



Volume 10

1968-1969

6 SH,
11
.A73
A4
v.10

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
Wallace H. Noerenberg, Acting Commissioner

Alaska Rupert E. Andrews, Director
Division of Sport Fish

Louis S. Bandirola, Coordinator

ARLIS
Alaska Resources
Library & Information Services
Anchorage, Alaska

ALASKA RESOURCES LIBRARY
U.S. DEPT. OF THE INTERIOR
ANCHORAGE, ALASKA
EST. 1957

44
11
A 93
A 4
6.10
Volume 10

THE STATE OF ALASKA
MILLER, GOV.

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.

CAMP
MILLER, GOV.

ALASKA
Alaska Resources

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 in Southwest Alaska.
Job No.: 6-A

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

ABSTRACT

Mid-winter water samples from selected Kodiak Island lakes showed two lakes to be marginal for trout survival and one lake to have a probable winter-kill.

The mapping of three additional sport fishing lakes virtually completed the surface area mapping requirements for Kodiak Island. Surface area calculations and biological observations were made in six of the most important sport fishing lakes on Adak Island.

The continuation of earthquake-altered habitat was verified in two Kodiak Island lakes where saline water is trapped or periodically deposited by high tides.

Gill net population sampling was conducted for the fifth consecutive year in 17 Kodiak Island lakes to evaluate populations of stocked rainbow trout, Salmo gairdneri, silver salmon, Oncorhynchus kisutch, and Arctic grayling, Thymallus arcticus.

King salmon, O. tshawytscha, and silver salmon spawning ground counts made in 1968 showed the Karluk River king salmon run to be continuing a decline, while silver salmon runs remained particularly strong in most Kodiak Island streams.

A creel census study on the Buskin River indicated a May sport fish catch of 12,808 Dolly Varden, Salvelinus malma, and a July-August sport fish catch of 4,347 pink salmon, O. gorbuscha.

Investigation of transplanted Arctic grayling in one rehabilitated alpine lake showed excellent growth, survival and reproduction.

Investigation of capelin, Mallotus villosus, in 1968 showed these fish to be entirely two-year olds at maturity, and spawning to be taking place in the surf during periods of rapid beach erosion.

An experimental silver salmon egg take at Lake Rose Tead demonstrated that a highly efficient operation is made possible by the availability of concentrated ripe fish and the close proximity of a landing strip behind the egg-take site.

Assistance was given to several minor public access and multiple-use water projects.

RECOMMENDATIONS

Physical surveys of uncataloged lakes and streams in the region should be continued for sport fish waters such as Saltery Lake, East Uganik Lakes, Uganik River, Marka River, and selected larger rivers on the Alaska Peninsula.

The experimental gill net sampling series should be continued every June in conjunction with July sport fish stocking; in 1969 this sampling should also evaluate previous stocking in Dry Spruce Lake and Upper Malina Lake.

As total enumeration appears unfeasible, a steelhead trout indexing program should be established on the Karluk River to detect major fluctuations in the escapement to this important system.

Aerial and ground counts of salmon escapements need to be continued, particularly for critical populations of king salmon in Karluk River, and silver and sockeye salmon, O. nerka, in Buskin River.

OBJECTIVES

1. To assess and inventory the physical, chemical, and biological characteristics of all potentially significant sport fishing streams and all lakes under management consideration in the region.
2. To make surveys on lakes, streams, and coastal marine areas for establishing the magnitude, distribution, timing, yearly fluctuations, and angler harvest of sport fish populations in areas of particular concern to resource management.
3. To investigate sources of Dolly Varden and silver salmon egg takes which appear to have significant future value in sport fish management; to attempt small-scale pilot egg takes as a test of feasibility, and to conduct other studies related to egg taking and population evaluation as found necessary.
4. To evaluate multiple-use development projects (public and private) and their effects on the region's streams, lakes and coastal marine areas for the proper protection of the sport fish resource.
5. To assist as required in the investigation of public access status to the region's sport fishing waters.

TECHNIQUES USED

Standard techniques, as described by Marriott, 1964, were used in surface mapping, in analysis of water samples, and in gill-net sampling.

Physical stream surveys were conducted as described by Marriott, 1966.

Lake captures of silver salmon were made with a 150-foot beach seine of one and one-half inch square webbing 12 feet deep. Lake captures of Arctic grayling were made with a standard variable mesh gill net and with a 50-foot minnow seine of one-half inch knotless nylon webbing eight feet deep.

FINDINGS

Assessment and Inventory of Sport Fish Environment

Mid-depth dissolved oxygen water samples were taken on January 27, 1969, from four shallow Kodiak Island lakes where water conditions were anticipated to be marginal for trout survival. A summary of the analysis of these samples is shown in Table 1.

TABLE 1 - Mid-Depth Dissolved Oxygen Samples for Kodiak Island Lakes in Late January, 1969.

	<u>Inches Ice Cover</u>	<u>Oxygen (ppm)</u>	<u>pH</u>
Snag	20	4.3	6.2
Dragonfly	22	1.6	6.0
Bridge (Beaver Ponds)	20	0.0	6.5
Big (Beaver)	20	1.5	6.3

The data reflects the moderately cold, dry conditions prevailing in December and January. The pH readings were expected to drop to approximately 5.9 in all of these lakes by the end of February.

The following three lakes on Kodiak Island were mapped in 1968 and all physical and biological observations recorded on standard lake survey cards:

Summit Lake: is a little utilized fly-in lake 17 air miles from Kodiak on the east side air route. The lake is 5,600 feet in length, with numerous good beaching areas for amphibious aircraft. The estimated surface area is 73.5 acres, with the surface elevation at 350 feet. The lake has a maximum depth of 42 feet. It has several small inlets with some spawning potential. The outlet measured 5.97 cfs on June 28, 1968. The upper section has good gravel, but the upper one-third is impassable to anadromous runs of silver salmon found in Lake Miam. It has grass and alder shoreline vegetation, and sparse aquatic vegetation. Four hours of gill netting produced three rainbow trout with a mean length of 207 mm and two Dolly Varden with a mean length of 240 mm. Summit Lake has a history of very large rainbow trout taken in 1958-62 following stocking of the lake in 1954. It is recommended that the lake be restocked in 1969 with 7,350 rainbow trout fry.

Wonder Lake: is a small lake on Old Woman Mountain which is popular for swimming and picnicing. Located at an elevation of 1,100 feet, Wonder Lake has been mapped at 2.02 surface acres and has a maximum depth of 15 feet. The lake bottom is of sand and pumice, with no aquatic vegetation and no major inlets. The outlet, which measured approximately 0.25 cfs, is impassable to fish. There are no native fish species present, but it was stocked with 1,500 silver salmon fry in 1967 and seven age II Arctic grayling in 1968.

Peninsula Lake (Lilly Pond): is a small recreational lake on Nyman's Peninsula. Located at elevation 15 feet, Peninsula Lake was mapped at 5.05 acres. The seawater entry of 1964 was cleared by 1966. The lake was stocked with 1,000 rainbow trout fry in 1967 and was a popular fishing lake in 1968 for small rainbow trout. It has heavy aquatic vegetation of Fontinalis sp. The lake depth is less than seven feet, and the bottom is of mud and silt. There is a spruce shoreline cover around the eastern half of the lake.

A survey of Adak Island lakes was made during July, 1968. Lake mapping was unnecessary as development maps were available from the Naval Base Engineering Department, and these maps showed sufficient detail to use directly for surface area plotting. Biological observations were made on six lakes, with the following noted:

Lake Andrew (including Lake Jean): has a Special Services boathouse and is the most heavily fished lake on Adak Island, with approximately 2,000 acres at an elevation of 15 feet. Lake Andrew has a maximum depth of 85 feet. It had a July surface water temperature of 53°F. The shoreline vegetation is sparse, but Potamogeton sp. is abundant in shoal areas. A one hour gill-net set by the outlet produced six Dolly Varden with a mean length of 220.0 mm, feeding on eyed cottid eggs. Kokanee, Oncorhynchus nerka kennerlyi, are reported to be abundant off the inlet streams. A small pink salmon run was reported in Nurse's Creek (stable bottom, approximately 8 cfs), but there was no reported spawning in Moffet Creek (unstable bottom, approximately 80 cfs). There is a history of heavy rainbow trout spawning, but these fish are rarely taken today.

North Lake: NAVCOMSTA reservoir has a popular shoreline fishery for Dolly Varden. The lake was mapped at 14.9 acres located at elevation 295 feet. Most of the lake is less than 10 feet in depth. It had a July water temperature of 60°F. It has heavy aquatic vegetation, mostly Fontinalis sp. A one hour gill-net set produced 19 Dolly Varden with a mean length of 228.7 mm, most of which were sexually maturing. There is no spawning area in the lake, which was stocked with 3,000 rainbow trout fry on July 21, 1968.

Haven Pond: is a popular fly-fishing lake for Dolly Varden and some rainbow trout. The lake has a firm bottom and most of the lake is wade-able. It is 13.3 acres in size, is located at elevation 95 feet, and has a maximum depth of five feet. Haven Pond had a July water temperature of 60°F. It has a very heavy growth of aquatic vegetation, mostly Fontinalis sp. and Potamogeton sp. Caddis larvae, snails and amphipods were observed on the bottom. A one and one-half hour gill-net set produced 10 Dolly Varden with a mean length of 147.6 mm, and one silver salmon 274 mm. The outlet stream is passable for smaller fish. Haven Pond was stocked with 2,000 rainbow trout fry on July 21, 1968.

Heart Lake: is a popular recreation area, but has a poor history of fishing. It is 32.6 acres in size. There is no depth data, but there are several visible shoal areas. It has sparse aquatic vegetation, mostly Potamogeton sp., in shoals. Heart Lake had a July water temperature of 63°F. Bottom fauna is predominantly snails. It has an abundant stickleback, Gasterosteus aculeatus, population. A one hour gill-net set produced three Dolly Varden with a mean length of 158.2 mm. The outlet stream is popular for Dolly Varden fishing, but there are impassable falls located half-way down.

Lake DeMarie: Use is limited by poor access and hilly shorelines. It is 70.94 acres in size. There is no depth data, but the lake appeared to be at least 50 feet in depth. It had a July water temperature of 54°F. There is sparse shoreline vegetation, partly due to heavy beach erosion. A one hour gill-net set produced two Dolly Varden with a mean length of 261 mm. The fish were heavily parasitized, and feeding on stickleback.

Lake Leonne: is moderately popular as a recreation area, and is 85.1 acres in size. There is no depth data available, but several visible shoal areas are present. Lake Leonne had a July water temperature of 57°F. There was sparse shoreline vegetation due to a rise of water level by the dam. A one hour gill-net set produced no fish.

On August 23, 1968, physical and biological observations were made at Lake Rose Tead. The mid-lake salinity-temperature profile obtained is shown in Table 2.

TABLE 2 - Lake Rose Tead Temperature-Salinity Depth Profile for August 23, 1968.

<u>Depth (ft.)</u>	<u>Temp. (°C.)</u>	<u>Salinity (ppt.)</u>
1	12.5	0.3
2	12.4	0.3
3	12.7	0.6
4	12.8	0.8
5	12.9	1.7
6	13.0	2.8
7	13.8	5.5
8	15.4	9.6
9	17.6	12.3
10	18.9	14.7
11	20.1	17.2
12	20.5	18.3
13	20.5	19.4
14	20.3	19.6
15	19.2	19.8

These observations were made just prior to the highest monthly tides, indicating a continuing occurrence of sea-water intrusion into the lake. A vertical plankton haul taken with a one-half-meter net of #20 nylon mesh produced a small population of copepods, but no cladocerans and little phytoplankton.

Mayflower (B.P. #40) Lake was investigated on May 31, 1968, to verify the presence of an unusual early summer supersaturation of oxygen noticed in 1967. This year's results are shown in Table 3.

Extreme supersaturation was present again this year, with a maximum value of 19.6 ppm at 12 feet. No oxygen and a heavy presence of hydrogen sulfide was noted in the 27-foot sample. An experimental plant of 2,300 silver salmon fry was stocked in the lake in July, 1968, to study their adaptation to this unusual habitat.

TABLE 3 - Mayflower Lake Temperature-Salinity-Oxygen Depth Profile for May 31, 1968.

<u>Depth (ft.)</u>	<u>Temp. (°C.)</u>	<u>Salinity (ppt)</u>	<u>Oxygen (ppm)</u>	<u>Saturation</u>
0	13.6	0.4	---	---
2	13.7	0.4	---	---
4	13.8	0.4	---	---
6	13.7	0.4	10.8	104%
8	13.7	0.4	---	---
10	13.6	1.4	---	---
12	14.0	7.7	19.6	180%
14	15.1	12.7	17.0	170%
16	16.4	15.6	8.5	86%
18	16.9	17.1	---	---
20	17.3	18.0	---	---
22	17.2	18.4	0.0	0%
24	15.9	18.6	---	---
25	15.4	18.6	---	---

Assessment and Inventory of Sport Fish Populations

Rainbow and Steelhead Trout:

The fifth consecutive year of Kodiak Island lake sampling was conducted in late June, 1968, with standard, monofilament nylon, sampling gill nets. The resulting data on population composition, abundance, and growth is shown in Table 4.

Catch-per-hour variance, which was unusually high, appears to reflect heavy fishing on most of these lakes. High catches came from the more productive, shallow lakes where 1967 brood year plants have grown rapidly enough to begin entering the sport fishery. High catches in the overnight set at Heitman Lake indicated that the previously unsuccessful one-hour sets in this lake were probably due to net avoidance caused by extremely clear lake water and that a sizable population of spawning rainbow trout does exist in the lake. The poor catches in Jupiter and Saturn Lakes appear to be the result of unusually heavy fishing pressure in these lakes in early June.

Aerial counts of spawning steelhead trout were made at Red Lake outlet, Frazer River, and Karluk River on May 9. The counts were 0 steelhead at Red Lake outlet, 10 in Frazer River, and 22 in the upper two-thirds of Karluk River. Despite good visibility, these fish were extremely difficult to observe aerially, and interviews with ground parties at Frazer and Karluk Rivers indicate that many more steelhead were available in these areas than could be aerially observed. More indirect methods of indexing steelhead population fluctuations may need to be developed to better manage these fisheries. The autumn, 1968, sport fish catches on Karluk River at Portage indicated that the 1968-69 run was higher than during the previous three years.

TABLE 4 - June, 1968 Kodiak Area Sampling Gill-Net Catches.

Lake	Hours Set	Fish/ Hour	Species	Brood Year	Number Caught	Mean Length (mm)	Mean Weight (gm)
Cascade	1.00	7.0	RT	1966	3	180	61.0
			GG	1966	3	204	85.4
			GG	1967	1	142	29.4
Jack	0.50	12.0	RT	1967	6	166	62.5
Lee	1.00	2.0	RT	1967	2	207	122.0
Beaver Ponds	0.08	96.3	RT	1967	4	149	43.6
			DV	--	4	209	90.8
Snag	0.17	58.8	RT	1966	2	189	85.0
				1967	8	166	65.3
Dragonfly	1.00	1.0	RT	1966	1	229	164.0
Horseshoe	1.00	2.0	RT	1966	1	175	66.6
				1967	1	163	50.4
Bull	1.00	2.0	RT	1967	2	174	74.3
Lupine	0.50	16.0	RT	1967	8	164	54.6
Cicely	1.00	1.0	RT	1964	1	302	295.3
Caroline	1.00	1.0	RT	1967	1	132	28.4
Aurel	1.00	0.0	--	--	--	--	--
Heitman	17.50*	1.4	RT	1963-4?	3	272	--
				1965	20	221	114.9
				1966	1	94	9.5
Margaret	1.00	0.0	--	--	--	--	--
Jupiter	1.00	0.0	--	--	--	--	--
Saturn	1.00	1.0	RT	1966	1	231	137.0
Southern (LI#72)	1.13	13.3	SS	1966	10	194	77.3
				1967	5	148	33.2

*Overnight set. Eight of the larger rainbows from this catch were released.

King Salmon:

King salmon studies were limited to one aerial observation at Karluk River on August 2, 1968, at which time 300 king salmon were seen from the lake weir to Portage, and 360 from Portage to the Lagoon. With a weir count of 35 kings, the total 1968 escapement is estimated at 700 fish. The 1968 commercial catch of king salmon in the Karluk area was 103 fish and the sport fish take was estimated to be under 150 kings.

Silver Salmon:

Ground counts were made in all important silver salmon streams along the Kodiak road system in October and November of 1968. A summary of these surveys is shown in Table 5.

The counts showed the 1968 silver salmon runs in the area to be even larger than the excellent escapements of 1967. Of particular interest was this year's escapement in Lake Rose Tead (Pasagshak River system), where the upward trend of escapement counts has continued for the fourth consecutive year. This was apparently due to alteration of the lake rearing habitat by the 1964 land subsidence. The upper lake spawning area is shown in Figure 1, and the corresponding spawning ground counts indicated in Table 6.

TABLE 5 - Silver Salmon Spawning Ground Enumeration in Northeastern Kodiak Island, 1968.

<u>System</u>	<u>Section Counted</u>	<u>Section Ground Count</u>	<u>Estimated System Escapement</u>	<u>Estimated Harvest*</u>	<u>Calculated Total Return to System</u>
Saltery	River migration	878	1,000	100 S.F.	1,100
Miam	All	300**	300	0 S.F.	300
pasagshak	Lake tributaries	3,500	3,500	300 S.F.	3,800
Roslyn	? miles up	195	250	50 S.F.	300
Old's	To main forks	704	750	1,000 C.F.	1,750
American	Upper pools	504	700	150 S.F.	850
Salonie	To rifle range	642	700	200 S.F.	900
Buskin	Entire system	1,800	2,100	1,200 S.F.	3,300
Mill	Out over falls	82	50	100 S.F.	150

*SF = Sport Fish
CF = Commercial Fish

**Aerial

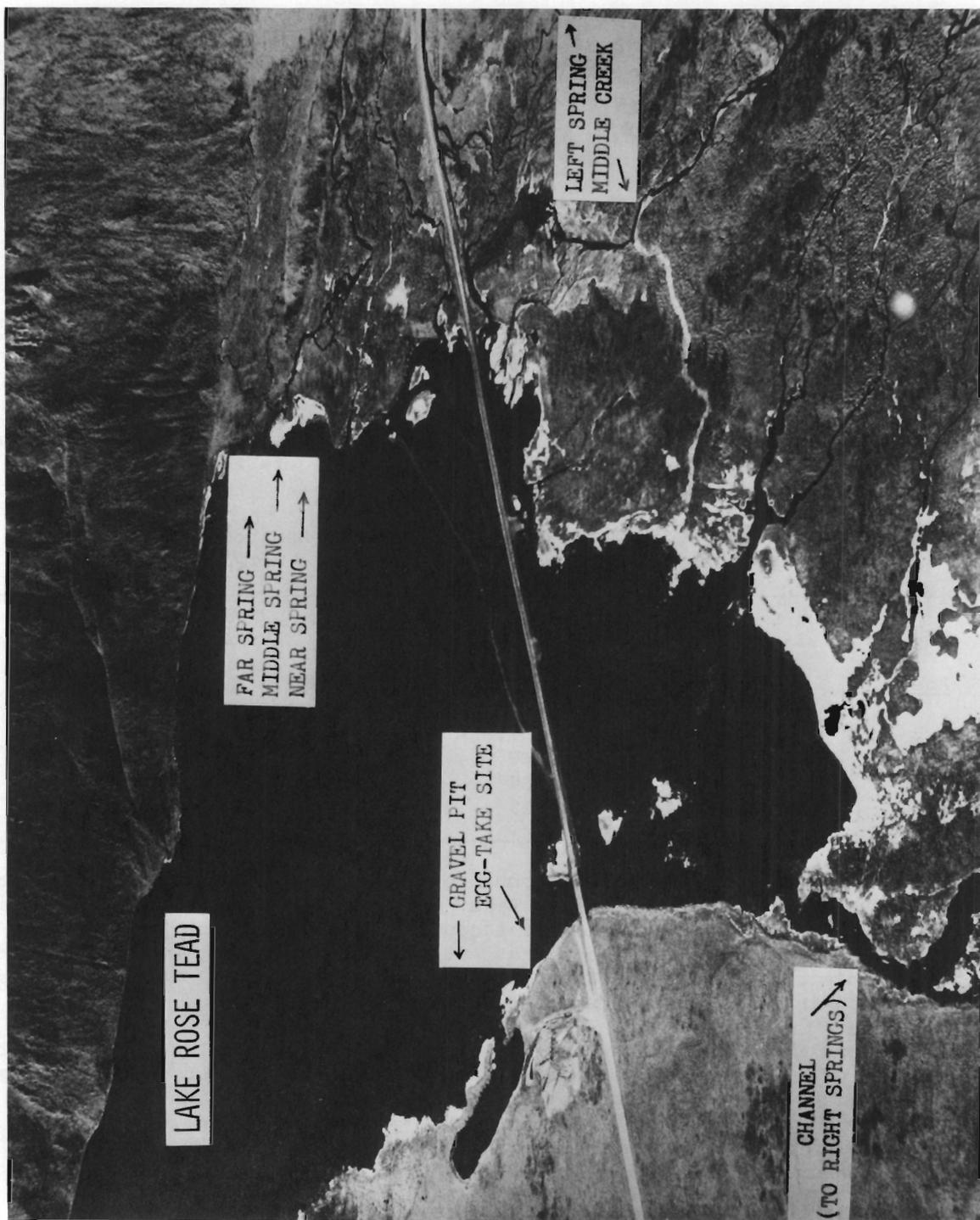


FIGURE 1. In 1968, 3,500 Silver Salmon Spawning in These Spring-Fed Tributaries of Lake Rose Teard.

TABLE 6 - 1968 Silver Salmon Spawning Ground Counts in Lake Rose Tead Tributaries.

<u>Area</u>	<u>Count</u>
Roadside Creeks	112
Near Spring	530
Middle Spring	338
Far Spring	110
Left Spring	680
Middle Creek	170
Right Spring & Channel	1,250
Gravel Pit	250
Egg take of October 19	<u>60</u>
Total	3,500

Sockeye Salmon:

Sockeye salmon studies centered around skiff counts and age analysis of Buskin Lake and Lake Rose Tead populations (Figure 2). Age analysis for these two systems is summarized in Table 7.

TABLE 7 - Age Composition of 1968 Sockeye Salmon Escapements to Buskin Lake and Lake Rose Tead.

<u>Age</u>	<u>Buskin Lake</u> (Per Cent)		<u>Lake Rose Tead</u> (Per Cent)	
	<u>Males</u>	<u>Females</u>	<u>Males</u>	<u>Females</u>
1.2	8	7	4	14
2.2	8	0	4	7
1.3	69	64	66	72
2.3	15	29	26	7

On August 6, 1968, a skiff count of spawning sockeye salmon was made along the western half of Buskin Lake, and a ground count was made on the Spring Creek tributary. Escapement counts showed 760 beach spawners and 148 creek spawners. The escapement estimate for this system was 950 sockeye. This run spends little time in Buskin River, and only 60 to 200 fish are taken in most years by sport fishermen.

Shoreline skiff observations were made at Lake Rose Tead on August 23. A total of 1,700 sockeye salmon were counted, most of which were spawning in shoreline areas of three- to five-foot depths. This high density of spawners is surprising in relation to the greatly modified lake rearing habitat and feeding competition with juvenile silver salmon. This partially saline habitat was also reflected in the otolith samples from the Lake Rose Tead population. Early calcium deposit appeared as one large, deformed hyaline ring and aging from otoliths was not possible.



FIGURE 2. Length and Scale Samples of Sockeye Salmon Spawning on Buskin Lake Beaches Were Taken to Determine the Age Composition of this Run.

Pink Salmon:

A pink salmon creel census was maintained on the Buskin River from July 6 to August 12, which encompassed the entire sport fishery for this species. Index hours of 14:00 and 20:00 hours were used, with four, 24-hour calibration counts spaced throughout the season. The seasonal calculations are as follows:

July 6 to 31 - 4,542 man-hours effort producing 2,027 pink salmon
Aug. 1 to 12 - 3,510 man-hours effort producing 3,520 pink salmon
Season Total - 8,052 man-hours effort producing 5,547 pink salmon

It was evident that the 1968 single-hook fishery was able to take as many pinks during July as the 1967 treble-hook fishery; however, the new regulations allowing the river to remain open in August resulted in a seasonal catch 2.8 times the 1967 catch.

On August 20, 1968, a ground count was made on the Buskin River. This included the use of a skiff to count fish in the warehouse pool area. A total count of 42,000 fish was obtained for the entire river and its tributaries. The river was well utilized by spawning pinks throughout, particularly the riffles in the lower sections of the river.

Dolly Varden:

A creel census was maintained throughout the 1968 spring fishery on outmigrating Dolly Varden in the Buskin River. This is the most popular and concentrated Dolly Varden fishery in the entire area and was monitored for the second consecutive year. During 1968, daily 11:00 a.m. and 7:00 p.m. index time periods were used. Four 24-hour observations were made to determine index-hour correlation. No differences were found between the weekday and weekend index hour correlation, permitting a conversion factor of 7.46 to be used for all daily estimates. The results of this census survey are summarized in Table 8.

TABLE 8 - Dolly Varden Creel Census for Buskin River, 1968.

<u>Weekly Time Period</u>	<u>Man-Hours Effort</u>	<u>Catch Estimate</u>	<u>Mean Length (mm)</u>
I (4/24 - 4/30)	725	1,514	353
II (5/1 - 5/6)	762	1,621	302
III (5/7 - 5/13)	2,171	5,597	302
IV (5/14 - 5/20)	1,283	3,283	264
V (5/22 - 5/25)	<u>456</u>	<u>792</u>	<u>241</u>
Totals	5,397	12,807	295*

*Weighted by weekly time period catches.

The weekly measurement of Dolly Varden (n=257) indicated that the mean length of the fish decreased throughout the outmigration. Many fish were voluntarily released during the last two weekly time periods and care was taken to measure only fish from the fisherman creel. Catch-per-hour data was also computed only from actual fish retained.

No tag recoveries or sightings of Dolly Varden tagged in 1965 and 1966 were made in 1968. Observations for these tags included incidental ground counts of approximately 200 Dolly Varden in American River on August 21, and approximately 500 Dolly Varden in Saltery Creek on September 12, 1968.

Arctic Grayling:

Grayling investigations centered around population evaluation of the Cascade Lake plants of 30,000 fry introduced in 1966, and 30 mature adults stocked in 1967. An experimental gill net set for one hour in June, 1968, produced three grayling from the 1966 plant and one grayling naturally spawned in 1967. Lengths and weights of these age groups are shown in Table 4, and size and scale differences shown in Figures 3 and 4, respectively. Two beach seine hauls were also made in June and produced four 1967 brood-year grayling, six 1966 brood-year grayling, and two 1966 brood-year rainbow trout. Additional observations were made at this lake in August, when three hours of hook-and-line sampling produced one 1966 brood-year grayling 213 mm in length; one 1967 brood-year grayling 193 mm in length; and one 1966 brood-year rainbow trout 224 mm in length. The 1967 brood-year grayling showed distinct signs of egg development and will probably spawn in 1969. A May, 1968, stream improvement project by the Kodiak Conservation Club improved the inlet stream spawning potential, and in August, 1968, four 3-inch grayling were seen in this area. These juvenile grayling appeared to be the progeny of a second spawning of the 1967 adult plant. Good grayling and rainbow trout catches were reported from Cascade Lake in 1968, with most fish being taken on small lures and spoons. No sticklebacks have been observed in the lake since it was rehabilitated in 1965.

Capelin:

Capelin investigations were conducted on Roslyn Beach on the high, night tides of May 25 and 26. Predictions of a heavy run on this beach, based on previous years' observations, proved to be correct for 1968. The run peaked on May 26, when densities of fish were approximately equal to those in 1966. About 100 people were harvesting fish on the peak nights. Dip-netting observations in the surf produced a sex ratio of 97.3 percent males (45 females out of 1,652 capelin sexed). A thermograph was installed in a waterproof container to obtain egg incubation data. Four days later, on May 30, the beach was checked and erosion of eight to 10 inches of sand had occurred along most of the upper beach area, washing away buried markers and exposing the thermograph lead. It appears that this erosion is an essential part of successful capelin spawning. As capelin spawn in the surf, the highly adhesive eggs probably attach themselves to suspended sand particles and are buried in subtidal areas of the beach. A small sample of 20 capelin of each sex was frozen and examined after a period of five months (Figure 5). The mean length was 125.1 mm for the males and 96.5 mm for the females. Vertebrae counts averaged 66.3 for males and 65.7 for the females. Fecundity samples were incomplete, but one large unspawned female contained 8,106 eggs. Although the vertebrae counts are similar to those reported from Atlantic capelin, the Kodiak Island populations are approximately 70 mm shorter and contain approximately 1/3 as many eggs. Otolith aging of Kodiak Island capelin showed all fish to be two years old at maturity, whereas most Atlantic populations are three and four years old at maturity.



FIGURE 3. Size Differences Between Arctic Grayling Planted as Fry in 1966 (top) and 1967 Natural Reproduction (bottom) Demonstrate Yearly Growth Increments.

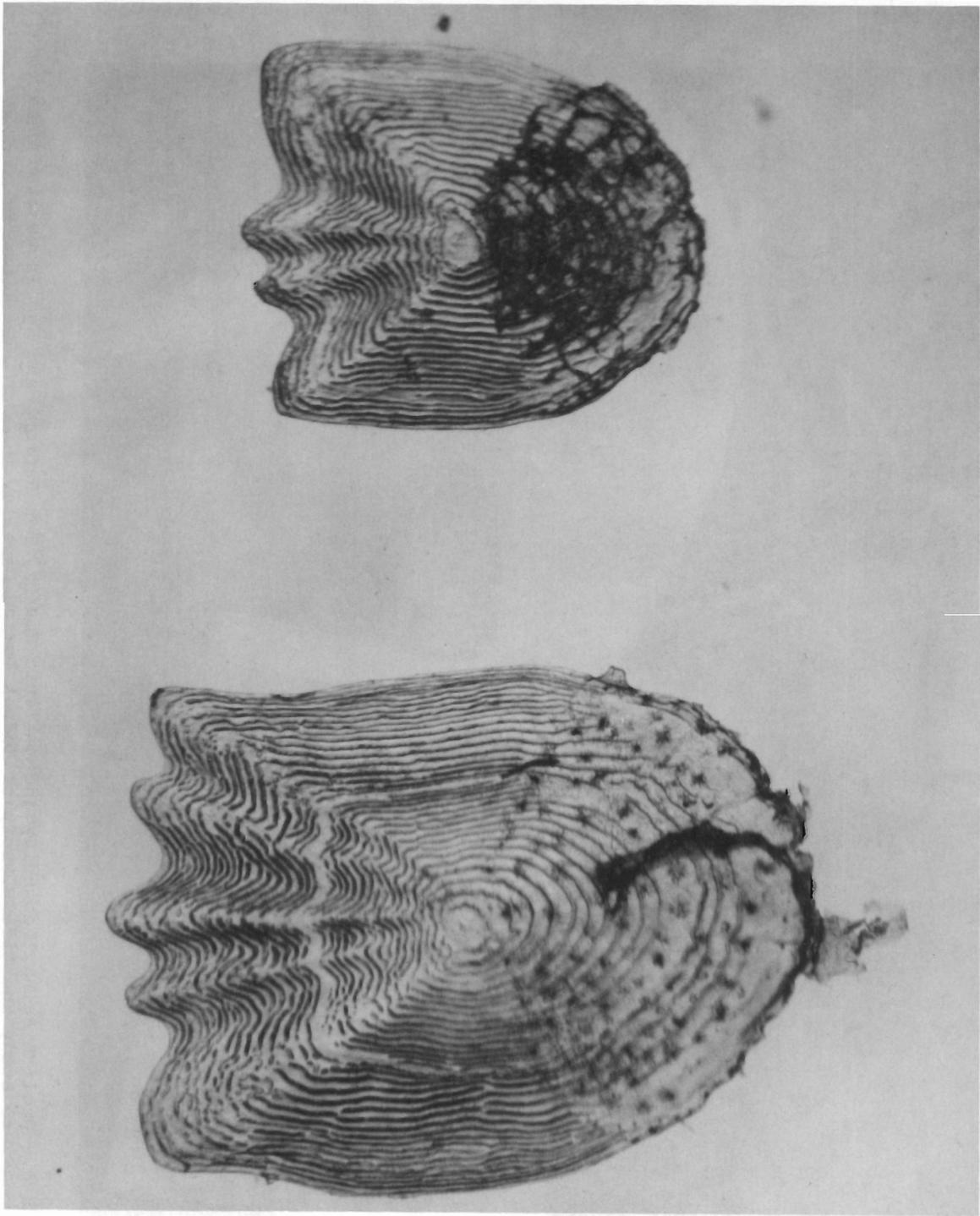


FIGURE 4. Reference to Scales from Known-Age Arctic Grayling (26 Month-Old on Left; 13 Month-Old on Right) Aid in AGing Fish from Other Populations.

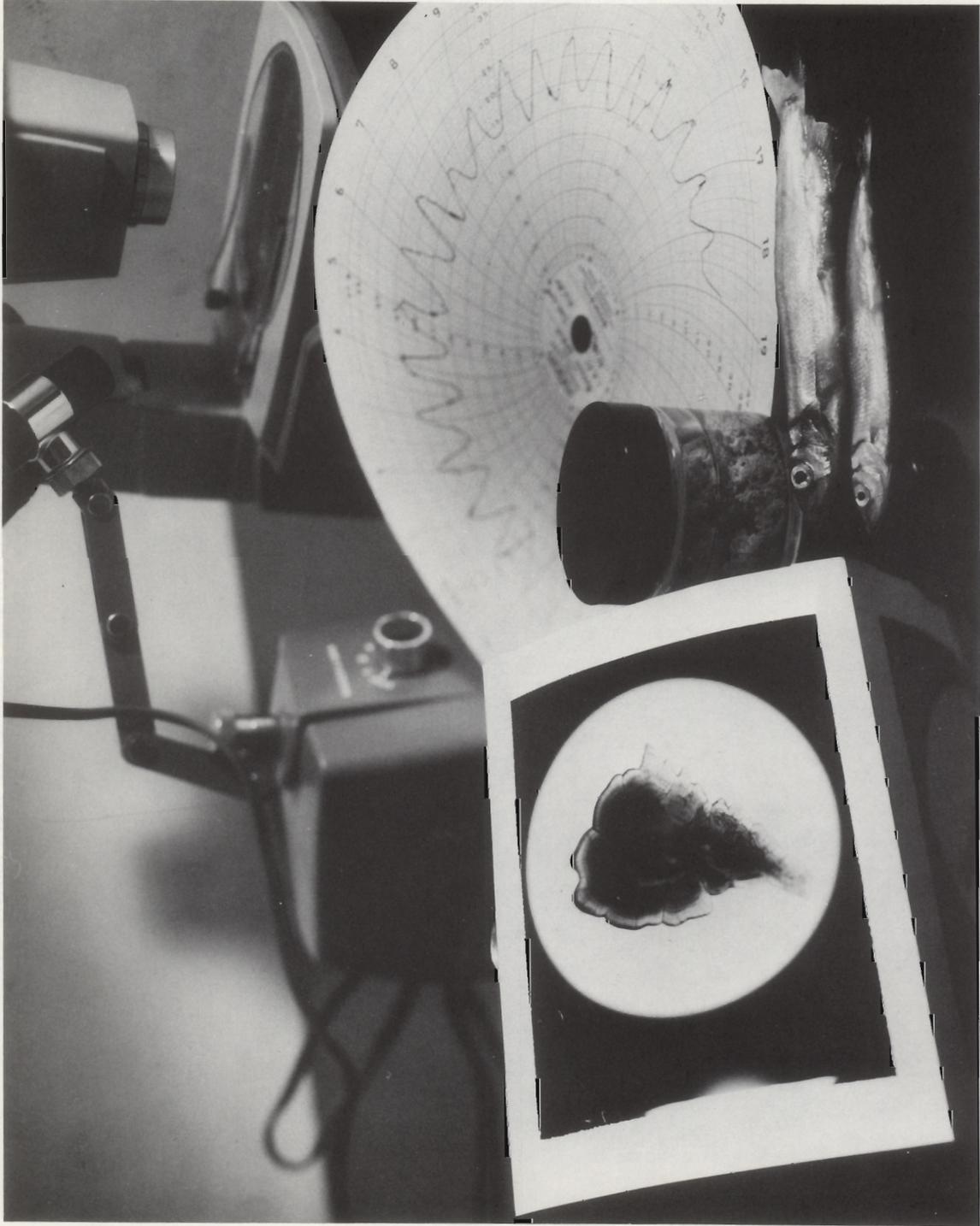


FIGURE 5. Otolith Aging, Fecundity and Meristic Counts, Sex Ratios, and Egg Incubation Data Is all Needed to Study the Life History of Kodiak Island Capelin.

Public Access Assistance

Assistance to public access was limited to establishing and marking a trail to Cascade Lake. The existing trail, which begins at the south-east corner of Anton Larsen Bay, can be reached only by boats launched from the road on the west side of the bay. Two trails (a one-half mile low-tide trail and a one and one-half mile high-tide trail) were established from the spur-road picnic site on the south end of the bay to connect with the existing trail. Signs and white trail marker posts were installed at appropriate points.

Evaluation of Multiple Water Usage

Assistance was given to the Division of Commercial Fisheries in obtaining flow data and making recommendations for minimum flow requirements for Pillar Creek. On September 3, the City of Kodiak switched discharge flumes on the Pillar Creek Reservoir and allowed the creek to go completely dry. Approximately 7,000 pink salmon and 50 silver salmon were stranded and died. It was recommended that the State require the City to maintain a minimum discharge of 9 cfs.

The Department of Highways requested permission to operate heavy equipment in the Roslyn Creek streambed as installation of sheet metal piling will be necessary to prevent severe erosion of a lower section of the streambank which would relocate the stream mouth to the north end of Roslyn Beach. Investigation of the problem area showed the proposed operation to be well below any spawning areas in the creek. Loss of the present mouth-area pools would eliminate the major silver salmon fishing areas in the stream.

LITERATURE CITED

Alaska Department of Fish and Game. 1965. Post Earthquake Studies Evaluation. An Interim Report on the March, 1964 Earthquake Effects on Alaska's Fishery Resources, 3-20.

Marriott, Richard A. 1965. Inventory and Cataloging of the Sport Fish and Sport Fish Waters of Southwest Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1964-1965, Project F-5-R-6, 6:97-110.

_____. 1967. Inventory and Cataloging of the Sport Fish and Sport Fish Waters of Southwest Alaska. Alaska Department of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1966-1967, Project F-5-R-8, 8:57-71.

Prepared by:

Approved by:

Richard A. Marriott
Fishery Biologist

s/Louis S. Bandirola
D-J Coordinator

Date: April 1, 1969.

s/Rupert E. Andrews, Director
Division of Sport Fish



Surveying lakes in Alaska during the winter months follows a routine procedure.