

## RESEARCH PROJECT SEGMENT

*State:* Alaska

*Project No.:* F-9-3                      *Name:* Sport Fish Investigations of Alaska.

*Study No.:* G-1                      *Study Title:* Inventory and Cataloging.

*Job No.:* G-1-G                      *Job Title:* Inventory and Cataloging of the  
Sport Fish and Sport Fish Waters in  
Interior Alaska.

*Period Covered:* July 1, 1970 to June 30, 1971.

## ABSTRACT

Fifteen lakes stocked with rainbow trout, Salmo gairdneri, and silver salmon, Oncorhynchus kisutch, were test netted to determine age and growth, stocking success, and interspecies relationships.

Creel census and a random, stratified angling pressure estimate were conducted on Birch Lake from June 1 through September 7, 1970, with the aid of military personnel.

Quartz and Lost lakes were rehabilitated using powdered rotenone.

Winter dissolved oxygen analyses were conducted on 23 lakes in the job area.

A bioassay of Fintrol (antimycin) was conducted at Lost Lake using silver salmon; longnose suckers, Catostomus catostomus; lake chub, Couesius plumbeus; and round whitefish, Prosopium cylindraceum.

Preliminary surveys were conducted on Mentasta and Moose creeks.

## RECOMMENDATIONS

1. Continue inventory and cataloging of waters in the job area, with increased emphasis on remote lakes accessible only by riverboat or plane.
2. Continue the annual test netting of stocked waters to provide information on present stocking policies, age and growth, interspecies relationships, and population dynamics.
3. Conduct more detailed limnological investigations on lakes where this information is insufficient or lacking. Initiate a limnological survey of Fielding Lake.
4. Investigate the feasibility of installing a fish barrier at the outlet of Deadman Lake and rehabilitating the lake.
5. Determine the potential of Delta Clearwater River silver salmon as an egg source.
6. Intensify the inventory and cataloging of streams, particularly in the Taylor Highway area.
7. Continue to evaluate the lake trout and silver salmon introductions in Harding Lake.

## OBJECTIVES

1. To determine the environmental characteristics and the fish species composition of the waters of the job area and, where practicable, obtain estimates of existing or potential angler use and sport fishing harvest.
2. To investigate remote area waters and determine fish species composition, quality of angling, accessibility, and value in distributing angler effort over a wider area, to offer desired protection of individual fish stocks.
3. To evaluate present stocking policies and programs and determine fish survival, growth, and interspecies relationships.
4. To evaluate application of fishery restoration measures and determine availability of sport fish egg sources.

5. To assist as required in the investigation of public access status to the area's fishing waters.
6. To evaluate multiple water-use development projects (public and private) and their effects on the area's streams and lakes for the protection of the sport fish resources.

## TECHNIQUES USED

Graduated mesh monofilament gill nets, 125' x 6', with five mesh sizes ranging from 1/2 to 2 1/2 inches square measure, were used to sample fish populations of stocked lakes and waters with undetermined fish populations.

Fish scales were mounted between glass slides and read using a Bausch and Lomb microprojector.

All fish were measured to fork length in millimeters.

A Hach (Model AL-36-WR) kit was used for determining dissolved oxygen content.

Military personnel at the Eielson AFB Recreation Camp located at Birch Lake conducted angler counts by boat at pre-selected hours set up by the area Sport Fish biologist. Angler contacts were made at the AFB Recreation Camp and creel census sheets were filled in by a creel census clerk following completed trips.

Graduated mesh gill nets and hook-and-line were used to sample fish populations in streams.

A bioassay on Lost Lake tested four concentrations of Fintrol (Anti-mycin A) and a control. Four fish species were utilized as test fish. Plastic containers with 20 gallons of water containing the desired concentration of test solution were used for the bioassay.

Lakes were chemically rehabilitated with powdered rotenone dispersed from burlap bags towed behind boats.

## FINDINGS

### Fish Stocking Evaluations

Fifteen lakes stocked with rainbow trout, Salmo gairdneri, and/or silver salmon, Oncorhynchus kisutch, were test gill netted during July and

TABLE 1 Test Netting of Stocked Lakes, Interior Alaska, 1970.

Lake	Date	No.	Species *	Length (mm)		Frequency **	% Comp.
				Range	Mean		
Birch	8/19	6	RT	261 - 434	372	00.32	100.0
Bolio	7/16	18	SS	223 - 460	345	0.86	100.0
Craig	7/21	1	RT	414	414	0.05	100.0
Donna	7/8	4	RT	395 - 480	420	0.21	100.0
	7/22	4	RT	190 - 470	281	0.18	100.0
Harding	8/20-28	6	LT	393 - 821	691	0.02	1.43
		9	BB	375 - 695	462	0.03	2.15
		12	NP	485 - 690	591	0.04	2.86
		392	LCi	120 - 235	-	1.11	93.56
Jan	7/10	65	SS	195 - 251	222	1.81	69.15
		29	RT	165 - 423	243	0.81	30.85
Lisa	7/10	45	SS	215 - 290	260	0.90	97.83
		1	RT	213	213	0.02	2.17
Little Donna	7/22	9	RT	193 - 461	294	0.20	100.0
Little Harding	8/20	9	NP	303 - 815	451	0.45	100.0
Lost	8/20	9	SS	204 - 255	229	0.35	24.32
		7	S	230 - 432	310	0.27	18.92
		21	CH	97 - 125	-	0.81	56.76
Mark	7/17	9	RT	137 - 313	194	0.45	100.0
Rapids	7/16	1	RT	240	240	0.05	100.0
North Twin	7/17	9	S	287 - 335	-	0.49	100.0
South Twin	7/17	22	S	223 - 365	-	1.19	100.0
81 Mile Pit	7/14	3	RT	159 - 198	180	0.19	100.0

\*BB - Burbot                      LT - Lake trout                      S - Sucker  
 CH - Chub                              NP - Northern Pike                      SS - Silver salmon  
 LCi - Least Cisco                      RT - Rainbow trout

\*\*Fish per hour - 125' variable mesh net.

August. Nets were set for periods ranging from 16 - 26 hours. The results are shown in Table 1.

#### Birch Lake:

Birch Lake was sampled for 19 hours in mid-August with one graduated mesh net. Six rainbow trout ranging from 261 - 434 mm in fork length, and 0.56 - 2.00 pounds in weight were captured. Five were mature males and one was a female with some gonad development. Four of the fish were from the original 1966 stocking, with one each from the 1967 and 1968 plants.

During the winter of 1970-71, rainbow trout up to 500 mm were being harvested by ice fishermen.

The lake was stocked with 189,200 rainbow trout fingerling in September, 1970.

#### Bolio Lake:

This lake, located on the Fort Greely military reservation, was netted in mid-July. Two gill nets were set, but one was pulled ashore by vandals. The undisturbed net captured 18 silver salmon ranging from 223 - 460 mm in fork length and 0.32 - 2.16 pounds. The mean length and weight were 345 mm and 1.12 pounds. The 460 mm silver salmon were the largest recorded in any managed lake in the Interior. Seventy-eight percent of the catch were 1966 year-class fish (in their terminal year) and 22% were of the 1968 year-class. The lake was last stocked with 19,925 fingerling silver salmon in 1968.

The water level on Bolio Lake was down several feet from normal.

#### Craig Lake:

Only one rainbow trout from the 1964 plant (414 mm and 2.12 pounds) was captured in 20 net hours. There was no evidence of survival of rainbow trout stocked in 1968 and 1969. Large numbers of small (50 - 100 mm) chubs, Coxius plumbeus, were observed in the shallows and fishing is reportedly poor.

Craig Lake was experimentally stocked with 7,500 silver salmon fingerling in September, 1970, in an attempt to reduce the chub population; however, rehabilitation may be necessary.

#### Donna Lake:

This approximately 60-acre lake was sampled with one gill net on July 8, 1970, and again on July 22, 1970. Eight rainbow trout were captured ranging from 190 - 480 mm. The largest fish weighed 3.59 pounds. Five year-classes were represented: 1963 (25%), 1964 (25%), 1965 (12.5%), 1968 (25%), and 1969 (12.5%).

Donna Lake has been stocked exclusively with rainbow trout since 1962. The lake was stocked in September, 1970 with 6,300 fingerling rainbow trout.

#### Little Donna Lake:

Little Donna Lake was test netted for 22 hours with two gill nets in July. Nine rainbow trout ranging from 193 - 461 mm were captured. Four year-classes were represented: 1964 (22%), 1966 (22%), 1968 (45%), and 1969 (11%).

Little Donna Lake was stocked with 3,700 fingerling rainbow trout in September.

#### Harding Lake:

This 2,633-acre lake was test netted for a total of 352 net hours during August, 1970. The primary purpose of the netting was to determine the success of 1968 and 1969 silver salmon introductions (714,300 fingerling) and evaluate the lake trout, Salvelinus namaycush, population.

Nets were set at depths from 6 - 112 feet, with most of nets being set at depths between 20 and 50 feet. No silver salmon were captured; however, six lake trout ranging from 393 - 821 mm were captured. The largest lake trout was a ripe male weighing 24 pounds. All of the lake trout except one (393 mm and 1.76 pounds) were large mature adults from transplants of 252 adults in 1963 and 235 in 1965. The one small lake trout was either from natural reproduction or from a stocking in 1965 of 88,000 eyed eggs, of which 75,000 were estimated to have hatched (Heckart and Roguski, 1966).

Other species captured were 9 burbot, Lota lota; 12 northern pike, Esox lucius; and 392 least cisco, Coregonus sardinella.

#### Little Harding Lake:

Spetz (1969) reported heavy fishing pressure and good success during February and March, 1969, for the 1967 silver salmon fingerling plant in Little Harding Lake. Silver salmon were stocked again in 1968 and 1969, principally to provide stock for Harding Lake, as the fish were allowed to enter Harding Lake after achieving some initial growth.

During the 1970 test netting, nine northern pike ranging from 303 - 815 mm were the only fish taken in one 20-hour net set.

The northern pike apparently gained entry to the lake via the outlet from Harding Lake during spring runoff.

A control barrier is scheduled for installation in 1971; the lake will then be rehabilitated.

Jan Lake:

This lake has the highest recorded catch frequency of any lake tested. A total of 65 silver salmon and 29 rainbow trout were captured in two gill nets for a frequency of 1.81 and 0.81 fish per net hour respectively. The silver salmon, ranging from 195 - 251 mm represented the 1968 stocking of 8,000 fingerling. Six year-classes were present in the 29 rainbow trout sampled.

Lisa Lake:

This small lake of approximately 50 acres was one of the more popular fishing lakes during the summer as well as in the ice fishing season. Limited creel census indicated fishing success was high for silver salmon with an occasional rainbow trout being harvested.

The 45 silver salmon captured in two gill nets were of the 1968 stocking. The size range was 215 - 290 mm with a mean length of 260 mm. Only one rainbow trout (213 mm) from the 1969 plant of 20,000 fingerling was netted.

Lost Lake:

This lake was netted prior to rehabilitation. A large number of suckers, Catostomus catostomus, and chubs were present as shown in Table I.

Mark Lake:

Nine rainbow trout were netted from Mark Lake in 20 hours. Three year-classes were represented: 1966 (11%), 1968 (56%), and 1969 (33%). The length range was 137 - 313 mm with a mean length of 194 mm.

Rapids Lake:

Only one 240 mm rainbow trout was taken in one gill net set. The fish was of the 1968 stocking. The lake was stocked in September, 1970, with 1,000 rainbow trout fingerling.

North Twin and South Twin Lakes:

These lakes of approximately 20 surface acres each were stocked with rainbow trout in 1966. Several large rainbow trout were reportedly caught from them within the past year; however, only suckers were netted in one overnight set in each lake.

It is recommended that these lakes be chemically rehabilitated when the necessary arrangements can be made with Fort Greely.

81-Mile Pit:

This small gravel pit located adjacent to the Richardson Highway was sampled with one gill net in July. Two rainbow trout of the 1969 stocking

should result in an excellent kill. Suckers and chubs were the main target species.

Lost Lake is scheduled for an experimental stocking of sheefish in 1971, depending on availability.

#### Winter Dissolved Oxygen Analysis

A total of 23 lakes was sampled for dissolved oxygen content during 1970-71. The results of these samples are given in Table 4.

TABLE 4 Lakes Tested for Dissolved Oxygen, 1970-71.

<u>Lake</u>	<u>Date</u>	<u>Depth</u>		<u>Sample</u> <u>(Ft.)</u>	<u>Oxygen</u> <u>(ppm)</u>
		<u>Snow</u> <u>(In.)</u>	<u>Ice</u> <u>(In.)</u>		
Berry Pond	3/18/71	12	26	Surface	9.0
Birch	2/10/71	10	30	6	11.0
Bolio	2/5/71	6	30	6	8.0
Craig	2/9/71	12	28	6	8.0
Donna	12/17/70	10	22	Surface	13.0
Four Mile	3/16/71	20	25	6	5.0
George	1/2/71	4	28	Surface	13.0
Harding	3/2/71	18	26	6	11.0
Hartman	3/2/71	24	25	Surface	0.2
Jan	3/3/71	12	23	6	7.0
Lisa	2/9/71	10	31	6	11.0
Little Donna	12/17/70	10	22	Surface	11.0
Little Harding	3/2/71	24	24	6	9.0
Lost (near Birch)	3/2/71	16	26	6	10.0
Lost (near Quartz)	2/6/71	10	31	6	0.2
Mark	2/5/71	10	29	6	10.0
Moosehead	2/17/71	12	40	Surface	0.4
Quartz	2/6/71	8	31	6	6.0
Rapids	3/15/71	12	44	Surface	12.0
Thompson	2/24/71	16	26	Surface	0.8
North Twin	2/8/71	0	31	8	12.0
South Twin	2/8/71	0	31	5	4.4
81 Mile Pit	2/10/71	24	30	6	3.4

## Stream Surveys

### Mentasta Creek:

This shallow, mud bottom stream originating near Mentasta Pass (Glenn Highway), flows approximately eight miles through marsh land before entering Mineral Lake. The lower section averages approximately 33 feet wide by 3 feet deep. The velocity is approximately 0.5 fps.

A 66-hour net set from April 17-20, 1970, captured three northern pike (224 - 333 mm) and two round whitefish, Prosopium cylindraceum (213 - 264 mm). In further sampling on May 8, 1970, with hook and line an additional 21 northern pike were taken. One was a 282 mm immature male while all others were in spawning condition. The size range for northern pike in both samples was 224 - 523 mm with a mean length of 402 mm.

### Moose Creek:

63°01'N 141°49'W

Moose Creek, a tributary to the Chisana River, enters approximately one mile downstream from the Chisana River bridge near Northway Junction. The creek originates south of Northway and flows generally in a northerly direction through marshy lowland before entering the Chisana River. The lower section averages approximately 30 feet wide and 2 feet deep, with a velocity of about 1 fps. The stream bottom is mud and the water color is brown.

Five days of hook-and-line sampling between April 28 and May 6, 1970, resulted in the capture of 41 burbot and 1 northern pike. The burbot ranged from 450 - 898 mm in length, with a mean length of 631 mm. The largest burbot weighed 11 pounds. The northern pike was 622 mm in length.

Moose Creek is easily reached from the Northway road. The road crosses and parallels the stream at several locations.

## Fintrol Bioassay Experiment

On September 15-17, 1970, a bioassay was conducted at Lost Lake using Fintrol (Antimycin A) fish toxicant at concentrations of 0.5, 1.5, 3.0, and 7.5 ppb. Heavy doubled plastic bags were used as containers for the test fish and a control. Twenty gallons of lake water were measured into each bag and the top was tied with heavy twine. The bags were allowed to rest on the lake bottom in a water depth of about one foot.

Round whitefish, longnose suckers, chubs and silver salmon were placed in each of the five containers. The silver salmon were about 225 mm while the other species were 125 - 150 mm in length.

A 0.5 ppb concentration was lethal to all test fish within 48 hours. A 1.5 ppb concentration was lethal to all fish tested within 24 hours, as were the higher concentrations. No fish were lost in the control container. Water temperature was 51°F (11°C) and dissolved oxygen exceeded 7.0 ppm in all test containers. This experiment will be repeated in 1971 at concentrations lower than 0.5 ppb to determine minimum effective concentrations, and northern pike will also be used as test fish in addition to the previously listed species.

#### LITERATURE CITED

- Heckart, Larry J. and Eugene A. Roguski. 1966. Inventory and Cataloging of the Sport Fish and Sport Fish Waters in the Interior of Alaska. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1965-1966, Project F-5-R-7, 7:215-229.
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