RESEARCH PROJECT SEGMENT

State: Alaska

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

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

Job No.: G-I-D *Job Title:* Inventory, Cataloging, and Population Sampling of the Sport Fish and Sport Fish Waters of the Cook Inlet Drainage.

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

ABSTRACT

Population sampling data, general morphometric data, and management recommendations are presented for 11 lakes surveyed during the reporting period.

Volumetric surveys were completed on three lakes scheduled for chemical treatment.

Sampling data is presented for 19 managed lakes. Fingerling rainbow trout, Salmo gairdneri, stocked September 14, 1970, were significantly smaller at sampling time than smaller fingerling stocked at an earlier date in 1969. Stocking time may be as important as fingerling size in successfully stocking rainbow trout in Cook Inlet area lakes.

Twenty-one lakes were sampled for dissolved oxygen concentrations. Only one lake contained less than 2.0 ppm dissolved oxygen. Light snow cover during the 1969-70 winter apparently allowed dissolved oxygen levels to remain above normal.

A reconnaissance of the Talachulitna River resident game fish populations was completed. A description of the fishery and a summary of observations are presented.

Research on stocked rainbow trout survival was initiated in Johnson Lake. Due to sampling error, the computed survival rate of 24.28% is believed to represent a significant over-estimate of the true survival rate.

King salmon, Oncorhynchus tshawytscha, enumeration counts indicate the 1970 escapement is the largest into area streams since Statehood.

Silver salmon, O. kisutch, numbers are believed to have been substantially lower than in 1968 and 1969 based on enumeration within established index areas.

RECOMMENDATIONS

1. Continue surveys of lakes located in Townships 15N and 16N, Ranges 3W and 4W, lakes located on the east side of the Talkeetna Spur Highway, and lakes in the Nancy Lake State Recreation Area as time and manpower permit.

2. Continue studies on the survival of stocked rainbow trout, in Johnson Lake.

3. Continue enumeration of spawning silver salmon within established index areas.

4. Operate a weir on Fish Creek during August, 1971, to provide an index of silver salmon escapement into Upper Cook Inlet streams and assist in evaluating the use of index areas to enumerate spawning silver salmon.

5. Continue enumeration of king salmon stocks in Willow, Montana, and Moose creeks and initiated in Byers and Troublesome creeks.

All recommended work relating to anadromous fish will be accomplished under a new anadromous fish study.

OBJECTIVES

1. To determine and record the environmental characteristics of the existing and potential fishery waters of the job area and to evaluate and develop the plans for the enhancement of anadromous and resident fish stocks.

2. To determine 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 and to make specific recommendations for selection of sites for segregation.

4. To evaluate multiple water-use development projects (public and private) and their effects on the area's streams and lakes, and for the proper protection of the sport fish resources.

5. To make recommendations for the proper management of the sport fish resources in the area and to direct future studies.

TECHNIQUES USED

Lakes were sampled with 125' x 6' variable mesh (3/4- to 2-inch bar measure) monofilament gill nets. Either one or two nets were fished approximately 24 hours each.

Volumetric lake surveys were made on the ice. Sample points were established by a grid using a surveyor's chain and transit. Depth determinations were made at the intersecting points of the grid, with distances between grid lines of 100 feet. Depth readings were made through the ice using a Ross P-100 fathometer with the transducer immersed in a spot of ethylene glycol.

Water samples for dissolved oxygen determinations were collected with a Kemmerer water sampler. Dissolved oxygen levels were determined by titration with PAO.

King salmon were enumerated by aerial, boat, and foot surveys.

Silver salmon were enumerated within index areas established in 1968. Only foot surveys were conducted.

A temporary weir was located on Fish Creek at the downstream end of the culvert passing under the Goose Bay Road, using one-inch diameter pipe as weir pickets. Salmon were identified by species and enumerated as they passed through a 3' x 3' trap built into the weir fence.

FINDINGS

Catalog and Inventory

Initial surveys were conducted on 11 lakes and follow-up survey work was done on four additional lakes. A listing of morphological characteristics of these lakes is given in Table 1. Fish population characteristics from these lakes, as determined by variable mesh gill nets, are shown in Table 2.

Byers Lake:

This lake is adjacent to the new Anchorage-Fairbanks Highway and within the Denali State Park. A major campground planned for the lake shore will undoubtedly result in heavy fishing pressure. The fish population is dominated by a lake trout, Salvelinus namaycush; and whitefish, Coregonus sp., complex. A limited number of longnose suckers, Catostomus catostomus, are also present. Burbot, Lota lota, have been reported but were not captured. Threespine stickleback, Gasterosteus aculeatus, generally inhabiting most lakes in the area, were not observed. Silver salmon, Oncorhynchus kisutch, fingerling rear in the lake, but rainbow

TABLE I Summary of Morphometric Data from Lakes Surveyed, Matanuska-Susitna Valleys, 1970.

Lake	Location	Surface Acreage	Max. Recorded Depth (Ft.)	Inlet	Outlet
Byers	T31N R5W Sec. 36	300	170	Minor	Byers Creek
Carpentier	T16N R4W Sec. 32	115	30	None	None
Anna	T16N R4W Sec. 15-22	95	40	Swamp Seepage	Yes
Jewel	T16N R4W Sec. 28	105	15	None	None
Pinochle	T20N R9E Sec. 23	50	Unknown	Minor	Yes
Tigger	T25N R4W Sec. 5	23	28	None	None
Trouble	T25N R4W Sec. 5	25	14	None	None
Turning Point	T19N R4W Sec. 20	8	37	None	None
Milo # 1	T18N R5W Sec. 1-12	105	95	Intermittent	Intermittent
Milo # 2	T18N R5W Sec. 7	60	27	Yes	Yes
Rolly (North)	T18N R5W Sec. 2	118	39	Yes	Yes
Rolly (South)	T18N R5W Sec. 11	113	59	No	Yes
Rhein	T18N R5W Sec. 1	84	34	Yes	Yes
Hein's Pond	T19N R4W Sec. 6	34	15	Yes	Yes
Bald	T18N R4W Sec. 5	38	Unknown	Yes	Yes

TABLE 2 Population Characteristics as Defined by Variable Mesh Gill Nets in Lakes Surveyed, Within Matanuska and Susitna Valleys, 1970.

Lake	Species*	No.	Length Range (mm)	Mean Length (mm)	Catch/Net Hr.	% Tot. Catch
Byers	WF	120	160-508	290	2.07	65
	LT	16	265-572	410	0.28	9
	SS	45	105-135	119	0.78	25
	LS	2	392-415	404	0.11	1
Carpentier	No Fish Taken	--	--	--	--	--
Anna	SS	11	211-455	398	0.25	58
	RT	2	561-665	613	0.05	10
	LS	6	Not Measured	--	0.14	32
Jewel	RT	1	663	--	0.05	100
Pinochle	No Fish Taken	--	--	--	--	--
Tigger	No Fish Taken	--	--	--	--	--
Trouble	No Fish Taken	--	--	--	--	--
Turning Point	No Fish Taken	--	--	--	--	--
Milo #1	RT	4	430-470	445	0.18	31
	SS	6	217-270	231	0.27	46
	LS	3	Not Measured	--	0.14	23
Milo #2	RT	1	423	--	0.04	12
	SS	3	175-218	203	0.13	38
	LS	4	Not Measured	--	0.18	50
Rolly (North)	RT	7	265-448	327	0.31	70
	LS	3	Not Measured	--	0.13	30
Rolly (South)	RT	4	333-357	345	0.17	100
Rhein	No Fish Taken	--	--	--	--	--
Hein's Pond	RT	1	445	--	0.04	14
	LS	6	Not Measured	--	0.26	86
Bald	RT	16	230-529	344	0.34	70
	SS	7	184-244	204	0.15	30

*WF - Whitefish SS - Silver salmon RT - Rainbow trout
LT - Lake trout LS - Longnose Sucker

trout apparently do not enter the lake from Byers Creek. No management recommendations will be made until the lake trout fishery can be evaluated and additional data on resident fish populations compiled.

Carpentier, Anna, and Jewel lakes:

These lakes are located south of Big Lake near the Burma Road. All three lakes contain indigenous stickleback populations. Carpentier Lake is landlocked and suitable for chemical treatment and stocking when demand warrants. No game fish are present. A large public access area has been set aside by the Matanuska-Susitna Borough. Anna Lake is connected to Stephan Lake by a small stream and to adjacent unnamed lakes by minor seepage. The lake contains a low-density rainbow trout population. Due to drought conditions, at least a portion of recently-spawned silver salmon became landlocked and averaged nearly 400 mm at the time of sampling. All silver salmon sampled were approaching sexual maturity and would complete their life cycle during the 1970-71 winter. Jewel Lake is landlocked, however, due to limited depth and extensive swampy areas, this lake is not recommended for management. The single rainbow trout taken during gill net sampling is believed to have been stocked by local residents.

Pinochle Lake:

This lake is located one mile from the Glenn Highway near Milepost 101. Gill net sampling and shoreline observations indicate the lake is barren. The lake is located at an altitude of 2,218 feet, resulting in a shortened growing season, therefore, Pinochle Lake is recommended for stocking of grayling, Thymallus arcticus, if access problems can be resolved.

Tigger and Trouble lakes:

These small, landlocked lakes are located one-quarter mile east of the Talkeetna Spur Highway near Milepost 11. Both lakes contain only indigenous stickleback populations. Trouble Lake is quite shallow; Tigger Lake is recommended for chemical treatment and stocking.

Turning Point Lake:

Located adjacent to the highway near Willow, this lake is the site of a non-profit boy's home. The lake was surveyed and recommendations made to the landowner for privately financed chemical treatment and stocking with rainbow trout.

Milo #1, Milo #2, North Rolly, South Rolly, Rhein, and Bald lakes and Hein's Pond:

All seven lakes are located within the Nancy Lake State Recreation area. All have inlets and/or outlets during years of normal rainfall. All contain indigenous stickleback populations. Survey activities were concentrated on determining the possibility of blocking outlets to allow

chemical treatment and stocking. Milo #1 and Milo #2 might be blocked if a spur access road, containing suitably positioned culverts was built from the existing main entry in a southwesterly direction to intercept both outlets. Due to extensive low, swampy shoreline areas, it would not be feasible to construct outlet barriers on any of the five remaining lakes.

Lake Volumetric Surveys

Volumetric surveys were completed during the 1970-71 winter on Matanuska, Long, and Johnson lakes. All three lakes are located in the Kepler-Bradley Lakes Complex.

Matanuska Lake, scheduled for 1971 chemical treatment and stocking, pending the conclusion of access negotiations, covers 61.5 acres, has a maximum depth of 82 feet, and contains 2,117 acre feet.

Long Lake, also scheduled for 1971 chemical treatment and stocking, covers 75.4 acres, has a maximum depth of 55 feet, and contains 1,945 acre-feet.

Johnson Lake, now used for research on rainbow trout survival, covers 40.5 acres, has a maximum depth of 46 feet, and contains 806 acre feet.

Detailed contour maps of these lakes are on file in the Palmer Sport Fish field office. Vertical reference markers were placed at each lake to allow easy recognition of surface level changes without re-survey.

Sampling of Managed Lakes

Most managed lakes were sampled during the winter season, continuing a procedure initiated during the previous reporting period. Winter sampling has several advantages over summer sampling in this area:

1. Winter thermal conditions are more stable. Thus, the depth distribution of fish is more predictable and catch rates should be less variable.

2. Sampling is done at the end of the growing season and results are therefore more comparable between lakes.

3. It is usually faster to set nets under the ice than to carry a boat to the lake, especially if no boat launching facilities are present.

4. Less interference with sampling nets is encountered from anglers in winter than during summer.

5. Winter sampling extends the field season and saves time during warm weather for anadromous fish work and projects which must be completed during the summer.

TABLE 3 Population Characteristics of Managed Lakes as Defined by Variable Mesh Gill Nets, Matanuska Valley, 1970-1971.

Lake & Location	Stocking History: Date Stocked	Species *	Total No.	Per Lb.	Per Acre	Sampling Data: Date Sampled	No.	Age Class	Length (mm) Range	Mean	Catch/ Net Hr.
Bradley											
T17N R1E Sec. 24	8/16/69	RT	15,000**	258	250***	1/7/71	14	I	214-305	261	0.62
	9/14/70	RT	10,111**	74	147***		41	0	98-137	111	1.82
Kepler											
T17N R1E Sec. 24	8/2/68	RT	18,000**	379	300***	1/7/71	1	II	440	--	0.05
	8/6/69	RT	15,000**	258	250***		7	I	307-387	333	0.32
	9/14/70	RT	10,000**	74	147***		7	0	97-117	114	0.32
Canoe											
T17N R1E Sec. 13	8/6/69	RT	8,500	258	405	1/13/71	9	I	311-372	351	0.47
	9/14/70	RT	5,700	74	271		28	0	98- 131	289	1.45
Irene											
T17N R1E Sec. 21	8/2/68	RT	6,300	379	300	1/14/71	2	II	402-435	419	0.09
	8/6/69	RT	8,400	258	400		5	I	230-325	289	0.22
	9/14/70	RT	5,600	74	267		8	0	100-120	112	0.80
Wishbone											
T19N R2E Sec. 24	7/17/69	RT	7,500	517	300	1/12/71	18	I	270-377	337	0.86
Florence											
T19N R5W Sec. 23-24	8/6/69	RT	21,000	258	382	6/19/70	37	I	154-260	215	1.61
		RT				7/21/71	3	I	300-333	321	0.15
Ravine											
T20N R6E Sec. 19	8/6/70	RT	5,000	349	400	1/21/71	6	0	96-149	122	0.27
Victor (Triangle)											
T17N R1E Sec. 13-14, 23-24	8/6/69	RT	6,000	258	400	1/7/71	4	I	307-326	313	0.18
		SS	5,000	449	333		25	0	113-161	140	1.14

TABLE 3 (Cont.) Population Characteristics of Managed Lakes as Defined by Variable Mesh Gill Nets, Matanuska Valley, 1970-1971.

Lake & Location	Stocking History: Date Stocked	Species *	Total No.	Per Lb.	Per Acre	Sampling Data: Date Sampled	No.	Age Class	Length (mm) Range	Mean	Catch/ Net Hr.
Reed											
T18N R1E Sec. 8	8/10/67	SS	5,200	352	281	1/12/71	4	III	310-322	318	0.19
	6/10/69	GR	8,000	--	432			no catch			0.00
	9/14/70	RT	3,400	74	184		2	0	102-110	106	0.10
Lower Bonnie											
T20N R7E Sec 23-24	6/16/69	GR	40,000	--	400	6/5/70	11	II	137-176	155	0.21
		RT	Mixed, uncertain				81	Mixed	98-453	195	1.56
Long											
T17N R1E Sec. 13-14	8/21/69	RT	22,600	379	300	2/4/71	4	II	414-462	436	0.03
Harriet											
T17N R1E Sec. 24	6/10/69	GR	4,000	--	400	5/28/70	8	0	232-247	239	0.33
						12/8/70	1	I	281	--	0.05
	6/3/70	GR	4,000	--	400		23	0	183-208	195	1.10
Klaire (Gen)											
T17N R1E Sec. 14	6/10/69	GR	2,000	--	222	5/28/70		no catch			0.00
						12/9/70	2	I	267-283	275	0.10
	6/3/70	GR	2,000	--	222		55	0	155-191	175	2.61
Sliver											
T17N R1E Sec. 14		RT	Source unknown			12/9/70	1	II	564	--	0.05
	5/23/68	DV	3,700	2,880	462		5	II	345-462	427	0.23
	6/10/69	GR	2,000	--	250		5	I	241-282	270	0.23
	6/3/70	GR	4,000	--	500		3	0	171-177	175	0.14
Gooding											
T18N R1E Sec. 22-23	6/13/69	GR	20,000	--	400	12/8/70	40	I	239-287	262	1.37
	6/13/70	GR	10,000	--	200		31	0	151-172	160	1.78
Meirs											
T17N R1E Sec. 18	6/3/70	GR	10,000	--	625	12/9/70	96	0	167-202	185	4.17

TABLE 3 (Cont.) Population Characteristics of Managed Lakes as Defined by Variable Mesh Gill Nets, Matanuska Valley, 1970-1971.

Lake & Location	Stocking History: Date Stocked	Species *	Total No.	Per Lb.	Per Acre	Sampling Data: Date Sampled	No.	Age Class	Length (mm) Range	Mean	Catch/ Net Hr.
Long (86-Mile)											
T20N R7E Sec. 20-21		BB		Wild		6/5/70	1	III & older	330	--	0.02
		GR		Source unknown			43		311-431	364	0.90
		GR		"			14	II	251-291	274	0.29
		GR		"			86	I	151-190	165	1.79
Matanuska											
T17N R1E Sec. 23	8/10/67	SS	13,000	352	224	6/19/70	12	III	200-334	278	0.40
Finger											
T17N R1E Sec. 23	8/20/69	RT	60,200	190	140	6/30/70	1	I	233	--	0.02
	8/15/67	SS	210,700	450	--		59	II & III (Mixed)	165-357	219	1.26
	6/20/68		25,000	1,030	--						
	6/26/69	SS	150,000	561	349		135	I	134-147	140	2.87
	6/20/68	SS	25,000	1,030	59	2/2/71	1	II	262	--	0.02
	6/26/69	SS	150,000	561	349		12	Mixed	160-227	193	0.30
	6/1/70		135,000	654	314						

*GR = Grayling RT = Rainbow trout
SS = Silver salmon BB = Burbott
DV = Dolly Varden
**Represents total plant stocked into both Bradley and Kepler lakes.
***Density computed on total acreage of Bradley and Kepler lakes.

A summary of sampling data from managed lakes is presented in Table 3.

Bradley, Kepler, Irene, and Canoe lakes:

All these lakes are located close together in the Kepler-Bradley Lakes Complex and are stocked annually with rainbow trout fingerling. As in past years, fish grew slower in Bradley Lake than in the interconnected Kepler Lake. Redick (1970) reported that growth appears largely independent of stocking density at densities presently in these lakes. Beginning in 1970, an increase in stocking densities was planned in Kepler and Bradley lakes to a point where growth was reduced, while continuing to stock Irene Lake at 400 fingerling per acre. In 1970, shortage of rainbow trout fingerling necessitated a reduction in planting density in all stocked lakes by a factor of 1/3. To compensate for this reduction, fingerling were stocked out at a larger size than in past years. A summary of comparative sampling data from 1969 and 1970 plants is presented in Table 4.

TABLE 4 Comparative Sizes of Age 0+ Rainbow Trout Fingerling Stocked in Four Matanuska Valley lakes, 1969 and 1970.

Lake	Density Stocked/Acre 1969	1970	Sampling Date 1969	1970	No. Captured 1969	1970	Mean Size (mm) 1969	1970
Bradley	250	147	12/18/69	1/7/71	14	41	126	111
Kepler	250	147	12/18/69	1/7/71	2	7	157	114
Irene	400	267	2/14/70	1/14/71	29	8	145	112
Canoe	405	271	**	1/13/71	**	28	**	114

*1969 planting made on 8/6/69. Fingerling averaged 258 fish/lb.
1970 planting made on 9/14/70. Fingerling averaged 74 fish/lb.
**Canoe Lake was not sampled in 1969.

Fingerling rainbow trout stocked at 258 fish per pound during early August, 1969, were considerably longer when sampled during the 1969-70 winter than fingerling stocked at 74 fish per pound during mid-September, 1970, and sampled in January, 1971. Catch rates were too variable to afford conclusions as to relative survival rates of these two plants. Data from Table 3 indicates growth of age 1+ rainbow trout in the lakes noted above was slightly slower in 1970 than during the previous year (Redick, 1970). This reduction in growth is believed due primarily to non-stocking of these lakes during 1967 which reduced competition faced by fingerling stocked in 1968. Kepler and Bradley lakes should be stocked annually at increasing rates as planned by Redick (1970).

Wishbone and Florence lakes:

Rainbow trout fingerling stocked in these two lakes in 1969 consistently produced good catches during late 1970. Net sampling indicates

that fish of the 1969 planting averaged over 300 mm at sampling time. It is recommended both lakes be stocked every other year at a density of 300 fingerling per surface acre.

Victor (Triangle) Lake:

This lake is not conducive to shore angling and harvest of a previous rainbow trout plant has been low; therefore Victor Lake was stocked with silver salmon in 1970. Silver salmon will encourage winter use when anglers can gain easy access across the ice.

Reed Lake:

Data from sampling indicates poor survival of both the 1969 grayling plant and the 1970 rainbow trout plant. This reduced survival is believed to be due to a residual number of silver salmon from the 1967 planting. All remaining silver salmon matured in 1970 and subsequent plantings of rainbow trout should demonstrate increased survival.

Stocking to date has been influenced by demands of the land owner granting access. The land owner has now agreed to rainbow trout plantings. This lake should be stocked annually at a density not to exceed 300 fingerling per acre.

Long Lake:

This lake in the Kepler-Bradley Complex was sampled with six overnight gill net sets to evaluate the density of rainbow trout still present in the lake. This lake has not been stocked since 1968 and is scheduled for chemical treatment in 1971. Only four rainbow trout were taken in the six gill net sets.

Other Managed Lakes:

Grayling survival is being evaluated in a series of small, shallow lakes in the Matanuska Valley. Sampling of Harriet, Sliver, Gooding, Meirs, and Klaire (Gen) lakes was conducted to evaluate planting success.

Dense populations of age 0+ grayling were found in Klaire, Gooding, and Meirs lakes. Moderate numbers were found in Harriet Lake. Survival in Sliver Lake was apparently quite low. Five Dolly Varden from a 1968 plant were taken from Sliver Lake, indicating a significant number of these fish are still present and probably account for the poor survival of stocked grayling in this lake.

A single rainbow trout weighing nearly six pounds was also taken from Sliver Lake. The origin of this fish is unknown but is assumed to have been mixed into the Dolly Varden plant made in 1968. On March 6, 1969, dissolved oxygen levels were computed to be 0.25 ppm (Redick, 1970).

Rainbow trout have not been previously recorded as surviving at this extremely low dissolved oxygen level. Periodic sampling of dissolved oxygen levels is in progress and some or all of these lakes may be resampled during the late 1970-71 winter season by gill nets if dissolved oxygen reaches critically low levels. It is hoped to determine the minimum dissolved oxygen levels grayling can tolerate in lakes of this area.

Dissolved Oxygen Sampling

Dissolved oxygen determinations were made on 21 lakes. Emphasis was placed on sampling lakes which have exhibited low dissolved oxygen levels in past years or lakes being evaluated for management.

In general, snow cover was limited during the 1969-70 winter and dissolved oxygen levels were above average. A summary of dissolved oxygen sampling data is presented in Table 5.

TABLE 5 Lakes Tested for Dissolved Oxygen, Matanuska Valley, 1970.

Name	Sample Date	Location	Snow Depth (In.)	Ice Depth (In.)	O_2 Sample Depth (Ft.)	ppm
Meirs	4/ 7	T17N R1E Sec. 18	2	20	5	4.8
					10	4.0
					20	2.8
					30	2.5
Harriet	4/ 8	T17N R1E Sec. 24	2	21	5	7.7
					10	4.9
					20	3.8
Klaire (Gen)	4/ 9	T17N R1E Sec. 14	2	22	5	7.7
					10	6.1
					15	4.8
Sliver	4/ 9	T17N R1E Sec. 13-14	2	22	2	2.1
					5	1.8
					10	1.1
Gooding	4/10	T18N R1E Sec. 23-27	1	18	5	1.9
					7	1.6
					5	1.5
					8	1.3
Conners	4/13	T12&15N R4W Sec. 2-35	0	23	5	4.8
					10	4.3
Goose	4/13	T13N R3W Sec. 21-28	0	25	5	4.0
					10	3.0
Woman	4/15	T23N R4W Sec. 5	1	29	5	10.2
					10	4.2
					13	1.1

TABLE 5 (Cont.) Lakes Tested for Dissolved Oxygen, Matanuska Valley, 1970.

Name	Sample Date	Location	Snow Depth (In.)	Ice Depth (In.)	O_2 Sample Depth (Ft.)	ppm
Irene	4/ 8	T17N R1E Sec. 13	2	20	5	11.3
					10	11.5
					20	7.1
Canoe	4/ 8	T17N R1E Sec. 13	2	21	5	9.9
					10	9.3
					20	9.4
Victor (Triangle)	4/ 9	T17N R1E Sec. 13-14 23-24	2	24	5	7.7
					10	6.7
					20	4.1
Johnson	4/10	T17N R1E Sec. 14	1	22	5	11.7
					10	11.1
					20	10.8
					30	5.1
Reed	4/22	T18N R1E Sec. 8	3	17	5	6.0
					10	3.4
Cornelius	4/10	T17N R1E Sec. 22-27	1	28	5	15.3
					10	14.0
					20	13.9
					30	9.5
Mirror	4/13	T15N R1W Sec. 2	2	25	5	6.0
					9	5.8
Lucile	4/14	T17N R1W Sec. 8- 9	0	17	5*	19.8
					5**	17.8
					7	17.0
	4/22				5	20.6
Sharon	4/14	T17N R3W Sec. 12	0	23	5	9.0
					10	8.5
Seymour	4/14	T18N R2W Sec. 8-10 9-33	0	20	5	9.1
					10	12.4
					15	12.0
Tigger	4/15	T25N R4W Sec. 5	1	27	5	10.1
					10	8.2
					20	3.1
Trouble	4/15	T25N R4W Sec. 5	1	29	5	12.7
					10	9.7
					14	8.2
East Sunshine	4/15	T25N R4W Sec. 8	2	25	5	9.0
					10	5.0
					20	3.4

*Station A
**Station B

Dissolved oxygen levels dropped below 2.0 ppm in only one lake. Gooding Lake (1.9 ppm), a shallow lake, is presently being used to test grayling survival at low oxygen levels. The oxygen supply is usually depleted during late winter. Grayling did successfully overwinter in Gooding Lake during the 1969-70 winter.

Very unusual results were obtained in Lucile Lake. This shallow lake typically exhibits low late-winter dissolved oxygen levels. However, in spring, 1970, four determinations made at two different sites and conducted on two different days indicated supersaturated dissolved oxygen levels of 17.0 ppm or greater. The reasons for these unusually high dissolved oxygen levels are unknown.

Survey of Resident Game Fishes - Talachulitna River

A limited investigation of Talachulitna River game fish stocks was completed. Creel census, hook-and-line sampling, surveys by rubber boat, and records of commercial air charter operators were used to evaluate the level of angling pressure, harvest, and to estimate the size and age classes of the bulk of the rainbow trout harvest during 1970.

The Talachulitna River is formed from two approximately equal tributaries. The eastern tributary originates from Wolf Lakes southeast of Beluga Mountain. The other major tributary (called Talachulitna Creek) originates at Judd Lake, about 11 miles north of Beluga Lake and about 62 air miles northwest of Anchorage. The tributary originating at Judd Lake and the main river below the forks sustain all the fishing pressure.

The trout fishery on the Talachulitna River can be divided into two distinct segments:

1. Anglers floating by rubber raft from Judd Lake to an exit point just upstream from a series of canyons about 15 stream miles above the confluence with the Skwentna River. Transportation to this area is almost entirely by commercial air charter due to the necessity of leaving the aircraft.

2. A fishery at the mouth for both salmon and trout. Planes land on a lake adjacent to the stream, or on the Skwentna River just below the confluence with the Talachulitna River. Due to the cost of a commercial four-place air charter (about $100.00 per round trip), this fishery is composed chiefly of anglers on one-day trips fishing from private aircraft.

Survey efforts were concentrated on the float fishery from Judd Lake to the upstream end of the canyons.

Heavy rains and cool weather prevailed in the Talachulitna River area from early June until mid-August, 1970. The cool weather held stream temperatures to below normal levels throughout the area. Repeated heavy rains resulted in high stream flows during most of the summer. This inclement weather restricted angler use of the stream throughout June, July, and early August. It is impossible to relate angler use in 1970 to an average year.

Information from the 10 guides and air charter operators regularly flying anglers to the Talachulitna River indicates commercial operators transported a total of only 21 anglers to Judd Lake for float trips during the 1970 summer season. One additional party of two anglers arrived by private aircraft. These 23 anglers fished a maximum of 78 man days.

It should be noted that after stream flows declined to optimum levels in mid-August, angler use did not increase despitethe Talachulitna's reputation as a "late summer and fall" stream.

Creel census was conducted during three different periods for a total of 33 days. These periods were June 26 through July 5, August 1 through August 9, and August 27 through September 9. This timing allowed census over the long weekends of July 4 and Labor Day.

During the 33-day creel census, a total of 10 anglers were checked. These anglers had in possession a total of 9 rainbow trout and 16 grayling. Only three anglers had limit catches in possession. Since nearly half the anglers believed to have floated the stream were creel checked, the total harvest of both rainbow trout and grayling was negligible. Several parties are known to have taken no trout.

Sport Fish personnel floated from Judd Lake to the float exit point on two occasions. The first trip was July 9 through July 10; water levels were quite high during this period. The first grayling were encountered about mid-way between Judd Lake and the forks; increasing numbers of grayling were found farther downstream. Only one rainbow trout was taken. The take of rainbow was at least partially due to cold water conditions and and high stream flows.

The Talachulitna River was floated again September 1 through 3. Water levels were significantly lower and water temperatures warmer. Grayling to 350 mm could be taken very easily out of practically every spot over one meter deep. Sixty-four rainbow trout ranging from 200 - 546 mm were taken. Trout were encountered from mid-way between Judd Lake and the forks to the pickup point.

Data from all rainbow trout sampled is summarized in Figures 1 and 2.

Figure 1 depicts the length frequency breakdown by 25 mm increments for 71 rainbow trout sampled from the Talachulitna River. The average length was 358 mm; only two fish exceeded 508 mm. This sample is limited in size but probably reflects the size range of rainbow trout anglers are taking from this stream.

Figure 2 describes the growth rate of trout in the Talachulitna River by defining the average length and length range of each age class. Due to the limited number of fish in the sample, this data is tenuous. Also, since most samples were collected in early September, each age class had an additional growing season beyond the listed age.

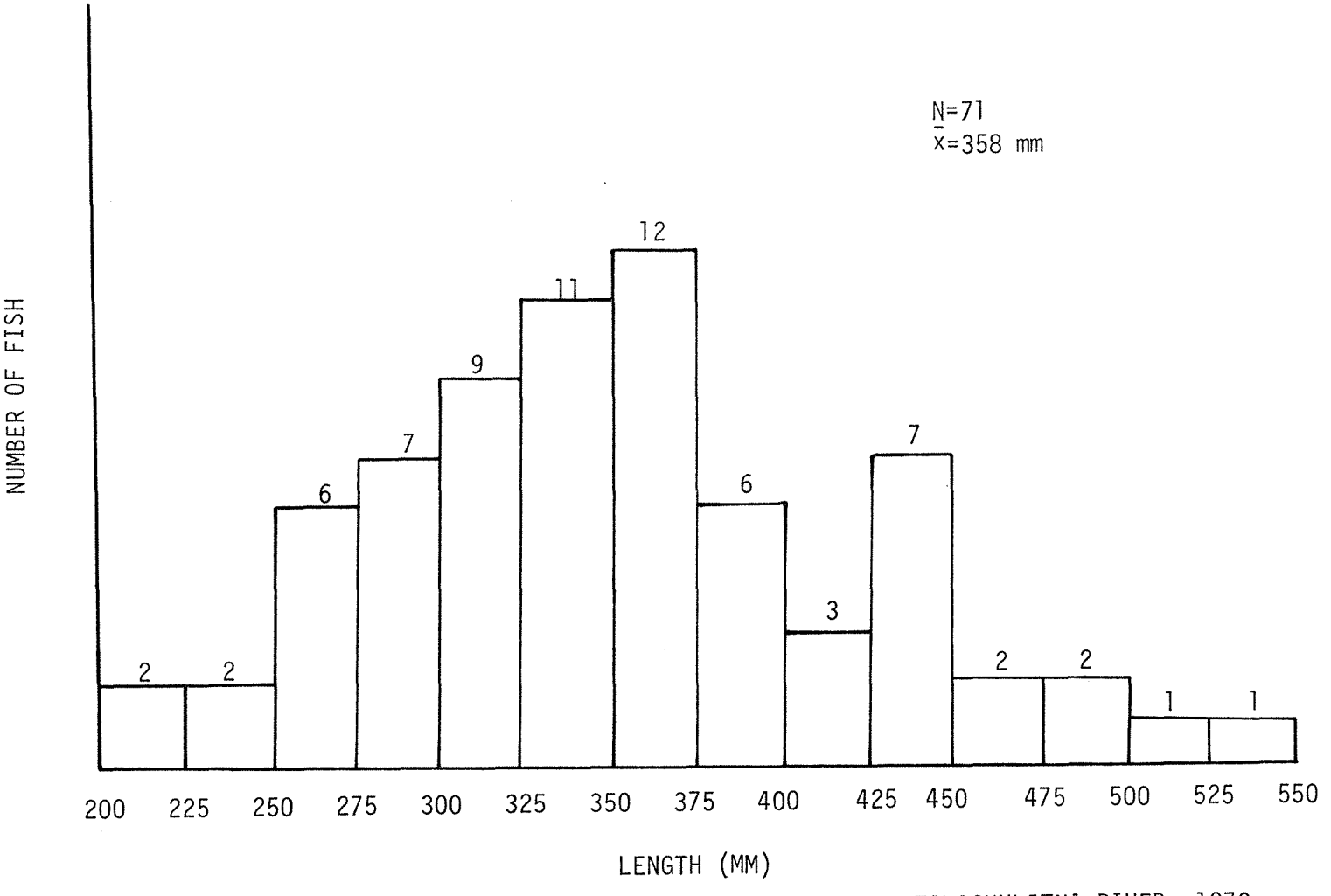

FIGURE 1 LENGTH FREQUENCY OF A SAMPLE OF RAINBOW TROUT, TALACHULITNA RIVER, 1970

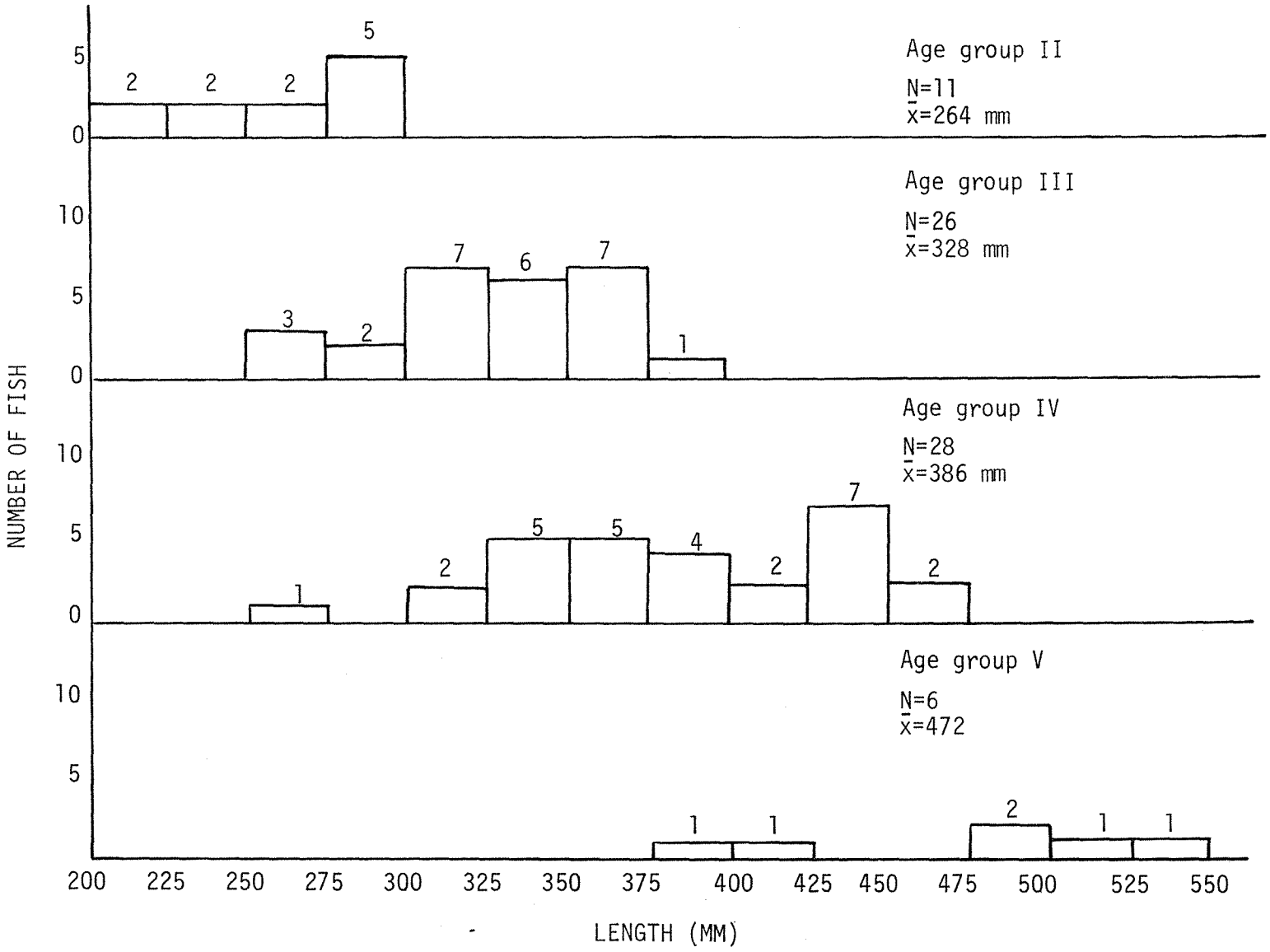

FIGURE 2 LENGTH FREQUENCY BY AGE CLASS OF A SAMPLE OF RAINBOW TROUT, TALACHULITNA RIVER, 1970

In summary, the following conclusions regarding the Talachulitna River sport fishery appear valid:

1. The 1970 Talachulitna River sport fishery was insignificant in terms of both angler use and game fish harvested.

2. Angler use during 1970 was reduced by some unknown percentage, by inclement weather and high water conditions.

3. The Talachulitna River angling pressure will gradually increase but will be moderated by the approximately $200.00 cost per float trip (two round trips by aircraft).

4. The Talachulitna River contains practically unlimited grayling stocks.

5. Since grayling have proven able to withstand heavy angling pressure, providing special protection for grayling (other than normal bag limits) is not necessary.

6. Large numbers of rainbow trout are available to the fishery when stream temperatures rise above 50°F and low summer flow conditions are attained.

7. A very small percentage of the rainbow trout population of the Talachulitna River currently exceeds 508 mm.

8. The sport fishery has probably reduced the average length of rainbow trout by cropping the older, larger individuals. This effect has undoubtedly been magnified by illegal over-limits.

9. Mortality from hook and release, spoilage of fish killed too early during float trips, and illegal overlimits may well exceed the legal kill of rainbow trout in the Talachulitna River.

Johnson Lake Rainbow Trout Survival Tests

A research program was initiated to define survival rates of various sized stocked rainbow trout fingerling in differing lake environments. The initial stocking was designed to determine the maximum expected survival of stocked rainbow trout fingerling when in competition with threespine stickleback.

This is the first recorded attempt in Alaska to define the actual number and percentage of stocked fish surviving their initial winter after stocking. The greatest mortality of stocked fingerling is believed to occur during the initial fall and winter after stocking while fingerling are too small to adequately compete with indigenous and/or older game

fish. Fingerling are also preyed upon to some unknown extent by older game fish.

Prior to Statehood, federal personnel evaluated population densities of indigenous rainbow trout in two Cook Inlet lakes (Allin, 1955; Baxter, 1956). Since these studies concerned wild populations, a variety of sizes and age classes were present. Also both lakes had open outlets and inlets, allowing fish to move into or out of the study area. This situation also allowed migration from the lakes during periods of low productivity and/or adverse environmental conditions. This fact may have signigicantly increased survival of game fish as compared to situations where game fish are isolated within a lake throughout their life span.

Daniel Vincent Lake, consisting of 14.2 surface acres, 26 foot maximum depth and 330 acre feet of water was computed to contain 192 rainbow trout and 179 silver salmon fingerling with a total average weight of 8.5 pounds of fish per surface acre (Allin, 1955).

Honeymoon Lake, covering 74.9 acres, with a maximum depth of 34 feet, and containing 1,246 acre feet of water, contained an estimated 257 rainbow trout and 7 silver salmon weighing an average of 4.4 pounds of fish per surface acre (Baxter, 1956).

Johnson Lake, T17N R1E Section 14, one of the Kepler-Bradley Lakes Complex located on University of Alaska Experimental Farm property, was selected for current study. This 40-acre lake has a maximum depth of 46 feet, and contains approximately 806 acre feet of water. When the work was initiated the only fish species present was an indigenous population of threespine stickleback. No public access is allowed to this lake.

On September 11, 1969, 2,496 hand-counted rainbow trout fingerling were planted into Johnson Lake. The fingerling were stocked at a low density (approximately 62 fish/surface acre). Large fingerling were stocked, averaging 73 $\pm$ 2.2 mm (95% Confidence Interval) and weighing 85 fish per pound. Since this lake is located within a lake complex known to exhibit high productivity, and no game fish were present in this lake prior to stocking, and large fingerling were stocked at a low density, this planting should have exhibited the highest percentage survival which can be expected when stocking rainbow trout fingerling into a lake containing stickleback.

On May 1, 1970, the stocked trout were sampled by two overnight gill net sets. A total of 28 tainbow trout averaging 114 $\pm$ 1.9 mm (95% Confidence Interval) and weighing 25 fish per pound were captured. Based on this sample, a total of 454 rainbow trout averaging 119.4 $\pm$ 3.3 mm (95% Confidence Interval) were stocked on May 14, 1970, after clipping the adipose fin. Prior to planting all finclipped fish were held 48 hours after clipping to check for handling mortality.

After allowing five days for the finclipped fish to distribute themselves in the lake, eight gill nets were fished continuously for eight days to define a ratio of clipped-to-unclipped fish in the lake.

This test assumes all finclipped fish were still alive when netting was conducted, that finclipped fish were as well distributed in the lake as non-finclipped fish, and that behavior of both groups made them equally vulnerable to the sampling nets.

The eight nets caught a total of 73 finclipped fish (16.08% of the plant) and 93 non-finclipped fish (3.77% of the plant).

The survival of the original plant can be estimated by the following ratio:

$$\text{CLIPPED } \frac{73}{454} = \text{NON-CLIPPED } \frac{93}{X} \qquad X = 578 + 28 \text{ (prior removal)} = 606$$

Survival of 606 fish from an original planting of 2,496 fish indicates a survival rate of 24.28%.

However, length frequency analysis of stocked and recovered trout indicates significant bias occurred in sampling techniques which nullifies the validity of the results. Table 6 lists numbers and percentage of fish by 5 mm length increments for all trout stocked and recovered. The 73 finclipped fish recovered during the tests averaged only 114.3 $\pm$ 2.4 mm (95% Confidence Interval). The 93 non-finclipped fish recovered averaged 139.6 $\pm$ 5.8 mm (95% Confidence Interval). Thus, the non-finclipped fish stocked in 1969 averaged approximately 25 mm longer than the 454 individuals finclipped and stocked in May, 1970, to serve as a comparative population of known size and number. Table 6 indicates approximately one-half of the non-finclipped fish in the lake were larger than all the finclipped comparative population. Since fish exceeding 150 mm were more vulnerable to the nets than fish of less than 150 mm, a greater percentage of the non-finclipped population should have been recovered. Thus, the survival rate is believed to have been significantly over-estimated. Since the difference in size between finclipped and non-finclipped stocks was so great, it is believed that the computed survival rate of 24.28% is so far in excess of the true survival rate as to make that figure invalid.

TABLE 6 Length-Frequency by Percent of Stocked and Recovered Rainbow Trout, Johnson Lake, 1970.

	Sample of Finclip Plant*		Finclip Recoveries*		Sample of Non-Finclipped **		Non-Finclipped Recoveries **	
Length (mm)	N	%	N	%	N	%	N	%
Less than 95	3	5.0	1	1.4	2	7.1	2	2.2
96-100	3	5.0	4	5.5	3	10.7	2	2.2
101-105	2	3.3	10	13.7	4	14.4	6	6.4
106-110	3	5.0	11	15.1	6	21.4	6	6.4

TABLE 6 (Cont.) Length-Frequency by Percent of Stocked and Recovered Rainbow Trout, Johnson Lake, 1970.

Length (mm)	Sample of Finclip Plant* N	%	Finclip Recoveries* N	%	Sample of Non-Finclipped ** N	%	Non-Finclipped Recoveries ** N	%
111-115	16	26.7	16	21.9	3	10.7	10	10.7
116-120	6	10.0	15	20.5	2	7.1	7	7.5
121-125	7	11.7	5	6.8	3	10.7	4	4.3
126-130	5	8.3	4	5.5	--	--	6	6.4
131-135	7	11.7	3	4.1	2	7.1	2	2.2
136-140	6	10.0	4	5.5	2	7.1	1	1.1
141-145	2	3.3	--	--	--	--	5	5.4
146-150	--	--	--	--	--	--	4	4.3
151-155	--	--	--	--	--	--	7	7.5
156-160	--	--	--	--	--	--	4	4.3
161-165	--	--	--	--	1	3.7	6	6.4
166-170	--	--	--	--	--	--	7	7.5
171-175	--	--	--	--	--	--	5	5.4
176-180	--	--	--	--	--	--	4	4.3
181-185	--	--	--	--	--	--	1	1.1
186-190	--	--	--	--	--	--	2	2.2
Over 190	--	--	--	--	--	--	2	2.2
								50.6%
Totals	60	100.0	73	100.0	28	100.0	93	100.0
Mean length (mm)	119.4	± 3.3	114.3	± 2.4	114.0	± 1.9	139.6	± 5.8

*454 Ad-clipped rainbow trout planted 5/1/70.
**2,496 rainbow trout planted 9/11/69.

Regardless of the validity of the final survival estimate, data collected on the relative efficiency of the sampling nets are of value. Table 7 defines catches, catch rates, and the percentage of the finclipped and estimated percentage of the non-finclipped populations taken in the nets during each day. Since the survival of the 1969 plant is believed to have been significantly over-estimated, the number of non-finclipped fish available to the nets would therefore have been somewhat less than that shown in Table 7. The number of finclipped fish available to the nets is known (assuming no natural mortality between plant and sampling). It is obvious that nets became progressively less efficient during the sampling interval. A marked reduction in catch occurred after the third sampling day. The maximum efficiency of eight nets fishing in 40 acres of water was the capture of 7.31% finclipped stock during the second sampling day. The reason for reduced net efficiency is uncertain but may have

been related to a buildup of algae on the net filaments causing them to be more visible. The nets were fished continuously except when catches were being removed. Periodic drying would have allowed removal of algae and various small debris. In both Daniel Vincent and Honeymoon lakes, gill net catches were reduced to negligible numbers after a sampling intensity of 32 net hours per surface acre of water, despite a fish density several times greater in Daniel Vincent Lake than in Honeymoon Lake (Baxter, 1956). In Johnson Lake, the total sampling effort was approximately 38 net hours per surface acre; the greatest reduction in catches occurred after an effort of about 14 net hours per surface acre.

TABLE 7 Estimated Numbers of Rainbow Trout Available in Lake and Percentage of estimated Populations Caught by Nets by Day, Johnson Lake, 1970.

Date	Catch	Catch Rate Fish/Net Hr.	Tot. Est. at Start of Day	Clipped	Not Clipped	% Non-Finclipped Population Caught	% Finclipped Population Caught
5/19-20	44	0.23	1032	454	578	4.84	3.52
5/20-21	55	0.29	988	438	550	4.18	7.31
5/21-22	34	0.18	933	406	527	2.85	4.68
5/22-23	9	0.05	899	387	512	1.17	0.78
5/23-24	8	0.04	890	384	506	1.19	0.52
5/24-25	5	0.03	882	382	500	1.00	0.00
5/25-26	4	0.02	877	382	495	0.61	0.03
5/26-27	7	0.04	873	381	492	1.42	0.00
Totals	166		866	381	485		

Variability in the catch rates of various nets is extreme. One particular net caught only three fish (1.81% of total) while another net caught 63 fish (37.9% of total). A summary of catches by individual net by day is shown in Table 8. Nets 1, 3, 7, and 8 were located over steeply sloping bottom areas where the effective net panels (1/2-inch and 3/4-inch bar measure) fished depths ranging from about 4 feet to about 20 feet. Nets 2, 4, 5, and 6 were set at depths of 10 feet or less, and over more or less level substrate. All nets were rigged to sink and all substrate was mud.

TABLE 8 Catch of Rainbow Trout by Individual Net, by Day, Johnson Lake, 1970.

	Nets By Number								
	1	2	3	4	5	6	7	8	Total
5/19-20	0	12	2	18	1	9	2	0	44
5/20-21	5	5	1	19	1	3	13	8	55
5/21-22	6	4	0	19	0	4	0	1	34
5/22-23	1	1	0	3	0	3	1	0	9
5/23-24	1	1	0	1	0	1	0	4	8
5/24-25	0	0	0	1	1	2	0	1	5
5/25-26	0	0	0	2	0	0	2	0	4
5/26-27	5	0	0	0	1	1	0	0	7
Total	18	23	3	63	4	23	18	14	166
Clipped	12	9	0	24	0	11	10	7	73
Unclipped	6	14	3	39	4	12	8	7	93
% of total catch	10.84	13.86	1.81	37.95	2.41	13.86	10.84	8.43	100.0

By observation, the deeper nets located over a sloping substrate were each quite similar as were the shallow nets. However, catches of the shallower sets ranged from 2.41% to 37.95% of the total catch. Net number 4 was nearly three times as effective as any other net and more effective than the combination of nets 1, 3, 5, 7, and 8. This data indicates that unless a great number of net catches are averaged, variable mesh monofilament sampling nets are of little value in relating catch rates to population density.

In future sampling during this project, nets will be aired and cleaned after each day's sampling. Also, a larger sample of the original stocked population will be collected to determine the optimum size range of finclipped stock to be introduced.

Sampling of Salmon Populations

King salmon were enumerated by ground surveys on Willow, Montana, and Moose creeks. The numbers of king salmon observed in these streams were greater than in any year since Statehood.

A total of 640 king salmon were enumerated by foot surveys on Willow Creek. This total represents a 120% increase over the highest previous count since Statehood, when 290 king salmon were enumerated in 1969 (Redick, 1970).

In Montana Creek, 261 king salmon were observed by streambank count from the mouth to the confluence of the north and middle forks. An additional 21 king salmon were observed by aerial survey of the north and south forks. Visibility was poor and it is believed that a considerably larger number of king salmon were spawning upstream from the forks. The 1970 streambank count represents an increase of 74% over a similar 1969 streambank count of 150 king salmon.

King salmon were observed for the first time in Moose Creek, a tributary of the Matanuska River. A total of 126 king salmon were enumerated by a foot survey. A number of residents have reported that Moose Creek contained significant numbers of king salmon in past years, however, few if any have been seen during the last half-dozen years.

In 1970, silver salmon appeared to be substantially fewer in number than in 1968 and 1969. A total of eight foot surveys were conducted on five separate streams over established index areas, as defined by Redick (1969). One additional index area was established in Wasilla Creek in 1970. This index area extends from about 500 yards above the Kircher residence to about 1.5 miles downstream to the highway crossing at Four Corners on the Palmer-Wasilla Highway.

In 1969, extremely warm fall weather held streamflows at critically low levels. Drought conditions continued through the spring and summer of 1970. Precipitation increased during the fall, but not sufficiently to increase stream flows. Due to low water levels, escapement surveys are believed to have been quite accurate. A summary of 1970 silver salmon enumeration data is presented in Table 9.

TABLE 9 Estimated Timing and Numbers of Silver Salmon in Escapement Index Areas, Upper Cook Inlet, 1968-1970.

Stream	No. Counts 1970	Est. Peak of Run	Date of Count	Largest Count 1970	1969	1968
Goose	1	None	9/16	2	0	147*
Birch	2	9/20-9/30	9/23	206	142	125
Cottonwood	1	None	9/22	5	9	22
Meadow	2	9/18-9/25	9/21	49	109	300
Fish	2	9/25-10/5	9/30	176	852	No Count
Wasilla	1	9/20-9/30	9/25	101	No Count	

*Believed to have re-entered Susitna River and spawned elsewhere.

Only two silver salmon were observed in Goose Creek. No silver salmon were seen in Goose Creek in 1969 and it is believed that this creek does not produce significant numbers of silver salmon; therefore, this index area will be discarded.

Two counts were made in Birch Creek in 1970, with the largest count being 206 silver salmon. This count compares with a maximum count of 142 fish in 1969, an increase of about 45% over the previous year. In 1968, the largest count was 125 fish. This is the only stream where escapement increased during the past three years.

Very few silver salmon were observed during repeated streambank surveys over various sections of Cottonwood Creek. As a result, Cottonwood Creek was closed to all salmon fishing at midnight, August 8, 1970, and remained closed for the rest of the season.

A total of five silver salmon were enumerated in the 2.3-mile index area on Cottonwood Creek. Counts made in 1968 and 1969 were 22 and 9, respectively. This run has steadily decreased over the past decade. In 1956, a weir enumerated a total of 900 silver salmon (Allin and Baxter, 1958) and in 1958, a total of 986 silver salmon were counted (Allin and Baxter, 1959).

A total of 49 silver salmon were counted in Meadow Creek, which drains a series of lakes and flows into Big Lake. Water levels in Meadow Creek were at critically low levels and may have blocked the passage of salmon into upper drainage areas. In 1968 and 1969, the highest counts attained were 300 and 109, respectively.

A maximum count of 176 silver salmon were enumerated in the index area on Fish Creek, outlet of Big Lake. It is believed that spawning activity was at a peak when the count was made. This count was about 79% below the previous year's count of 852.

In 1970, the Sport Fish Division continued the operation of the Division of Commercial Fisheries weir on Fish Creek. In 1969, this weir allowed index area escapement counts in Fish and Meadow creeks to be evaluated against a numerically known escapement. In 1970, this evaluation was not possible because on August 8, 1970, a sudden rise in the water level of Fish Creek washed the weir downstream. To insure adequate salmon escapement, the stream was closed by emergency regulations at midnight, August 9, 1970. It was reopened at midnight, August 19, 1970.

A total of 1,048 silver salmon had been counted through the weir before it washed out. Total silver salmon escapement could not be estimated since migration of this species was in progress when the weir washed out.

In 1969, escapement through August 8, was 1,071 silver salmon and the total 1969 escapement was 4,250 fish. Even though the 1970 silver salmon count was almost identical to the 1969 count at the time the weir washed out, it is believed the 1970 run was significantly smaller than the 1969 run. This belief is based on much lower index area counts in 1970 and because small commercial catches of silver salmon in Cook Inlet during the latter portion of the run indicates a reduced number of silver salmon entered most spawning streams after mid-August 1970 as compared to 1969.

A total of 21,511 red salmon, O. nerka, and pink salmon, O. gorbuscha, also passed the weir before it washed out.

An intense silver salmon fishery prevailed in Rabbit Slough, which is part of lower Wasilla Creek. Very few silvers were observed in Wasilla Creek during a foot survey conducted in early August, 1970. To insure adequate escapement, the stream was closed by emergency regulation at midnight, August 9, 1970 and remained closed the remainder of the season. In mid-September, a foot survey was made on Wasilla Creek from the Palmer-Wasilla Highway upstream to Fishhook Road. A total of 195 silver salmon were found; no salmon were found upstream from Fishhook Road. An index area was established and a total of 101 silver salmon were enumerated in the index area on September 25, 1970.

Access

The access status of various lakes and streams within the job area was reviewed and recommendations made to the habitat section. A listing, by priority, of the most critical access problems was compiled and submitted to habitat personnel.

Land development is proceeding very rapidly in this area. Emphasis is on subdivision of private land holdings into recreation tracts and cabin sites. This type of land use emphasizes streambank and lakeshore development.

Subdivision and consequent increased public use is resulting in privately constructed roads, previously open to public use, being blocked. Increasingly, management of lake fisheries in this area requires not only lakeshore public sites but also dedication of access roads.

Significant access projects included:

(1) An access proposal submitted to the Matanuska-Susitna Borough administration to provide public access to lower Willow Creek and the Susitna River. Currently, the Matanuska-Susitna Borough and State of Alaska Parks and Recreation personnel are investigating various sources of funding for this project.

(2) A master listing of all streams within the Matanuska-Susitna Borough, which have recreational fishing potential and should have public easement reserved along the streambanks, is being compiled at the request of Borough officials.

(3) A proposal to provide public access to all lakes in the Stephan-Seven Mile Lakes Complex from the Burma Road was submitted to the Matanuska-Susitna Borough.

(4) Blockage of the Canoe Lake access trail required a new trail along a dedicated route. A sign defining this access site and revised access route is being prepared.

(5) Proposed subdivision in the Irene Lake area requires the construction of an alternate trail along a dedicated route. Suitable signs will be erected.

(6) Negotiation of an access agreement across private land to Matanuska Lake.

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