prince William Sound Areas.

Job No.: 7-A

Period Covered: July 1, 1964, to June 30, 1965.

ABSTRACT

A creel census again conducted on the Russian River showed that an estimated 6,855 red salmon were caught during 4,942 man-days of effort. The mean catch per hour was 0.31. Based on tower counts at the outlet of Lower Russian Lake, the sport harvest was 11.6 percent of the total red salmon run in the Russian River.

A total of 254 Arctic grayling from Crescent Lake was introduced into Juneau and Grayling Lakes which have tributaries believed suitable for the establishment of self-sustaining populations.

Inventory and cataloging activities were conducted on 41 lakes in the northwestern part of the Kenai Peninsula. Twenty-nine lakes contained game fish with rainbow trout being the most common species. Results of population sampling are presented.

RECOMMENDATIONS

Retain present objectives of the study with emphasis directed toward the following:

1. Continue cataloging activities in the Swanson River drainage to provide information for expansion of the Swan Lake Canoe System.
2. Evaluate past Arctic grayling introductions and investigate additional waters for the establishment of this species.
3. Continue the Russian River creel census to determine the effectiveness of recent "antisinggling" regulations on red salmon.

4. Initiate a creel census on the saltwater sport fishery in Kachemak Bay.
5. Evaluate roadside lakes having no game fish populations for possible rehabilitation and stocking with rainbow trout.

OBJECTIVES

1. To assess the environmental characteristics of the existing and potential fishery waters of the job area and, where practicable, obtain estimates of existing or potential angler use and sport fish harvest.
2. To evaluate application of fishery restoration measures and availability of sport fish egg sources.
3. To assist as required in the investigation of public access status to the area's fishing waters.
4. To evaluate multiple water use, development projects (public and private) and their effects on the area's streams and lakes for the proper protection of the sport fish resources.

TECHNIQUES USED

The creel census method used on the Russian River is a modification of that described by Neuhold and Lu (1957). All weekends, holidays and three of the weekdays were sampled. Each day (0200 to 2200) was divided into five 4-hour periods. The five daily periods were further divided into 1-hour periods. Fishermen counts were stratified on the basis of each daily and hourly period. Two counts were made on weekend days and one on each weekday. Counts included all anglers fishing a 2.5-mile section of the Russian River between its confluence with the Kenai River and Lower Russian Lake. Completed fishermen were interviewed at two access points on the river to determine the number of red salmon caught and hours fished.

Weekend and weekday data were analyzed separately because of differences in fishing pressure. Total fishing effort was computed by expanding the average number of fishermen per count by the total possible fishing hours in the season. The total fishing effort in hours was multiplied by the mean catch per hour to determine the seasonal harvest.

Transplanted grayling from Crescent Lake were anesthetized with Tricaine Methanesulfonate (MS 222-Sandoz) at a concentration of 1:40,000. They were transported by a Cessna 180 in 10-gallon plastic containers, holding up to 35 fish. Those destined for Grayling Lake were placed in polyethylene bags

containing 5 gallons of water free of anaesthetic after arrival by aircraft from Crescent Lake. The bags were filled with oxygen, sealed tightly and placed in backpacks.

Standard lake survey methods were used to collect physical and chemical data. Variable mesh experimental gill nets (3/4 to 2-inch mesh) were employed to determine the fish species present, relative abundance and to obtain age and growth information.

FINDINGS

Russian River Creel Census

The Russian River red salmon sport fishery is probably one of the most controversial in Alaska. This is because most of the fish are taken by "snagging" which involves retrieving the hook through the water in such a manner that the fish is impaled without hooking it in the mouth. Although some dislike this type of fishing, it is the most effective means of catching this species which does not readily strike lures or bait. On the basis of angler participation (7,882 man-days in 1963), it is evident that many fishermen do not find "snagging" objectionable. This fishery is the second largest on the Kenai Peninsula. Current management practices for the Russian River have been reviewed by Lawler (1963).

To evaluate existing management methods on the Russian River a creel census was again conducted to estimate the sport harvest and effort on red salmon. The census was active from June 20 to August 16 and sampled nearly all the upstream migration. During 58 fishermen counts, 1,213 anglers were enumerated. Weekday and weekend counts averaged 12.1 and 26.7 anglers, respectively. Projected fishermen counts indicated 4,942 man-days of effort. Anglers fished an average of 3.3 and 4.8 hours per day on weekdays and weekends, respectively. The total catch, based on 651 angler interviews, was estimated at 6,855 red salmon. The mean rate of success was 0.31 fish per hour.

Creel census information is summarized for the past three years in Table 1. Inspection of this data shows that in spite of reduced effort the 1964 harvest was the largest recorded. The reduced effort can be attributed to earthquake damage to the Seward Highway which frequently prevented Anchorage anglers access to the Kenai Peninsula during much of June. Normal traffic was resumed in time for anglers to fish the peak of the red salmon migration.

TABLE 1. - The Red Salmon Sport Harvest and Effort on the Russian River, 1962-1964

<u>Year</u>	<u>Harvest</u>	<u>Effort (Man-days)</u>	<u>Catch/Hour</u>	<u>Period of Census</u>
1962	4,700	6,595	0.22	6/15 to 8/12
1963	5,062	7,882	0.19	6/8 to 8/15
1964	6,855	4,942	0.31	6/20 to 8/16

A counting tower operated by the Commercial Fish Division of the Alaska Department of Fish and Game allows an assessment of the run after it has passed both the Cook Inlet commercial and Russian River sport fisheries. Based on an escapement of 52,052 red salmon, the sport harvest was 11.6 percent of the total run in the Russian River. Past tower estimates and percentages taken by the sport fishery are shown in Table 2.

TABLE 2. - Russian River Red Salmon Tower Counts and Percentage Taken by Sport Fishery, 1962-1964.

<u>Year</u>	<u>Tower Count</u>	<u>Count Period</u>	<u>Percentage Taken by Sport Fishery</u>
1962	48,214	6/18 to 8/31	8.9
1963	56,960	6/18 to 8/23	8.2
1964	52,052	6/20 to 8/15	11.6

Although useful as a relative index, these percentages are probably high for all years. Annually, 30 to 40 percent of the red salmon catch is taken from the Kenai River just below its confluence with the Russian River. Fish moving up the glacial Kenai River tend to school in this area of relatively clear water before entering the Russian River or continuing on to spawning grounds farther up the Kenai River. Undoubtedly many of the fish included in the Russian River sport harvest are upper Kenai River stocks.

The only other significant red salmon sport fishery on the Kenai Peninsula is located at the confluence of the Moose and Kenai Rivers. Twenty-two random counts, covering most of the run (June 17 to July 31), showed an average of 5.7 anglers per count. The mean catch per hour was 0.20. Although data are not extensive, the 1964 harvest is believed to be less than 500 fish. At the present time the combined catch of less than 7,500 fish from the Russian and Moose Rivers is not considered deleterious to the resource. The total sport harvest on the Kenai Peninsula was less than one percent of the 1964 Cook Inlet commercial catch of 961,891 red salmon.

Grayling Transplants

Arctic grayling were introduced into Crescent Lake on the Kenai Peninsula in 1952. A flourishing sport fishery has developed from an original plant of 240 fish. Since 1962, the feasibility of transplanting Crescent Lake stocks to other barren areas of the Kenai River system has been under investigation.

During this report segment, grayling transplants were made in Grayling and Juneau Lakes in the Chugach National Forest with assistance from the U.S. Forest Service. Both lakes lie within the Kenai River drainage. Tributaries to these lakes have suitable spawning areas for the establishment of self-sustaining populations.

Grayling were seined from the outlet of Crescent Lake on August 18 and 19. Fork lengths from a sample of 48 fish ranged from 142 to 253 mm with a mean of 181.7. This size range is similar to that recorded for age-groups I and II from this lake (Lawler, 1962). One hundred grayling were flown to Juneau Lake and released without visible mortality.

The size of Grayling Lake (28 acres) precluded float plane landings; all fish were flown to Kenai Lake and then backpacked approximately two miles to the lake. During the 1 1/4-hour trip no mortality occurred at densities as high as 17 fish per backpack. A total of 154 grayling was transported to the lake and all appeared to be in good condition upon release.

Lake Surveys

Standard lake surveys were conducted on 41 lakes in the northwestern part of the Kenai Peninsula. Principal features of the area are low hills, muskegs and numerous small lakes. Drainage patterns are complicated and often obscure. Much of the land is forested with spruce, birch, aspen and alder. The entire region is less than 500 feet above sea level. Except for lakes adjacent to the Kenai Spur Road system, all work was accomplished within the Kenai National Moose Range.

North Kenai Area

Numerous homesteads and a rapidly expanding road system characterize this region. Public access to many of the lakes in the area is limited because much of the land is privately owned. The location, size and maximum observed depth of the 17 lakes surveyed during 1964 are shown in Table 3. All are fairly small, ranging from 8 to 156 acres.

TABLE 3. - Location, Surface Acreage and Maximum Depth of Lakes in the North Kenai Area

Name of Lake	Surface Acres *	Max. Observed Depth (ft.)	Location
Steibs	36	42	T7N., R11W., Sec. 4
Laura	21	25	T7N., R11W., Sec. 4-9
Wik	96	80	T7N., R11W., Sec. 5-6 7-8
Kivi	21	28	T7N., R11W., Sec. 5
Puddle	8	10	T7N., R12W., Sec. 25-26
Bee	33	26	T7N., R12W., Sec. 26
Kidney	44	31	T7N., R11W., Sec. 29-30
Claw	22	24	T8N., R11W., Sec. 23-26
Bishop	92	27	T7N., R11W., Sec. 16-21
Thompson	79	12	T7N., R11W., Sec. 14
Sucker	156	14	T8N., R11W., Sec. 21-22 27-28
Club	11.5	22	T7N., R12W., Sec. 16
Trail	16	22	T7N., R12W., Sec. 9-16
Long Pine	36	18	T7N., R11W., Sec. 9-16
Short Pine	31	42	T7N., R11W., Sec. 8-17
Barbara	31	23	T7N., R11W., Sec. 3-10
Tarbo	28	22	T7N., R11W., Sec. 16

* Acreages were determined by map grids from U.S.G.S. maps (1:63, 360).

Population sampling revealed that 11 of these lakes contained game fish. Threespine sticklebacks were present in all surveyed waters. Test net data are summarized in Table 4. With the exception of Bishop, Thompson and Sucker Lakes, all investigated waters were without tributaries. The presence of game species in many of these lakes can, in part, be attributed to introduction by local residents. Whether these populations have been successfully established and are maintaining themselves has not been determined. The size range of landlocked silver salmon (Table 4) in Steibs, Bee and Kidney Lakes suggest either frequent restocking or natural reproduction. The possibility of natural reproduction should be investigated further.

Finger Lakes

The Finger Lake complex consists of four spring-fed lakes, located in the Kenai National Moose Range, two miles west of the Swanson River Road. The group lies in a region of hilly forested moraines that is underlaid with unstable glacial deposits. The impact of the March 27 earthquake on immediate

TABLE 4. - Test Net Results for North Kenai Lakes, 1964

<u>Name of Lake</u>	<u>Species</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch Per Hour *</u>
Steibs	SS	5	240-400	360	0.10
Laura	Rb	3	440-550	497	0.06
	SS	3	360-440	408	0.06
Wik	RS	1	330	330	0.02
Kivi	RS	11	240-285	257	0.23
	Rb	3	555-595	570	0.06
Puddle	DV	2	500-580	540	0.04
Bee	SS	17	170-465	265	0.35
	DV	2	453-500	477	0.04
	RS	1	450	450	0.02
Kidney	SS	12	170-470	316	0.25
	Rb	2	490-603	545	0.04
	DV	1	410	410	0.02
Claw	Rb	20	227-455	365	0.42
Bishop	RS	24	435-645	536	0.50
	Rb	5	175-410	277	0.10
	SS	1	118	118	0.02
	SK	20	160-370	268	0.42

TABLE 4. (Cont.) - Test Net Results for North Kenai Lakes, 1964

<u>Name of Lake</u>	<u>Species</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch Per Hour *</u>
Thompson	Rb	27	194-465	286	0.56
Sucker	Rb	1	493	493	0.02
	SK	119	145-365	229	2.48
Club	No fish taken.				
Trail	No fish taken.				
Long Pine	No fish taken.				
Short Pine	No fish taken.				
Barbara	No fish taken.				
Tarbo	No fish taken.				

* Number of fish caught per hour in a 125-foot gill net

Key: Rb - rainbow trout
 DV - Dolly Varden
 SS - silver salmon
 RS - red salmon
 SK - longnose sucker

topography is discernible throughout the area. Prior to the earthquake three of the lakes were connected by short channels. Dewatering after the earthquake resulted in isolation of all four lakes. As of October 26 the water level in West Finger Lake had dropped six feet while levels of South and Middle Finger Lakes dropped two and four feet, respectively. The water level of East Finger Lake remained unchanged.

Gill netting showed that Dolly Varden were present in each of the lakes. The fork lengths of these fish ranged from 240 to 523 mm. Populations of longnose suckers and threespine sticklebacks are also present. A summary of the population sampling is shown in Table 5.

Swan Lake Canoe System

Throughout the northwestern portion of the Kenai National Moose Range there are hundreds of lakes, many of which contain game fish populations. Unless visible from the road or large enough to accommodate float planes, most of these waters are seldom if ever fished because of dense vegetation and a scarcity of trails. To encourage angler utilization of these unfished waters, the U.S. Fish and Wildlife Service established the Swan Lake Canoe System (Figure 1). Completed in 1964, the 45-mile system connects 20 lakes by land and stream portages. The entire system encompasses portions of the Moose and Swanson River drainages.

The system consists primarily of dystrophic lakes which are often stained with humic materials. Muskeg development is common around lake margins. The location, size and maximum observed depth of all the lakes included in the system are presented in Table 6.

Population sampling disclosed game fish in 14 of these waters. Rainbow trout and Dolly Varden were the most prominent species (Table 7). Fork lengths of 205 net-caught rainbow trout ranged from 130 to 535 mm with a mean of 261.8. Fifty-seven Dolly Varden ranged from 200 to 552 mm with a mean of 333.4. Rainbow trout and Dolly Varden length frequency data for all the lakes in the canoe system are presented in Figure 2. The most salient feature of these data is the absence of Dolly Varden under 250 mm.

Complete records of all cataloging and inventory activities during this report segment are on file at the Seward and Soldotna offices of the Alaska Department of Fish and Game.

LITERATURE CITED

Lawler, Robert E.

1962. Inventory and Cataloging of the Sport Fish and Sport Fish Waters on the Kenai Peninsula and Prince William

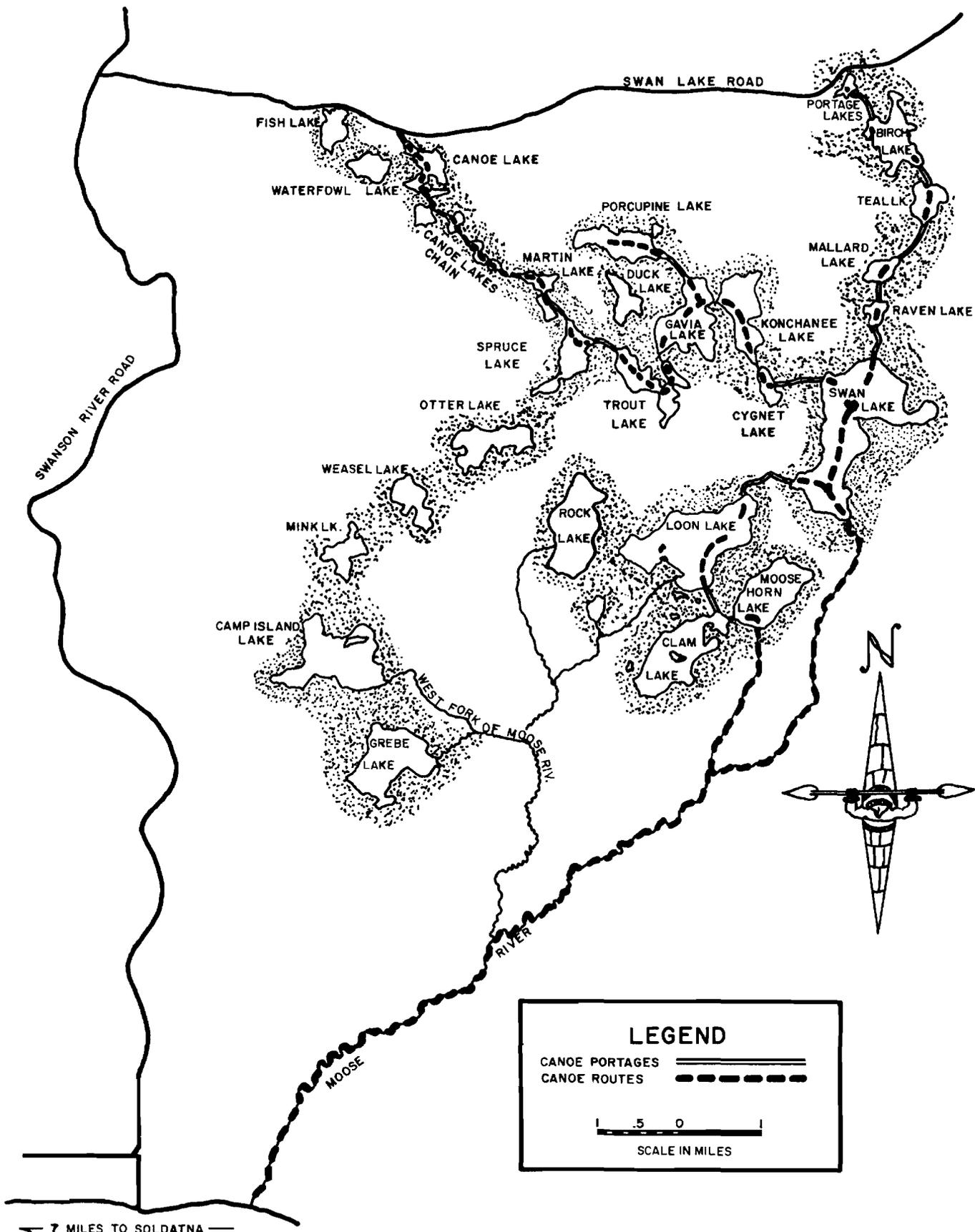


Figure 1. Map Showing Lakes Included In The Swan Lake Canoe System, 1964.

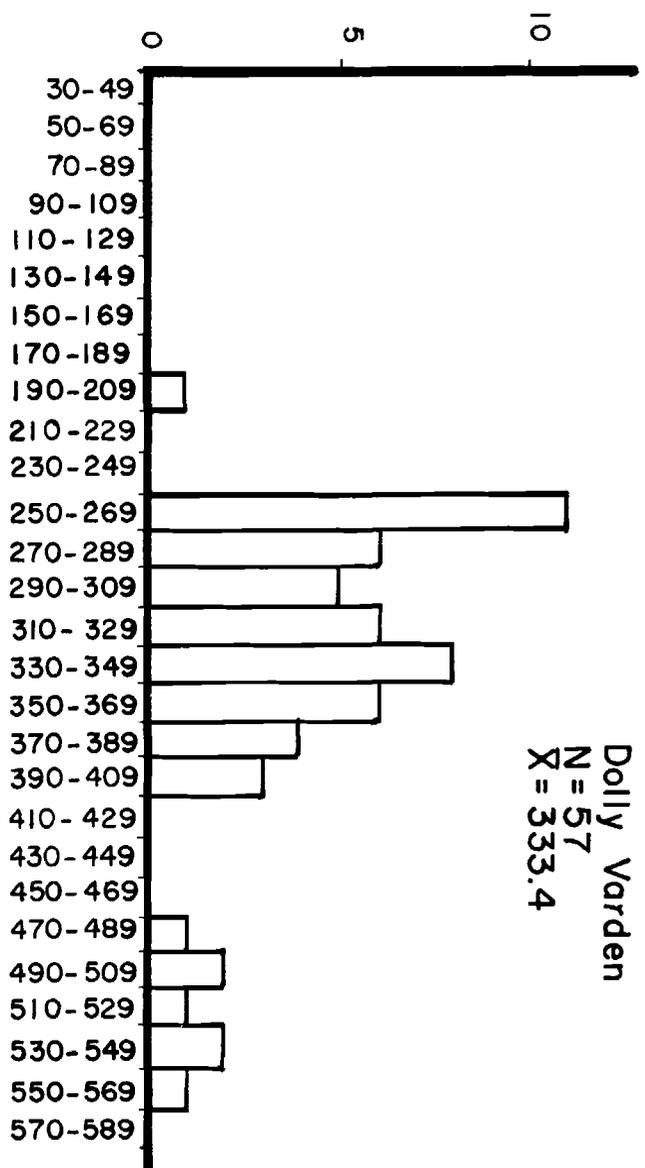
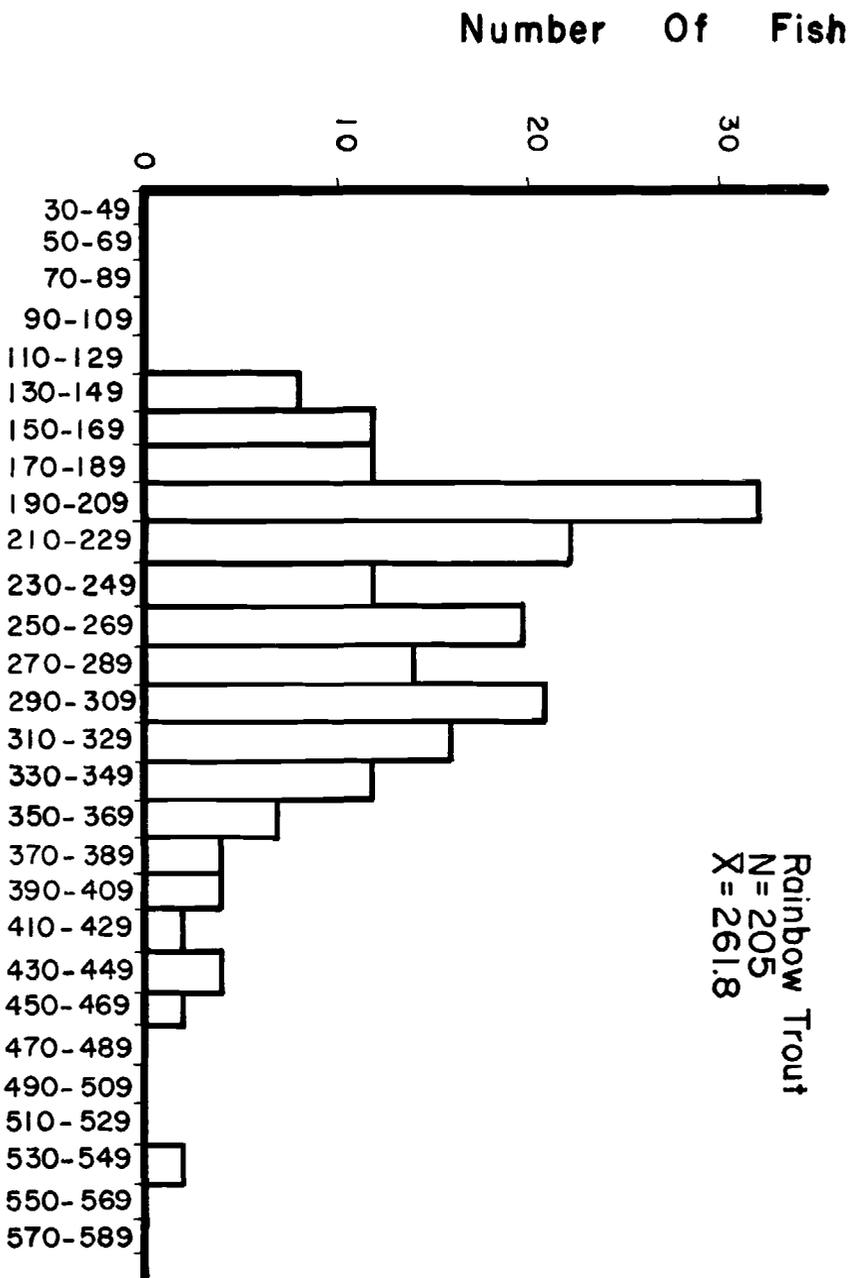


Figure 2. Length frequency of Rainbow Trout and Dolly Varden from the Swan Lake Canoe System, 1964. (Fork length in millimeters)

TABLE 5. - Survey Results for the Finger Lake, 1964

<u>Name of Lake</u>	<u>Surface Acres *</u>	<u>Max. Observed Depth (ft.)</u>	<u>Species</u>	<u>Number Fish</u>	<u>Fork Length (mm)</u>		<u>Catch Per Hour</u>
					<u>Range</u>	<u>Mean</u>	
East Finger	70	47	DV	30	240-332	256	0.63
Middle Finger	180	88	DV	23	248-470	357	0.48
West Finger	73	42	DV	16	250-500	395	0.33
South Finger	220	100+	DV	1	523	523	0.02

* Acreages were determined by map grids from U.S.G.S. maps (1:63, 360).

TABLE 6. - Location, Surface Acreage and Maximum Depth of Lakes in the Swan Lake Canoe System

Name of Lake	Surface Acres *	Max. Observed Depth (ft.)	Location
Canoe Lake #1	113	30	T7N., R8W., Sec. 4-9
Canoe Lake #2	37	73	T7N., R8W., Sec. 9
Canoe Lake #3	28	19	T7N., R8W., Sec. 9
Canoe Lake #4	27	29	T7N., R8W., Sec. 10-15
Marten	75	40	T7N., R8W., Sec. 15
Spruce	134	33	T7N., R8W., Sec. <u>14-22</u>
			23
Trout	193	57	T7N., R8W., Sec. <u>23-24</u>
			25
Gavia	293	31	T7N., R8W., Sec. 13-24
Konchane	224	79	T7N., R9W., Sec. 8-19
Cygnets	53	40	T7N., R9W., Sec. 19
Clam	336	32	T6N., R8W., Sec. 1-12
Moose Horn	293	27	T6N., R9W., Sec. 6
Loon	604	70	T7N., R8W., Sec. 36
Swan	803	48	T7N., R9W., Sec. <u>20-21</u>
			29-32
Raven	36	29	T7N., R9W., Sec. 16-17
Mallard	52	87	T7N., R9W., Sec. 16-17
Teal	101	12	T7N., R9W., Sec. 9
Birch	211	45	T7N., R9W., Sec. <u>4-5</u>
			9
Little Portage	12	18	T7N., R9W., Sec. 5
Portage	29	43	T7N., R9W., Sec. 5

* Acreages were determined by map grids from U.S.G.S. maps (1:63, 360).

TABLE 7. - Test Net Results for the Swan Lake Canoe System, 1964

<u>Name of Lake</u>	<u>Species</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch Per Hour</u>
Canoe Lake #1	Rb	37	153-450	254	0.79
	DV	7	200-552	374	0.15
	SS	6	133-630	467	0.13
	RS	1	267	267	0.02
	SK	4	190-419	350	0.09
Canoe Lake #2	DV	10	250-541	341	0.41
	Rb	9	165-265	215	0.38
	SK	12	160-415	273	0.50
Canoe Lake #3	Rb	13	186-396	289	0.55
	SS	3	561-630	596	0.13
	DV	1	394	394	0.04
	SK	6	322-406	374	0.25
Canoe Lake #4	Rb	14	165-352	239	0.74
	DV	3	260-290	270	0.15
	RS	1	160	160	0.05
	SK	2	142-151	147	0.11
Marten	Rb	18	130-326	225	0.86
	DV	10	257-337	286	0.49
	RS	4	205-230	213	0.19
	SS	5	121-530	334	0.24
	SK	1	124	124	0.05

TABLE 7. (Cont.) - Test Net Results for the Swan Lake Canoe System, 1964

<u>Name of Lake</u>	<u>Species</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch Per Hour</u>
Spruce	Rb	21	138-329	194	0.87
	SS	8	133-157	144	0.33
	RS	3	323-345	332	0.13
	SK	5	410-443	423	0.21
Gavia	DV	22	256-525	342	0.92
	Rb	12	212-344	275	0.50
Konchanees	Rb	19	180-320	257	0.79
	DV	1	373	373	0.04
	SS	1	217	217	0.04
Trout	Rb	18	215-344	284	0.75
	DV	2	316-342	329	0.08
Cygnet	Rb	12	178-292	235	0.50
Clam	Rb	2	348-407	377	0.08
	DV	1	354	354	0.04
	SK	Present			
Moose Horn	Rb	7	220-435	334	0.29
	SS	3	154-167	160	0.13

TABLE 7. (Cont.) - Test Net Results for the Swan Lake Canoe System, 1964

<u>Name of Lake</u>	<u>Species</u>	<u>Number of Fish</u>	<u>Fork Length (mm)</u>	<u>Mean (mm)</u>	<u>Catch Per Hour</u>
Loon	SS	9	131-240	199	0.19
	SK	Present	_____	_____	_____
Swan	Rb	23	177-535	344	0.24
	RS	1	154	154	0.01
	SK	Present	_____	_____	_____
Raven	No fish taken.				
Mallard	No fish taken.				
Teal	No fish taken.				
Birch	No fish taken.				
Little Portage	No fish taken.				
Portage	No fish taken.				

Sound. Alaska Department of Fish and Game Dingell-Johnson Annual Report of Progress, 1962-1963, Vol. 4.

1963. Inventory and Cataloging of the Sport Fish and Sport Fish Waters on the Kenai Peninsula, Cook Inlet-Prince William Sound Areas. Alaska Department of Fish and Game, Dingell-Johnson Annual Report of Progress, 1963-1964, Vol. 5.

Neuhold, John M., and Kou H. Lu.

1957. Creel Census Method. Utah Department of Fish and Game, Publication No. 8, 36 pp.

Prepared by:

Larry J. Engel
Fishery Biologist

Job Leader:

Sidney M. Logan
Fishery Biologist

Date: March 15, 1965

Approved by:

s/ Louis S. Bandirola
D-J Coordinator

s/ Alex H. McRea, Director
Sport Fish Division



A properly managed saltwater sport fishery provides good catches and satisfied anglers.