

## 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-F

*Job Title:* Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River, Prince William Sound, and the Upper Susitna River Drainage.

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

## ABSTRACT

Twenty-eight unsurveyed lakes were sampled with gill nets in 1970 for fish population analysis. The majority of these lakes are located adjacent to the Glenn Highway.

Twenty-seven managed lakes were also sampled to determine the success and condition of experimentally stocked fish and the status of existing native fish stocks.

Tests conducted on Tolsona and Moose lakes since 1964 indicate ice thickness may have little effect on dissolved oxygen concentrations.

During the Copper River dip net season, 2,682 dip net fishermen caught 18,557 red salmon, Oncorhynchus nerka, and 253 king salmon, O. tshawytscha. The number of dip net permits increased from a total of 794 in 1964 to 3,230 in 1970.

A creel census was conducted on the silver salmon, O. kisutch, sport fishery at Valdez. The silver salmon catch per angler hour of 0.32 was nearly identical to that of 1969 (0.33).

Highway constuction and oil well drilling operations in the Copper River Basin were monitored to prevent damage to adjacent fisheries.

Ten subsistence fishermen reported netting 360 humpback whitefish, Coregonus pidschian, from Tyone, Susitna, Louise, and Mankomen lakes.

Angling pressure for king salmon increased in 1970 and an estimated 600 were taken by rod and reel from the Gulkana, Indian, and Klutina rivers, and Mendeltna Creek.

## RECOMMENDATIONS

It is recommended that cataloging and inventory surveys be continued, with emphasis in the Valdez and Cordova areas.

The program of winter dissolved oxygen determinations should be continued to determine minimum requirements for the various game fish species.

Continued effort should be made to increase the recreational winter use of the area's fisheries.

Increased emphasis should be placed on studies of anadromous salmon stocks due to increasing angler effort.

Monitoring of pipeline construction, road and bridge construction, and other land uses should be continued to afford maximum protection to the fishery resources.

Experimental stocking of salmonids and other hatchery produced fish should be continued when conditions are deemed suitable. Follow-up surveys should be conducted to determine the success of these experimental introductions.

Grayling introductions should be limited to lakes free from predator or competitive species.

---

## OBJECTIVES

1. To record the environmental characteristics of the existing and potential recreational fishing waters of the job area, and where practical, obtain estimates of the sport fish harvest and angler participation rates.
2. To determine the current status and public availability of the recreational fishing waters within the job area. To assist as required in the investigation of public access studies and make recommendations for segregation of recreational fishing access sites.
3. To evaluate multiple water-use development projects (public and private) and the effects on the area's streams and lakes for the proper protection of the resource.
4. To locate sport fish egg sources and to make egg takes as required for experimental hatching and stocking.
5. To determine stocking measures and to formulate recommendations for the management of area waters and direct the course of future studies.

6. To determine and develop plans for the enhancement of anadromous and resident fish stocks.
7. To collect life history information of the sport fish species of the area as required for the fisheries management program.

## TECHNIQUES USED

Fish populations were sampled with 125' x 6' variable mesh (1/2- to 2-inch bar measure) nylon, sinker type, gill nets.

All fish were measured to fork length in millimeters.

A Hach, Model OX-2-P kit was used for determining dissolved oxygen concentrations.

A small tracked vehicle, a "Ranger", was used to transport men and equipment to the various waters for survey work.

Creel census was conducted on the dip net fishery in accordance with a method designed by Neuhold and Lu (1957), and was used to census the Russian River sport fishery (Engel and Logan, 1965).

## FINDINGS

### Population Sampling - New Lakes

Twenty-eight new lakes were surveyed during 1970. All these lakes were sampled with gill nets for fish species composition (Table I).

TABLE I Gill Net Summaries of New Lakes, Glennallen Area, 1970.

Lake	Location*	No. Fish	Species**	Length (mm)		Frequency***	% Comp.
				Range	Mean		
Boot	T4N R6W Sec.20	8	S	402-442	418	0.34	50.0
		7	GR	160-210	190	0.30	43.5
		1	WF		395	0.04	6.5
Buffalo	T3N R7W Sec. 2	No Fish					
Harvey	T3N R7W Sec. 1	No Fish					
Link	T4N R6W Sec.19	1	S			0.04	100.0
McLeod	T3N R6W Sec. 1	64	GR	160-310	224	4.20	97.0
		2	S			0.13	3.0
Popeye	T4N R6W Sec.32	79	GR	122-198	176	3.95	93.0
		6	S	109-382	248	0.30	7.0

TABLE 1 (Cont.) Gill Net Summaries of New Lakes, Glennallen Area, 1970.

Lake	Location*	No. Fish	Species**	Length (mm)		Frequency***	% Comp.
				Range	Mean		
Ranger	T3N R7W Sec.13	251	GR	165-320	272	5.70	80.0
		62	S	210-435	356	1.40	19.5
		1	BB		395	0.02	0.5
Little Ranger	T3N R6W Sec. 7	No Fish					
Scaup	T3N R6W Sec. 3	No Fish					
Triangle	T3N R8W Sec.24	No Fish					
Loon	T6S R16E Sec. 7	No Fish					
Lake Creek	T6S R15E Sec.12	No Fish					
Island	T6S R16E Sec.12	No Fish					
Trail	T6S R15E Sec. 1	No Fish					
O'Neil	T6S R16E Sec. 7	120	DV	110-315	200	6.00	92.0
		7	WF	300-385	340	0.15	5.0
		3	GR	250-265	255	0.35	3.0
		12	DV	110-350	288	0.63	100.0
Beaver Dam	T6S R16E Sec. 7	1	BB		270	0.50	100.0
Crumb	T6S R16E Sec. 7	1	BB		270	0.50	100.0
Curtis	Long. 146°59'W Lat. 62°18'N	34	WF	190-302	243	1.70	91.0
		2	LT	520-670	595	0.10	6.0
		1	S			0.05	3.0
Dolly	Long. 145°52'W Lat. 62°28'N	101	DV	115-340	148	4.40	99.0
		2	SB	80-85	84	0.80	1.0
Grayling	Long. 146°51'W Lat. 62°18'N	3	LT	368-592	443	0.015	37.5
		3	S			0.015	37.5
		2	WF	215-265	240	0.010	25.0
Kaina	Long. 146°12'W Lat. 61°50'N	12	GR	200-370	290	0.30	33.0
		11	WF	150-410	310	0.27	31.0
		8	LT	390-670	535	0.20	22.0
		3	S		450	0.75	8.0
		1	RS		432	0.02	3.0
U. Kaina	Long. 146°15'W Lat. 61°42'N	1	BB		560	0.02	3.0
		8	WF		290	0.40	44.0
		6	DV	130-560	250	0.30	33.0
		2	RS		310	0.10	11.5
Small	Long. 144°29'30"W Lat. 63°41'30"N	2	GR		540	0.10	11.5
		59	S	370-485	431	2.90	100.0
Green	Long. 144°28'W Lat. 62°41'N	32	S	420-495	445	0.78	100.0
Little Mae West	T4N R5W Sec.35	49	S	100-360	190	2.38	63.0
		28	GR	125-300	245	1.38	37.0
Chain	T4N R6W Sec.19	15	WF	215-360	276	0.65	65.0
		5	GR	210-225	217	0.21	22.0
		3	S	335-440	376	0.13	13.0
Leech	T3N R6W Sec. 1	No Fish					
Moosibou	T3N R8W Sec.22	No Fish					

TABLE 1 (Cont.) Gill Net Summaries of New Lakes, Glennallen Area, 1970.

\*Locations given in Township, Range, and Section (Copper River Meridian), when available; otherwise longitudes and latitudes are used.

**S - Sucker	DV - Dolly Varden
GR - Grayling	LT - Lake Trout
WF - Whitefish	SB - Stickleback
BB - Burbot	RS - Red Salmon

\*\*\*Frequency is the number of fish/net hour.

#### May Creek - Dan Creek Area:

Seven lakes were surveyed in the May Creek-Dan Creek drainages in the upper Chitina River valley. Approximately 35 small lakes, ranging in size from one to 22 acres are located along the isolated road system between May and Dan creeks, a distance of 15 miles. This road system was once connected to the McCarthy-Chitina road system by a bridge across the Nizina River; however, the bridge is no longer usable.

The lakes surveyed range in depth from 7 - 16 feet and most are interconnected by small streams which drain into Lake Creek and the Nizina River. Many of these small tributaries are partially, or entirely, blocked by beaver dams.

Only three lakes surveyed have fish populations. O'Neil Lake has a large population of Dolly Varden, Salvelinus malma. Grayling, Thymallus arcticus, and humpback whitefish, Coregonus pidschian, were also taken. This lake is fed by a small inlet stream and the outlet drains into Lake Creek. The fish may be temporary summer residents, as maximum depth is seven feet.

Beaver Dam Lake has a small Dolly Varden population; and one burbot, Lota lota, was collected from Crumb Lake.

Eventually the May Creek-Dan Creek road system will be reconnected with the Alaska Highway system and introduction of other game fish species will be considered.

#### Glenn Highway:

Eleven lakes located from 0.25 to 2.25 miles from the Glenn Highway were surveyed for the first time in 1970. Four lakes support grayling populations and the remainder are barren of fish.

Popeye Lake contains a large population of grayling ranging in length from 122 - 198 mm. The fish are small and mean length of age IV grayling was 176 mm.

Ranger Lake, located two miles south of the Glenn highway at Mile 157, has a large population of grayling. The net catch per hour was 5.7 fish, indicating the highest density of the species found in any of the 56 lakes test netted in 1970.

McLeod Lake, 2.25 miles south of the highway at Mile 164, is 45 acres in size and has a maximum depth of nine feet. It supports a large grayling population, with individuals measuring up to 310 mm in length, but is lightly fished due to its distance from the road.

Harvey Lake is located 0.5 mile south of the highway at Mile 157; Buffalo Lake is located adjacent to Mile 156. These two lakes have surface areas of eight and four acres respectively, and each a maximum depth of 16 feet. No fish were taken in either lake by test netting. The lakes will be checked for winter oxygen concentrations, and if suitable, considered for stocking with salmonids.

Little Mae West Lake is located due south of Mae West Lake at Mile 169 and both are connected by 0.25 mile of stream. The lake has a maximum depth of six feet.

Little Ranger, Scaup, Triangle, Moosibou and Leech lakes are all located adjacent to the Glenn Highway. All these lakes are small, shallow, and range from 7 - 13 feet in depth. No fish were taken by test netting. Three lakes have maximum depths of 13 feet and experimental grayling plants will be considered if winter oxygen concentrations are favorable.

#### Lake Louise Road:

Chain, Link, and Boot lakes are in the same drainage as Burnt Lake, located within 0.5 mile of the Lake Louise road. These lakes were initially surveyed several years ago.

Burnt Lake is the upper lake in the watershed and the outlet drains into the other three lakes and eventually into Tolsona Creek. The lakes support small populations of grayling; humpback whitefish; longnose suckers; Catostomus catostomus; and burbot. Silver salmon, Oncorhynchus kisutch, have been stocked on three different years in Burnt Lake, but none have been recaptured. Winter dissolved oxygen concentrations are high (7.5 ppm in February, 1966) and appear adequate for salmonids. The lakes range from 17 - 35 feet in depth.

The stocked silver salmon may have migrated downstream from Burnt Lake and out of the system, as sometimes occurs where outlets are present. Rehabilitation of this lake system is planned; following the construction of a system of downstream fish barriers, stocking of salmonids is recommended.

#### Tok Cut-off Highway:

Small and Green lakes are located about one mile north of the Tok cut-off near Indian River. These lakes have a local reputation for good Dolly

Varden and lake trout, *S. namaycush*, fishing. Gill net samples, however, indicate the fish population is comprised entirely of suckers.

Cordova area:

Dolly Lake is located 0.25 mile south of the Copper River highway at Mile 17. This seven acre lake is 13 feet deep and has a good population of Dolly Varden. Threespine stickleback, *Gasterosteus aculeatus*, are also present.

Fly-In Lakes:

Upper and Lower Kiana lakes were surveyed in 1970. These fly-in lakes drain into Tazlina Lake. The lower lake is 250 acres in size and has populations of whitefish, grayling, lake trout, burbot, and suckers. Red salmon, *O. nerka*, also spawn in this system.

Upper Kiana Lake is 35 acres in size and located near the headwaters of Kiana Creek. One overnight gill net set caught grayling, Dolly Varden, whitefish and red salmon.

Curtis and Grayling lakes are located southwest of Lake Louise. Curtis Lake has a surface area of 210 acres, and the fish population is comprised primarily of whitefish, with some lake trout measuring up to 670 mm in length.

Grayling Lake, 250 acres in area, is apparently misnamed, since only lake trout, whitefish, and suckers were taken during test netting.

Population Sampling-Managed Lakes

Chitina-McCarthy Area:

Six lakes in this area were test netted to determine the results and progress of experimental fish stocking (Table 2).

TABLE 2 Gill Net Summaries, Managed Lakes, Glennallen Area, 1970.

Lake	Location*	No. Fish	Species**	Length (mm)		Frequency***	% Comp.
				Range	Mean		
Mill Pond	T6S R11E Sec.10	No Fish					
Moose (McCarthy Hwy)	T6S R10E Sec. 3	74	GR	208-248	230	4.60	100.0
Ruth	T6S R11E Sec. 9	4	GR	235-260	248	0.30	100.0
Sculpin	T4S R7E Sec.16		RT	230-375	313	0.80	100.0
Strelna	T4S R7E Sec. 7	49	RT	170-320	227	1.10	100.0
Arizona	T8N R7W Sec.11	30	GR	270-301	284	0.70	100.0
Dadina	T1N R3E Sec.25	57	GR	220-265	240	4.10	100.0

TABLE 2 (Cont.) Gill Net Summaries, Managed Lakes, Glennallen Area, 1970.

Lake	Location*	No. Fish	Species**	Length (mm)		Frequency***	% Comp.
				Range	Mean		
Elbow	T5N R7W Sec.22	1	SS		314	0.04	100.0
Lindy	T4N R7W Sec.25	10	S			0.50	100.0
Mirror	T3N R8W Sec.23	36	GR	115-390	200	1.60	100.0
Moose (Glenn Hwy)	T4N R5W Sec.13	196	GR	170-395	282	2.30	67.0
		83	S	110-430	290	1.00	28.0
		13	BB	215-560	440	0.15	5.0
Lee's Guide	T4N R6W Sec.31	41	S	98-470	345	0.63	70.0
		17	GR	185-315	238	0.26	29.0
		1	LT		690	0.01	1.0
Tolsona	T4N R5W Sec.24	107	GR	160-370	231	2.18	88.0
		12	S	310-435	391	0.24	10.0
		2	BB	530-580	555	0.04	2.0
Gergie	T3N R7W Sec.14	13	GR	180-365	319	0.54	65.0
		7	S	445-512	498	0.29	35.0
Suzie	Long. 144°21'W Lat. 61°31'N	29	S	150-270	220	1.45	78.0
		8	GR	190-270	243	0.40	22.0
Spruce	T5N R7W Sec. 4	19	S	110-455	332	1.00	83.0
		4	GR	220-265	239	0.21	17.0
14-Mile (Caribou)	Long. 145°48'W Lat. 63°5'N	No Fish					
Crosswind	T7N R4W	26	S	454-490	284	4.30	51.0
		23	WF	350-388	369	3.80	45.0
		2	LT	415-565	490	0.30	4.0
High	Long. 146°18'W Lat. 61°51'N	10	LT	410-560	457	0.30	77.0
		3	DV	165-290	235	0.08	23.0
Mankomen	Long. 144°32'W Lat. 63°N	42	WF	155-445	400	0.50	61.0
		25	LT	150-820	333	0.80	37.0
		1	GR		410		1.0
		1	DV		210		1.0
Town	Long. 144°26'W Lat. 61°30'45"N	226	GR	85-345	177	5.00	80.0
		56	S	100-265	130	1.30	20.0
Dicky	Long. 146°7'W Lat. 62°56'N	8	WF	102-420	332	0.38	61.0
		4	RS	502-560	525	0.19	31.0
		1	GR		254	0.04	8.0
Crater (Dicky area)	Long. 146°6'W Lat. 62°57'N	12	LT	390-550	467	0.28	100.0
Big Echo	Long. 145°19'W Lat. 60°29'N	2	DV	200-360	280	0.09	100.0
Little Echo	Long. 145°19'W Lat. 60°29'15"N	3	GR	203-218	212	0.12	100.0
Pipeline	Long. 145°15'55"W Lat. 60°28'20"N	4	CT	265-296	282	0.22	67.0
		2	DV	335-380	357	0.11	33.0

TABLE 3 Winter Dissolved Oxygen Determinations, Glennallen Area, 1970.

Date	Lake	Snow (In.)	Ice (In.)	Sample Depth (Ft.)	Oxygen (ppm)	Max. Depth (Ft.)	Fish Present*
3/9	June	10	31	6	7.5	20	GR,WF,BB
3/9	Nita	10	32	5	6.0	45	GR,WF,BB
3/9	Dick	14	29	5	9.5	32	GR,BB
3/17	Muskrat	0	30	5	4.0	12	None
3/21	Tolsona	0	36	5	1.8	13	GR,BB
3/21	Moose	0	30	5	1.5	30	GR,BB
3/24	Mill Pond	0	36	6	Trace	10	None
3/25	Star	10	31	6	7.0	20	None
3/25	Moose	0	29	6	7.0	15	GR
3/25	Lou's	6	31	6	7.0	17	GR,SS
3/25	Sculpin	7	31	6	7.0	40	RT
3/26	Ruth	0	29	5	1.0	22	GR
3/26	Dadina	8	23	5	9.0	15	GR
4/1	Junction	8	31	5	5.5	19	GR
4/1	Elbow	8	30	10	6.5	17	GR
4/1	Crater	8	24	10	6.0	17	RT
4/1	Forgotten	10	23	5	2.0		GR
4/1	Caribou		21	10	6.5	25	GR,SS,BB
4/1	Tex Smith	6	28	7	6.0	25	RT
4/6	Little Junction	6	28	5	0.0	10	None
4/8	Scoter	10	24	5	0.0	18	GR
4/8	Arizona	10	25	5	4.0	19	GR
4/8	Mirror	10	25	5	6.5	12	GR
4/8	Kay	4	30	5	0.0	11	GR**

\*GR - Grayling      RT - Rainbow trout      WF - Whitefish

SS - Silver salmon      BB - Burbot

\*\*Kay Lake - this grayling population is thought to be only a summer population.

Snow depths are apparently not a critical factor either, since in 1967 and 1970, there was no snow on Tolsona Lake during the testing. In 1966 it had 10 inches of snow cover and 4.0 ppm of dissolved oxygen.

Since 1963, there has been a significant increase in emergent and submergent vegetation in Moose and Tolsona lakes. Increasing amounts of decaying vegetation in these lakes during the periods of ice cover contribute significantly to low oxygen concentrations.

Mill Pond was stocked with grayling fry in 1969. Dissolved oxygen tests conducted in March, 1970, showed only a trace amount in the lake and fish did not survive the winter.

Ruth Lake, located one mile from Mill Pond, has a maximum depth of 22 feet. Winter dissolved oxygen determinations indicated only 1.0 ppm. Grayling fry stocked in this lake had good overwinter survival.

Scoter Lake, located near Mile 143 Glenn Highway, is 18 feet deep and has a good grayling population. Dissolved oxygen determinations conducted in 1967, 1969, and 1970 were 1.0, 0.0, and 0.0 ppm, respectively.

#### Valdez Bay Creel Census

The Valdez Bay silver salmon creel census was conducted in 1970 for the fifth consecutive year; the fishery occurs from late July through August. Creel census during 1970 was limited to six weekend days. A total of 317 anglers were checked who fished 1,313 hours, for a catch of 419 silver salmon, and 31 pink salmon, O. gorbuscha. The silver salmon catch per hour was 0.32 and is compared to catch rates of past seasons (Table 4).

TABLE 4 Creel Census Summaries, Valdez Bay, 1966 - 1970.

<u>Year</u>	<u>No. Anglers Checked</u>	<u>SS/Hr.</u>	<u>No. Days Creel Census</u>
1966	123	0.49	6
1967	181	1.10	5
1968	552	0.14	7
1969	524	0.33	8
1970	317	0.32	6

Although a steady increase in fishing pressure has occurred since 1966, the number of anglers checked does not accurately reflect the rate of increase. Many factors, especially weather, have considerable influence on the number of anglers who will venture forth on any given day. The creel census was conducted on the dock at the small boat harbor and anglers were contacted as they returned upon completion of their fishing trip.

#### Copper River Dip-Net Fishery

A creel census was conducted on the 1970 subsistence dip-net fishery in the Copper River near Chitina. This fishery is unusual in that conventional angling methods are not employed, and fishing is conducted using a large dip net. These nets are at least three feet in diameter and have handles up to 12 feet long. The bags are made of netting or wire mesh.

Anglers fish by dipping the net intermittently, or by holding the net in place underwater and waiting until an upstream migrant salmon enters the bag. This method of fishing is efficient in these waters as the Copper River carries a heavy silt load and transparency is near zero.

The dominant fish species in this fishery is red salmon, although some king and silver salmon are taken. The dip-net fishery season extends from June 1 through December 30. The seasonal limit is 40 salmon for a family with an income of \$5,000 or more, and 500 salmon for families with an income of less than \$5,000.

The creel census sampling method used follows one designed by Neuhold and Lu (1957), and as used on the Russian River (Engel and Logan, 1965). Weekends and weekdays were treated separately because of differences in fishing pressure. With a few exceptions, all days were sampled. Daily angler counts were made and correlated with actual angler interviews to determine the number and fish species taken per angler, angler effort, and total dip net catch.

A total of 2,308 anglers were counted and 590 interviewed. The estimated total number of anglers was 2,682. The total computed catch was 18,557 red salmon and 253 king salmon. No silver salmon were checked since the creel census was terminated on August 15, which is prior to their appearance in the area.

Fifty-five percent of the fishing pressure occurred on weekdays and 45% on weekends, with no difference in catch per weekday or weekend angler. Fifty-nine percent of the anglers made one fishing trip, 37% made two trips, and 4% made three trips.

The number of permits issued for the dip-net fishery has increased from 794 in 1964 to 3,220 in 1970 (Table 5), and the catch has varied from 4,133 to 18,810 salmon. 1970 was the first year a creel census was conducted on this fishery and prior harvest information was based on required catch reports from the fishermen.

TABLE 5 Number of Dip Net Permits and Salmon Catch, Copper River, 1964 - 1970.

<u>Year</u>	<u>No. Dip Net Permits</u>	<u>No. Red Salmon</u>	<u>No. King Salmon*</u>
1964	794	3813	320
1965	982	6899	316
1966	1132	7240	212
1967	1166	5932	214
1968	1235	7672	368
1969	1415	18054	486
1970	3220	18557	253

\*The salmon harvest from 1964 through 1969 was computed from required fisherman harvest returns. The 1970 salmon harvest was computed from creel census.

The commercial catch on the 1970 run of red salmon was 1,117,971, with an estimated escapement of 303,232, before being fished by dip net fishermen. The commercial king salmon catch in 1970 was 19,316, with an estimated escapement of 4,600 fish.

### King Salmon

Prior to 1969 the annual Copper River drainage king salmon harvest by sport fishermen did not exceed 400. In 1969 and 1970, low water conditions prevailed throughout the system and king salmon were quite vulnerable to anglers.

The Gulkana and Indian rivers were readily accessible and were heavily fished during 1970. It was necessary to close the Gulkana River by emergency order to allow an adequate king salmon escapement. An estimated 400 salmon were taken prior to the closure. The king salmon harvest in the remainder of the Copper River system was estimated to be 200 fish.

### Whitefish

During 1970, 10 subsistence and 1 commercial whitefish permits were issued for Paxson, Louise, Susitna, Tyone, Ewan, Mankomen, and Fish lakes. The permits allowed the use of gill nets.

Four hundred-eighty whitefish were taken by commercial fishermen from Fish Lake; these fish were not marketed, but were used for subsistence and dog food.

All but two subsistence permits were returned. Five permits were not used and the three that fished took 310 whitefish from Tyone Lake and 50 from Mankomen Lake.

The number of subsistence whitefish permits issued for the upper Susitna River and Copper River drainages has varied from 5 to 12 since 1963. Permittees are generally lax in returning their catch records; however, present regulations require a catch report before obtaining a new permit.

### Habitat Protection

Highway construction plans for five different areas were reviewed for multiple water-use projects and recommendations made to provide maximum protection to affected fisheries habitat. Regular inspections were made of actual construction in the Lake Louise and Chitina areas, with an engineer from the Alaska Department of Highways. On the Lake Louise road, signs denoting locations of three lakes were included in the project.

Water requests for domestic and road construction purposes by the construction company working on the Lake Louise road were reviewed, and subsequently allowed to be taken from lakes not supporting recreational fisheries. These controls were necessary due to critical water level in many area lakes, brought about by several years of drought.

A final inspection of the oil well drilling site near Mendeltna Creek was made. The drilling company picked up all loose trash and removed it from the area, leveled the pad, and filled in the sump. The access road was left intact; unfortunately the road will wash out since no culverts were required by the state agency who approved the permit. This road could have served as an excellent recreational access road to Mendeltna Creek.

As a result of monitoring this drilling operation during the winter of 1969-70, the following recommendations are made regarding future projects: (1) access roads constructed to drilling sites should be constructed in a manner as to be usable after the drilling is completed; (2) permits for such activities should not be granted until all facets are considered. This test well was drilled within 100 yards of an important red salmon spawning and grayling fishing stream; (3) sumps should be built with a capacity greater than the anticipated need. This should alleviate emergency situations.

An inspection was made of Eyak Lake and the proposed development plan. This plan will include a water control structure at the outlet, fish passage facilities, a structure to allow boat passage, and rehabilitation of the lake.

The preliminary investigation revealed many problems concerning the project, including local disagreement as to raising the existing water level and operating facilities that will prevent ingress of stickleback but still pass salmon.

A reported fish kill in the Robe River was investigated. At least 10,000 dead threespine stickleback were found on the banks of the river near the Richardson Highway. The investigation indicated these dead fish had been scooped out of the river by persons unknown; no evidence of pathological mortality was found.

An outlet structure was rebuilt at Tex Smith Lake to maintain the water level and prevent downstream movement of rainbow trout. This lake drains into a swamp and by mid-summer the fish are unable to return to the lake.

With the assistance of local cabin owners, the outlet structure at Tolsona Lake was rebuilt to prevent loss of water. Several years of drought conditions have lowered the lake to a near critical level.

Activities of the Trans Alaska Pipeline System route relating to fisheries were monitored; however, most of the activities involved alignment surveys and test drilling the substrata.

## LITERATURE CITED

- Neuhold, John M., and K. H. Lu. 1957. Creel Census Method. Utah Department of Fish and Game. Publication No. 8. 36 pp.
- Engel, Larry J., and Sidney M. Logan. 1965. Inventory and Cataloging of the Sport Fish and Sport Fish Waters on the Kenai Peninsula, Cook Inlet-Prince William Sound Areas. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1964-1965, Project F-5-R-6, 6:111-127.
- Williams, Fred T. 1964. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and the Upper Susitna River Drainage. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1963-1964, Project F-5-R-5, 5:321-336.
- \_\_\_\_\_. 1965. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and Upper Susitna River Drainage. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1964-1965, Project F-5-R-6, 6:273-290.
- \_\_\_\_\_. 1966. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and the Upper Susitna River. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1965-1966, Project F-5-R-7, 7:185-213.
- \_\_\_\_\_. 1967. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and the Upper Susitna River. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1966-1967, Project F-5-R-8, 8:217-230.
- \_\_\_\_\_. 1968. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and the Upper Susitna River. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1967-1968, Project F-5-R-9, 9:241-256.
- \_\_\_\_\_. 1969. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and the Upper Susitna River. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1968-1969, Project F-9-1, 10:275-289.
- \_\_\_\_\_. 1970. Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River and Prince William Sound Drainage, and the Upper Susitna River. Alaska Department of Fish and Game. Federal Aid In Fish Restoration, Annual Report of Progress, 1969-1970, Project F-9-2, 11:241-261.

*Prepared by:*

Fred T. Williams  
Fishery Biologist

*Date:* April 1, 1971

*Approved by:*

s/Howard E. Metsker  
D-J Coordinator

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