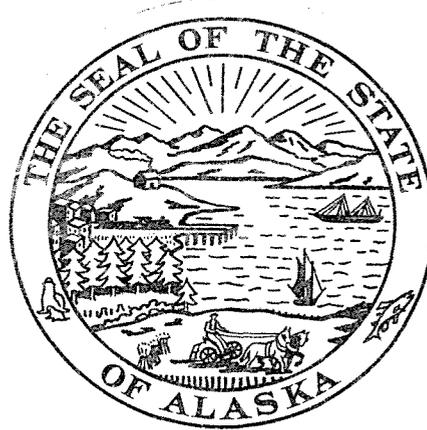


SH
11
A73
A4
v.1
p61

3 3755 000 67872 2

STATE OF ALASKA

William A. Egan, Governor



Annual Progress Report for

INVENTORY AND CATALOGING

INVESTIGATIONS OF ALASKA'S PUBLIC FISHING
ACCESS REQUIREMENTS

LAKE AND STREAM INVESTIGATIONS

ALASKA DEPARTMENT OF FISH AND GAME

Wallace H. Noerenberg, Commissioner

Alaska. DIVISION OF SPORT FISH

Rupert E. Andrews, Director

Howard E. Metsker, Coordinator

ARLIS

Alaska Resources
Library & Information Services
Anchorage, Alaska

Merged With
ARLIS
UNIVERSITY OF ALASKA
ANCHORAGE, ALASKA
ARCTIC ENVIRONMENTAL INFORMATION
AND DATA CENTER
707 A STREET
ANCHORAGE, ALASKA 99501

ANNUAL REPORT OF PROGRESS

TABLE OF CONTENTS

	<u>Title</u>	<u>Page No.</u>
Job G-I-A	Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Southeast Alaska. Michael J. McHugh, Darwin E. Jones, and Robert T. Baade.	1
Job G-I-B	Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Southwest Alaska. Frank D. Van Hulle.	29
Job G-I-C	Inventory and Cataloging of Kenai Peninsula, Cook Inlet, and Prince William Sound Drainages and Fish Stocks. Sidney M. Logan.	53
Job G-I-D	Inventory, Cataloging, and Population Sampling of the Sport Fish and Sport Fish Waters of the Cook Inlet Drainage. R. Russell Redick.	65
Job G-I-E	Inventory and Cataloging of the Sport Fish and Sport Fish Waters of the Bristol Bay and Lower Kuskokwim Drainages. Donald L. Siedelman.	95
Job G-I-F	Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Copper River, Prince William Sound, and the Upper Susitna River Drainage. Fred T. Williams.	117
Job G-I-G	Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Interior Alaska. Richard D. Peckham.	137
Study A-1	Investigations of Alaska's Public Fishing Access Requirements. Jay L. Bergstrand.	149
Job G-III-B	Salmonid Rearing in Heated Ponds. Joe Wallis.	161
Job G-III-C	Fire Lake Salmonid Rearing and Migration Study. Joe Wallis.	165

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-A

Job Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Southeast Alaska.

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

ABSTRACT

Fifty-four lakes were surveyed to determine the species, size, and abundance of fish present and/or the current effects of land use developments, angling pressure, and the success of previous fish stockings.

The size and age of steelhead, Salmo gairdneri, from the Situk River was determined from samples taken during the spring and fall runs. Ages ranged from three to seven years, with a high percentage of the sampled steelhead spawning for the second or third time.

Ten streams were surveyed for potential study sites for research into the life history of steelhead and cutthroat trout, S. clarki. Salmon Bay Creek, Castle River, and Petersburg Creek were considered suitable for the research program.

RECOMMENDATIONS

1. Continue investigational studies both on new unsurveyed waters and those presently included in the management program.
2. Place primary work emphasis on those waters in closest proximity to population centers and on those waters with access being improved by completion of road and trail systems.
3. Continue evaluating stocked waters and current stocking policies.
4. Make no change in the general Southeast Alaska Sport Fishing Regulations at this time.
5. The following lakes are recommended for stocking in 1971:

<u>Area</u>	<u>Lake</u>	<u>Location</u>	<u>Species*</u>	<u>No.</u>
Sitka:	Swan	Baranof Island	RT	9,000
	Biorka	Biorka Island	RT	1,000
Petersburg:	Spurt	Thomas Bay	RT	20,000
	Boot	Kupreanof Island	RT	5,000
	Sherman Park	Kupreanof Island	RT	2,000
	Boat	Stikine River	RT	10,000
Juneau:	QT	Juneau	RT	1,000
	Marshall	Juneau	RT	1,000
Ketchikan:	Punkie	Cleveland Peninsula	GR	10,000
	Whitesox	Cleveland Peninsula	GR	10,000
	Sundial	Rudyard, Mainland	GR	10,000
	Beaver Mountain	Prince of Wales Island	RT	2,500
	Blue	Unuk River, Mainland	RT	2,500
	Humpy	Chickamin, Mainland	RT	2,500

OBJECTIVES

1. To determine the physical and biological characteristics of the existing and potential recreational fishery waters within the job area.
2. To determine the degree of success obtained from past fishery restoration measures and implement needed population manipulation measures.
3. To determine and develop plans for the enhancement of anadromous and resident fish stocks.

4. To locate sport fish egg sources and make egg takes as required for experimental hatching and stocking programs.
5. To evaluate multiple-use development projects (public and private) and their effects on the area's streams, lakes, and salt water for the proper protection of the sport fish resources.
6. To assist, as required, in the investigation of public access status to the area's fishing waters.

TECHNIQUES USED

Information and results obtained from prior studies were used for directing some phases of work activity.

Fish population sampling, water chemistry determinations, and accumulating related biological and physical survey data were accomplished by standard techniques as discussed in previous reports (Heckart, 1966).

Multiple-use activities affecting the sport fish stocks and the biological environment were monitored and recommendations made to various authorities as warranted.

Variable mesh monofilament gill nets, fyke nets, and rod and reel were used for sampling the various fish species. Nets were fished for varying periods of time based on lake size, population density, and fish species present at the time of survey. These capture methods provided fish for biological analysis and for determinations as to the suitability of fish populations for recreational angling.

Complete files of field data obtained during the 1969-70 fiscal year are maintained in the respective Sport Fish Division field offices and the Headquarters office.

FINDINGS

Upper Southeast Alaska

The upper southeast area consists of an approximate 30,000-square-mile area which encompasses the major communities of Juneau, Sitka, Wrangell, Petersburg, Haines, Skagway, and Yakutat.

Major investigations and management emphasis was in the area of the larger population centers of Juneau, Sitka, and Petersburg. The degree of survey and investigational work conducted on any lake or stream was governed by current management needs, with cognizance of potential demands through road and trail extensions, or angler requests.

Waters more than 50 miles from population centers were generally given lower priority for survey work as these lakes and streams support less angling pressure due to transportation costs.

Lake Investigations:

Physical and biological work was conducted on 33 lakes in Upper Southeast Alaska during the 1970 field season (Table I).

Summaries of the lakes receiving initial surveys in 1970 are presented in this report. Summaries of previously surveyed lakes have been included in past progress reports.

The *Sarkar Lake complex* on the west coast of Prince of Wales Island is comprised of four large and several smaller lakes. All the large lakes, Finger, Tammy, and Moss, feed into Sarkar Lake and then to Sarkar Bay. This lake complex has been reported to support excellent populations of red, *Oncorhynchus nerka*, and coho salmon, *O. kisutch*, but little was known of the cutthroat, *Salmo clarki*, and Dolly Varden, *Salvelinus malma*, populations. Test net and rod-and-reel sampling throughout the lake system confirmed the presence of cutthroat and Dolly Varden. At the time of survey, red salmon were in the system and the first coho salmon had entered Sarkar Bay.

Future work on this system should provide data on the magnitude of salmon runs, as well as confirming the presence of steelhead trout, *S. gairdneri*.

The *Sweetwater Lake complex* lies on the northeast side of Prince of Wales Island and is comprised of three large lakes, Galea, Hatchery, and Sweetwater, plus several small lakes. Two large tributaries, Hatchery and Logjam creeks, enter Sweetwater Lake through a common estuary and support the major fish runs in the system.

The Sweetwater Lake area has been known for its fine sea-run cutthroat trout populations, but very little else was known of other species. During 1970 surveys, populations of Dolly Varden, red, and coho salmon were noted. The most outstanding development of the 1970 surveys was the discovery of a strong run of "summer coho salmon." These coho were entering Sweetwater as early as mid-July. Summer coho runs occur in other systems in Southeast Alaska, but this was the first good run discovered in the Petersburg-Wrangell district. These coho will undoubtedly receive additional fishing pressure as the angling public becomes aware of their availability during July and early August. Future work should be devoted toward enumerating this "summer coho" run and investigating the steelhead and cutthroat populations.

Eagle Lake, located on the south side of Bradfield Canal, this lake has a local reputation for trophy-size cutthroat trout. Test net sampling confirmed this reputation with the largest cutthroat in excess of three pounds. A population of kokanee salmon was also confirmed. The abundance of forage-size kokanee may account for the large cutthroat in this land-locked lake. No additional work, except periodic population checks, is planned for Eagle Lake at this time.

Barnes Lake is located just below the Canadian boundary on the Stikine River. Ketili Creek flows out of Barnes Lake and has long been known to contain an excellent cutthroat trout and coho salmon population. Test net sampling in Barnes Lake resulted in a catch of cutthroat, Dolly Varden, coho salmon, and mountain whitefish, Prosopium williamsoni. Whitefish have been recorded before in the lower Stikine drainage and their presence in Barnes Lake is not unique. Barnes Lake has a maximum depth of 3 m and appears to be a productive rearing area for coho salmon. No additional work beyond periodic checks on existing populations is planned for Barnes Lake.

Campbell Lake is located on the north side of Bradfield Canal. This lake lies at an elevation of 152 m and contains numerous impassable waterfalls in its outlet stream to Tom Lake. Test net sampling revealed a stunted climax population of Dolly Varden. Numerous, more productive lakes are located in the same general area which precludes additional management work on Campbell Lake.

North Arm Lake is located near the mouth of North Arm of the Stikine River. This small, dark water lake contains a climax population of cutthroat trout and Dolly Varden, with the largest cutthroat less than 24 cm. The lack of overnight facilities and the small fish do not make North Arm Lake attractive to the local fishermen. No additional work is planned.

Brown Cove Lake is a tributary to Muddy River, Thomas Bay. Brown Cove Lake supports a run of coho salmon. The existing resident population of cutthroat trout and Dolly Varden are found in the lakes of the area. A logging road is scheduled to be built in the near future from the logging camp in Thomas Bay to within 1/4-mile of this lake. This access may result in some angling effort where none now exists. When the road is completed, another check of the fish populations will be made and management plans formulated.

Situk River Steelhead Investigations:

Two survey trips to the Situk River were made during 1970. During the spring trip of May 5 - 10 and the fall trip of November 16 - 25, biological samples were collected from 55 steelhead taken in gill nets and on rod and reel. Data collected included sex, length, weight, and scale samples for age determination.

TABLE I Test Net Summaries, Upper Southeast Alaska, 1970.

	Lake Name	Species*	No. Fish	Length (cm)		Catch Frequency**	% Comp.
				Range	Mean		
Mainland - Petersburg-Wrangell	Barnes	CT	32	17.8 - 40.1	28.8	0.66	21
		WF	13	17.3 - 30.5	26.5	0.27	8
		DV	2	30.5 - 36.1	33.3	0.04	1
		SS	100	smolts		2.08	70
	Goat	RT	6	31.8 - 43.1	35.0	0.12	100
	Spurt	RT	4	18.5 - 43.2	29.9	0.08	45
		DV	5	12.2 - 22.8	14.5	0.10	55
	Eagle	CT	74	17.3 - 51.8	24.1	1.54	80
		DV	9	12.2 - 24.1	18.8	0.18	10
		KK	9	18.8 - 22.8	18.8	0.18	10
	Campbell	DV	2	12.2 - 12.7	12.5	0.04	100
	Brown Cove***	CT	2	12.7 - 32.5	22.6	0.04	40
		DV	2	12.1 - 23.6	17.8	0.04	40
		SS	1	smolt		0.02	20
	DeBoer	RT	38	18.0 - 28.4	25.1	0.79	100
	Tyee	GR	1		29.2	0.02	100
	North Arm***	CT	10	17.0 - 22.7	19.3	0.48	76
		DV	3	21.8 - 23.9	22.6	0.06	24
	Swan	RT	19	23.8 - 39.6	30.2	0.79	100
	Kupreanof Island	Kah Sheets	CT	38	13.9 - 39.4	27.2	0.79
SS			3	smolts		0.06	8

TABLE 1 (Cont.) Test Net Summaries, Upper Southeast Alaska, 1970.

	Lake Name	Species*	No. Fish	Length (cm)		Catch Frequency**	% Comp.
				Range	Mean		
Prince of Wales Island	Sarkar	CT	5	21.6 - 38.2	28.7	0.20	50
		DV	2	22.8 - 24.1	23.4	0.08	20
		SS	2	smolts		0.08	20
		RS	1	"jack"		0.04	10
	Moss***	CT	20	18.8 - 36.1	26.9	0.83	44
		DV	23	18.2 - 44.4	27.8	0.95	50
		RS	3	adults		0.12	6
	Tammy***	CT	10	24.1 - 32.8	29.8	0.41	58
		RS	7	adults		0.29	42
	Finger***	CT	7	25.1 - 32.5	29.2	0.29	50
		RS	7	adults		0.29	50
	Red	CT	6	18.8 - 31.5	24.4	0.12	42
DV		2	23.4 - 26.7	24.9	0.04	16	
RS		6	adults		0.12	42	
Salmon Bay	CT	11	23.8 - 29.7	27.7	0.22	58	
	DV	1		35.1	0.02	5	
	RS	5	adults		0.10	26	
	SS	2	smolts		0.04	11	
Sweetwater	CT	25	17.8 - 36.6	28.7	0.52	48	
	DV	24	20.3 - 33.5	23.1	0.50	46	
	SS	2	adults		0.04	4	
	RS	1	adult		0.02	2	

TABLE I (Cont.) Test Net Summaries, Upper Southeast Alaska, 1970.

	<u>Lake Name</u>	<u>Species*</u>	<u>No. Fish</u>	<u>Length (cm)</u>		<u>Catch Frequency**</u>	<u>% Comp.</u>	
				<u>Range</u>	<u>Mean</u>			
Prince of Wales Island (Cont.)	Hatchery	CT	75	14.2 - 29.9	24.8	1.56	83	
		KK	1		17.3	0.02	1	
		SS	2	smolts		0.04	3	
		RS	12	adults		0.25	13	
	Galea	CT	10	18.0 - 28.4	25.1	0.20	66	
		SS	5	smolts		0.10	34	
Mainland - Juneau ∞	Auke	CT	10	23.6 - 32.8	28.9	0.50	100	
	Peterson	DV	62	8.3 - 27.0	15.7	2.50	90	
		RT	7	12.0 - 25.7	20.0	0.20	10	
	Turner	CT	26	11.5 - 37.0	23.5	1.19	23	
		DV	27	13.1 - 36.5	23.6	1.23	24	
		KK	58	18.0 - 22.0	18.4	2.76	53	
	Mendenhall Ponds:							
		Crystal Lake	RT	8	15.4 - 22.8	18.7	0.66	100
		Moraine Lake	DV	2	12.9 - 16.1	14.5	0.08	7
			SS	28	9.2 - 15.4	11.0	2.30	93
	Glory	DV	165	9.8 - 28.9	13.3	3.40	100	
	Antler	GR	110	6.9 - 39.8	13.4	2.50	100	
Admiralty Island	Kanalku	CT	14	20.4 - 32.0	30.0	0.58	100	

TABLE I (Cont.) Test Net Summaries, Upper Southeast Alaska, 1970.

	Lake Name	Species*	No. Fish	Length (cm)		Catch Frequency**	% Comp.
				Range	Mean		
Sitka	Suloi	RT	233	10.7 - 26.8	17.6	7.80	78
		DV	66	9.6 - 18.6	14.9	6.60	22
	Swan	RT	2	20.1 - 21.2	20.7		100
Yakutat	Square	CT	19	11.0 - 32.0	22.3	0.80	44
		DV	1		13.5	0.04	2
		SS	23	10.9 - 13.1	11.9	0.90	54
	Situk	DV	134	98.0 - 50.0	16.3	5.58	60
		RT	22	6.0 - 34.2	14.1	0.91	10
		SS	68	42.0 - 17.8	10.4	2.80	30
Haines	Chilkat	DV	62	12.3 - 45.8	23.6	0.43	40
		CT	56	12.4 - 52.0	27.7	0.38	37
		KK	35	21.1 - 43.7	27.6	0.24	23

6

*CT - Cutthroat Trout
 DV - Dolly Varden
 RT - Rainbow Trout

GR - Grayling
 WF - Whitefish
 SS - Silver Salmon

RS - Red Salmon
 KK - Kokanee Salmon

**Fish catch per hour in 125-foot vari-mesh gill net.

***Unofficial name.

Weight and length relationships by sex and season for Situk River steelhead is presented in Table 2. Results of spring sampling revealed that females averaged larger and were more numerous than males with a male-to-female ratio of 1:1.6. During the fall run, females were again more numerous than males, but averaged smaller than males. The fall sample was rather limited and may not reflect the true average size of male steelhead in the Situk River. The combined spring and fall average weight for both sexes was 4.4 kg, which is somewhat greater than the average weight of steelhead found in most streams in Southeast Alaska. One in every four steelhead sampled from the Situk River weighed over 5.4 kg.

TABLE 2 Weight-Length by Sex and Season, Situk River Steelhead, 1970.

	No. in Sample	Length (cm)		Weight (kg)	
		Range	Avg.	Range	Avg.
Spring: Female	27	58.4 - 93.9	76.2	2.0 - 7.7	4.6
Male	18	60.9 - 81.3	71.1	2.7 - 6.3	3.5
Fall: Female	7	52.1 - 85.1	73.9	1.6 - 6.8	4.6
Male	3	80.0 - 83.8	82.5	6.1 - 6.8	6.4

Total age of the Situk River steelhead was obtained from 49 of 53 fish sampled. Scale examination revealed two outstanding population characteristics: (1) the run is composed of many age classes with ages from three to seven years noted; (2) a high percentage of steelhead were spawning for the second or third time.

Nine age groups were recorded during the spring survey (Table 3). Age class 2.2 was the most numerous with 28% of the total. Age classes 2.3 and 2.4 were the next most abundant with 15% and 18%, respectively. Only four age groups were recorded during the fall survey. Age class 2.2 was also the most numerous in the fall run, with age class 3.2 the next most common. The fall sample was small and may not be representative of all age classes in the run. Additional sampling of both spring and fall run fish will be undertaken in 1971 in an effort to determine age differences in the two runs.

TABLE 3 Age Composition of Steelhead Sampled from the Situk River, 1970.

		Age Classes								
		<u>1.2</u>	<u>1.3</u>	<u>1.4</u>	<u>2.2</u>	<u>2.3</u>	<u>2.4</u>	<u>2.5</u>	<u>3.2</u>	<u>3.3</u>
Spring Run:	No. SH	2	2	1	11	6	7	2	4	4
	% Tot. (N=39)	5%	5%	3%	28%	15%	18%	5%	10%	10%

		Age Classes			
		<u>1.3</u>	<u>2.2</u>	<u>2.3</u>	<u>3.2</u>
Fall Run:	No. SH	1	5	1	3
	% Tot. (N=10)	10%	50%	10%	30%

Thirty-five percent of the total number of steelhead were repeat spawners. The high occurrence of repeat spawners in the Situk River does not conform to the steelhead streams in the remainder of Southeast Alaska. Perhaps the reason for a high survival rate following spawning is that they are not subjected to predator filled inside waters as in Southeast Alaska. On further breakdown by season, repeat spawners comprised 38% of the spring run and 33% of the fall run. Age classes 2.3 and 2.4 were the most numerous in the spring sample and age class 3.2 in the fall sample (Table 4).

TABLE 4 Age Classes of Repeat Steelhead Spawners, Situk River, 1970.

		Age Classes						
		<u>1.4</u>	<u>2.2</u>	<u>2.3</u>	<u>2.4</u>	<u>2.5</u>	<u>3.2</u>	<u>3.3</u>
No. steelhead	Spring	1	1	3	7	2	0	1
	Fall	0	0	1	0	0	2	0

The male-to-female sex ratio of repeat spawning steelhead was 1:3.5. Of 30 female steelhead examined, 14, or 46%, were repeat spawners as compared to only 4, or 16%, of the males.

The ability of Situk River female steelhead to survive the initial spawning run and return again in such numbers is unique in steelhead populations sampled in Alaska.

The reputation of the Situk River as a trophy steelhead stream rests almost entirely on the presence of repeat spawners. These older fish average slightly more than the "trophy" size of 5.4 kg and range upward to over 7.7 kg (Table 5).

TABLE 5 Weight and Length for Initial and Repeat Steelhead Spawners, Situk River, 1970.

	No. Fish	Length (cm)		Weight (kg)	
		Range	Avg.	Range	Avg.
Initial spawners	34	58.4 - 83.8	71.8	1.5 - 6.8	3.9
Repeat spawners	19	73.6 - 93.9	80.0	4.1 - 7.7	5.5

Steelhead-Cutthroat Life History Studies:

In preparation for this study, 10 streams in the Petersburg-Wrangell-Kake area were evaluated during 1970. The study stream selected for the research project should be typical of those streams supporting runs of steelhead and cutthroat trout.

During foot surveys, the following physical features were noted for each stream: potential weir sites, number of tributaries, extreme high water marks, spawning and rearing areas, distance from population centers, numbers of steelhead and cutthroat trout, and numbers of lakes in the system.

Hatchery and Logjam creeks enter Sweetwater Lake, Prince of Wales Island, through a common estuary. Both streams contain and support red and coho salmon runs. Reports of steelhead in these two streams have been received but none were found during foot surveys in mid-April. Cutthroat were numerous in both streams at the time of survey. Both Hatchery and Logjam creeks contained good weir sites above Sweetwater Lake. The lack of a confirmed steelhead run and remote location precluded these two streams from further serious consideration as a study site.

Salmon Bay Creek is located on the northeast end of Prince of Wales Island approximately 25 miles north of Sweetwater Lake. Salmon Bay Creek heads in Salmon Bay Lake and flows two miles to Salmon Bay. This stream is known to contain steelhead and cutthroat. The stream receives moderate fishing pressure from Wrangell and various logging camps in the area. Foot surveys were made in April and November, 1970. During the spring survey, 150 - 200 steelhead were observed. Most of these steelhead were spawning

and appeared to have overwintered in the system. To confirm this theory, a survey was made in mid-November. Bright fish were noted on this survey confirming the theory that a portion of the steelhead population of Salmon Bay overwinters in the lake. Large numbers of cutthroat were observed on both surveys, indicating a sizeable population in the system.

Salmon Bay Creek contains a good weir site just above tidewater. This stream appears to have the necessary requirements for a study stream and should be considered in making any final decision.

Red Bay is just 15 miles northwest of Salmon Bay. *Red Bay Creek* flows 1/2-mile from Red Lake to Red Bay. During foot surveys in April, 1970, 12 steelhead were observed between tidewater and the lake. Surveys of the inlets to Red Lake were not made, but these streams undoubtedly contain spawning steelhead. Cutthroat were present in Red Bay Creek but not in the numbers noted at Salmon Bay.

A weir site is present at the high tide line of Red Bay Creek. The creek was not considered to have the necessary requirements for a study stream due to its small size and questionable numbers of steelhead and cutthroat.

Anan Creek, located on the mainland in Bradfield Canal, has a history of being an excellent steelhead and salmon fishing stream. Boulder and Anan lakes form the headwaters of the west fork of Anan Creek and are open to steelhead and cutthroat migrations. A foot survey in late April, 1970, from upstream to the forks enumerated one bright steelhead and numerous cutthroat. An old weir was located above the first falls about 1/2-mile above tidewater. Anan Creek is not considered a good prospect for study due to its large size, remote location, and questionable run of cutthroat.

Petersburg Creek, located on Kupreanof Island across Wrangell Narrows from Petersburg, completes the list of streams with lakes available for anadromous fish surveyed in 1970. A sport fishery, and at one time a commercial fishery, exists on the steelhead run in Petersburg Creek. Surveys of the steelhead run in Petersburg Creek for the last three years have tabulated between 200 and 300 fish annually. Cutthroat are abundant most of the year and support a summer and early fall sport fishery.

The stream is not subject to extreme fluctuations in water levels. Several possible sites have been surveyed and if this stream is selected, one of these sites would be developed. Petersburg Creek was considered to meet all the necessary requirements for a steelhead-cutthroat study.

Four streams were surveyed during 1970. *Tunehean Creek*, located on the west side of Kupreanof Island, has a large rather flat watershed. This stream was foot surveyed for a distance of 2 1/2 miles in April, 1970. Several schools of steelhead totaling about 200 fish, together with

numerous cutthroat, were observed in two large pools 1 1/2 miles above tidewater. Tunehean Creek is prone to extreme fluctuations in water level. This stream was not given serious consideration for a study stream.

Kadake Creek, Kuiu Island, is known for its good cutthroat fishing. Steelhead have been reported to be numerous in the system and a foot survey in May, 1970, confirmed their presence. Kadake Creek has a large drainage and is prone to extreme high water levels in the spring and fall months. Maintaining a weir in this stream would prove difficult and this fact eliminates it from consideration.

Jackson Hole Creek, Kuiu Island, is a small, non-lake stream reported to support runs of both steelhead and cutthroat. Foot surveys in May, 1970, failed to reveal any steelhead and only a limited number of small cutthroat. These two facts, plus its remote location placed it low on the list of study streams.

The last non-lake stream surveyed in 1970 was *Castle River* located on the east side of Duncan Canal, Kupreanof Island. Castle River is locally famous for its cutthroat fishing and, to a lesser extent, its steelhead. This stream is the largest system surveyed and contains well over 30 stream miles open to migratory fish. Large deep pools in the lower river hold cutthroat and fall-run steelhead throughout the winter. Castle River has been placed high on the list of study streams as it has most of the requirements needed for a good study stream. The only drawback would be the construction of a weir capable of withstanding the peak flows.

In summary, Salmon Bay Creek, Castle River, and Petersburg Creek contain the prerequisites necessary for the life history study on steelhead and cutthroat. Final selection of a study stream will be made in early 1971, with initiation of the project in April, 1971.

Petersburg Area Freshwater Creel Census:

A creel census program to assess the sport fish harvest in Petersburg area freshwater streams was initiated in 1966 and has continued on an annual basis through 1970. The 1970 census was conducted during August and September when the major fishing effort occurs on these freshwater streams. Petersburg Creek on Kupreanof Island, and Falls Creek and Blind Slough on Mitkof Island receive good runs of coho and pink salmon, *O. gorbuscha*, with lesser numbers of chum salmon, *O. keta*. Petersburg Creek receives a good run of red salmon, however, the reds remain in the lower stream area for only a short time and are not exploited to any great extent by sport anglers. Insignificant effort is expended on red salmon in Petersburg Lake at the present time. Anadromous Dolly Varden and cutthroat are abundant only in Petersburg Creek and Blind Slough. Petersburg Creek, Falls Creek, and Blind Slough support the majority of the freshwater sport fishery in the Petersburg area and are censused annually to gather data for the proper management of the sport fishery.

Falls Creek and Blind Slough are accessible by auto from the Mitkof Highway and Petersburg Creek is accessible by skiff across Wrangell Narrows from Petersburg.

The Petersburg Creek census program was restricted to the intertidal portion of the creek, as this area is the most popular and productive fishing area. Fishing success varies with tide level; the best fishing occurs in the upper areas at high tide and just before low tide in the intertidal portion of Petersburg Creek.

Creel census of sport fishermen was initiated August 10 and continued to September 13. Census was conducted on the same schedule as in previous years with two randomly selected weekdays and one weekend day sampled each weekly period. The census was conducted twice daily, once during high tide in the upper intertidal area, and again at low tide in the lower areas. Fishing effort for steelhead, red salmon, pink salmon, cutthroat, and Dolly Varden begins before the first of August, but major effort is during the coho salmon run in August and September.

Fishing success on Petersburg Creek was poor the first half of August but improved by mid-month and peaked in early September (Table 6). Dolly Varden and cutthroat trout were considered as abundant as in previous years, but were not retained by fishermen. Census data on released fish were not compiled.

TABLE 6 Petersburg Creek Creel Census Summaries by Weekly Periods, 1970.

Weekly Period	No. Anglers	Angler Hrs.	Fish Caught				Fish/ Hr.	Fish/ Angler
			SS	PS	CT	DV		
8/10-8/16	6	12	-	-	-	2	0.16	0.33
8/17-8/23	26	45	18	2	-	4	0.53	0.92
8/24-8/30	31	63	14	-	-	3	0.26	0.54
8/31-9/ 6	25	59	16	-	-	-	0.27	0.64
9/ 7-9/13	43	153	27	-	-	2	0.18	0.67
Totals	131	332	75	2	0	11	0.26	0.67

Falls Creek crosses the Mitkof Highway at Milepost 9. The area covered in the census begins about 91 m below the fish ladder and extends approximately 1/2-mile out on the tide flats. As this area is intertidal, fishing success is closely related to tide level, with the greatest success for shore fishing anglers occurring from two hours before to two hours after high tide. Fishermen fishing from skiffs are most successful at or near low tide.

Falls Creek receives an early run of coho salmon, with fish present below the falls from late July through August. The coho and pink salmon run in Falls Creek in 1970 was poor. Unlike Petersburg Creek and Blind Slough, few anadromous Dolly Varden and cutthroat are present in the intertidal area of Falls Creek. Due to the poor showing of salmon, the 1970 sport catch at Falls Creek was quite poor (Table 7).

TABLE 7 Falls Creek Creel Census Summaries by Weekly Periods, 1970.

<u>Weekly Period</u>	<u>No. Anglers</u>	<u>Angler Hrs.</u>	<u>Fish Caught</u> <u>SS</u>	<u>Fish/Hr.</u>	<u>Fish/Angler</u>
8/10-8/16	0	-	-	0.00	0.00
8/17-8/23	13	46	8	0.17	0.61
8/24-8/30	12	26	2	0.07	0.16
8/31-9/ 6	0	-	-	0.00	0.00
9/ 7-9/13	0	-	-	0.00	0.00
Totals	25	72	10	0.13	0.40

Creel census at Falls Creek was conducted on the same random schedule as Petersburg Creek from August 10 until termination of the census on September 13. Census was conducted twice daily, once by skiff at low water, and again by vehicle at high tide from the Mitkof Highway.

Blind Slough parallels the Mitkof Highway from Milepost 13 to Milepost 22 and can be reached from the road. The most popular and productive fishing area of Blind Slough is the intertidal "rapids" area that is reached by a 1/2-mile foot trail from the Mitkof Highway at Milepost 14, or by skiff from Wrangell Narrows at high tide. Trout and salmon are present in this intertidal area at all tide levels. Bank and skiff fishermen follow the schools of fish as they move with the tides. Blind Slough receives chum and coho salmon and a few pink salmon. Chum salmon are normally in an advanced stage of sexual maturity when they reach the "rapids area" and are not of much interest to the sport fishermen. In 1970, coho salmon began to enter the fishery by mid-August and were abundant throughout the census period. Anadromous Dolly Varden and cutthroat are present in the intertidal area of Blind Slough most of the year, but the largest numbers are taken during the fall salmon runs.

Blind Slough was censused from August 10 through September 13. The census was conducted on the same schedule as Petersburg and Falls creeks. Fishing success was poor during the first week of the census, but improved and remained good throughout the remainder of the census period (Table 8).

TABLE 8 Blind Slough Creel Census Summaries by Weekly Periods, 1970.

Weekly Period	No. Anglers	Angler Hrs.	Fish Caught				Fish/Hr.	Fish/Angler
			SS	PS	CT	DV		
8/10-8/16	2	3	-	-	-	-	0.00	0.00
8/17-8/23	47	119	19	1	3	6	0.24	0.61
8/24-8/30	32	77	20	-	4	8	0.41	1.00
8/31-9/ 6	15	29	14	-	1	2	0.58	1.13
9/ 7-9/13	<u>37</u>	<u>115</u>	<u>19</u>	<u>-</u>	<u>7</u>	<u>15</u>	<u>0.35</u>	<u>1.10</u>
Totals	133	343	72	1	15	31	0.34	0.89

The observed freshwater harvest of coho, pink salmon, cutthroat trout, and Dolly Varden from Petersburg Creek, Falls Creek, and Blind Slough was expanded to project the estimated total season catch (Table 9). Data obtained on census days were extrapolated to the total days in the month with an estimated two thirds of all anglers contacted on any given census day.

TABLE 9 Estimated All Season Catch, Petersburg Area, 1970.

	Tot. Anglers	Angler Hrs.	Fish Caught				Fish/Hr.	Fish/Angler
			SS	PS	CT	DV		
Petersburg Creek	567	1,379	315	9	9	44	0.27	0.66
Falls Creek	135	325	45	-	-	-	0.13	0.33
Blind Slough	<u>480</u>	<u>1,493</u>	<u>314</u>	<u>4</u>	<u>69</u>	<u>133</u>	<u>0.35</u>	<u>1.08</u>
Totals	1,182	3,197	674	13	78	177	0.29	0.79

Comparative annual freshwater sport fish harvests for Petersburg Creek and Blind Slough for 1966 - 1970 are presented in Table 10. Falls Creek catch statistics prior to 1968 are incomplete and are deleted.

The assessment of coho salmon spawning escapement in Blind Slough has been conducted annually since 1966. Counts are made by foot surveying the 20 small tributaries to Blind Slough in late October to coincide with peak spawning activity. The numbers of salmon observed during these surveys are considered minimal, as many coho are removed from the small spawning streams by bears and eagles. Additional coho enter Blind Slough as late as November and are not included in total escapement counts.

TABLE 10 Estimated All Season Harvest, Petersburg Creek and Blind Slough, 1966-1970.

	Petersburg Creek					Blind Slough				
	1966	1967	1968	1969	1970	1966	1967	1968	1969	1970
Anglers	369	198	570	461	567	465	365	343	379	480
Angler Hrs.	765	396	1581	1549	1379	1141	862	1063	1324	1493
SS	118	81	541	330	315	349	212	358	356	314
PS	224	--	53	94	9	--	--	--	--	4
CS	7	--	--	--	--	--	--	104	8	--
CT	33	99	58	233	9	76	32	158	203	69
DV	145	72	185	296	44	251	176	109	225	113
Fish/Hr.	0.69	0.64	0.53	0.61	0.27	0.59	0.49	0.69	0.59	0.33
Fish/Angler	1.43	1.27	1.47	2.06	0.66	1.45	1.15	2.13	2.09	1.04

Total escapement counts of coho salmon have varied from a low of 858 in 1967 to the high of 2,843 observed in 1970 (Table II).

TABLE II Coho Salmon Escapements, Blind Slough, 1966-1970.

<u>Year</u>	<u>Coho Escapement Counts</u>
1966	1,400
1967	858
1968	2,040
1969	1,133
1970	2,834

Lower Southeast Alaska

Lake Investigations:

Twenty-two lakes were investigated in Lower Southeast Alaska during the 1970 season. These lakes were surveyed for the first time for an assessment of existing fish populations (if any) and determinations of future management potential. The lakes are listed in Table 12.

A brief description of all lakes surveyed in the 1970 field season follows, and includes locations, biological characteristics, method of access, and management recommendations.

Bear Lake. This lake lies on the Cleveland Peninsula and drains into Union Bay. The surface elevation is 150 m and the lake surface measures 34 ha. It is 29.8 miles from Ketchikan bearing 320° True. The timbered watershed of the lake measures 539 ha, of which 15% is alpine and above 500 m. There are many falls in the outlet impassable to migratory fish. There are meager areas of Nuphar sp. and Vallisnaria sp. The water has noticeable muskeg stain. Outlet flow during the summer is estimated at 113 lps. Spawning gravels are adequate in both inlet and outlet to maintain a sport fish population. A climax cutthroat population resides in this lake. Access is usually by small float plane, although an old trail system gives access from the head of Union Bay and Helm Bay. This trail has not been maintained in over 20 years.

Beaver Mountain Lake (unofficial name). This lake is situated on Prince of Wales Island near the head of Polk Inlet. The surface elevation is 350 m and the lake surface measures 24.7 ha. It lies 34 miles from Ketchikan bearing 246° True. The watershed measures 397 ha, of which 60% is alpine and above 450 m elevation and peaks at 864 m. The outlet has many falls impassable to migratory fish, flows a summer estimated 114 lps and drains into the head of Polk Inlet via Rock Creek. Lake bottom areas supporting Nuphar sp. and Vallisnaria sp. are quite restricted by the steep shorelines. The water is only faintly muskeg stained. The lake is barren of fish. Gravel areas for spawning are meager but adequate for a fish population. Access presently is by small float plane.

Cloud Lake (unofficial name). A long, narrow lake on the mainland and west of Steep Point on Portland Canal. The surface elevation is 648 m and the surface measures 96 ha. It lies 60 miles from Ketchikan, bearing 78° True. The watershed measures 1,034 ha, all of which is alpine. The outlet has many barrier falls impassable to migratory fish, flows a summer normal of 226 lps, and enters Portland Canal one mile northwest of Steep Point. Aquatic vegetation is sparse and only meager beds of Vallisnaria sp. were noted. The lake is glacier fed and the water is pale green with rock flour. Spawning gravels are extensive in the outlet and the inlet also has adequate gravels for use by a fish population. The lake is barren of fish. Access is presently by float plane.

TABLE 12 Initial Lake Surveys, Lower Southeast Alaska, 1970.

<u>Lake</u>	<u>Location</u>	<u>N. Latitude</u>	<u>W. Longitude</u>	<u>Quadrangle</u>
Bear	Mainland	55°40'53"	132°06'26"	Craig (C-1)
Beaver Mountain	Prince of Wales Island	55°17'45"	132°29'35"	Craig (B-2)
Cloud	Mainland	55°30'55"	130°11'22"	Ketchikan (B-1, C-1)
Carrie	Mainland	55°35'28"	130°36'06"	Ketchikan (C-2)
Halibut Bay (2)	Mainland	55°14'54"	130°08'25"	Ketchikan (B-1, B-2)
Grant Creek	Mainland	55°02'51"	131°15'46"	Bradfield Canal (A-4)
Blue	Mainland	56°20'32"	130°54'13"	Bradfield Canal (B-3)
Upper Lake Creek	Mainland	56°08'58"	130°55'55"	Bradfield Canal (A-3)
Heart	Mainland	55°51'10"	130°54'52"	Ketchikan (D-3)
Humpy Creek	Mainland	55°53'37"	130°57'12"	Ketchikan (D-5)
Gilbert	Mainland	55°47'02"	130°50'00"	Ketchikan (D-3)
Mouse	Mainland	54°55'50"	130°30'32"	Prince Rupert (D-2)
Wasta	Mainland	55°51'14"	131°55'50"	Ketchikan (D-6)
Sarkar	Prince of Wales Island	55°57'00"	133°12'44"	Craig (D-4)
Chuck	Hecata Island	54°46'29"	133°27'48"	Craig (D-5)
Monie	Prince of Wales Island	55°19'24"	132°10'28"	Craig (B-1)
Welcome	Dall Island	54°58'53"	133°07'12"	Dixon Entrance (D-4)
Devil	Dall Island	55°00'28"	133°06'44"	Craig (A-1)
Tombstone	Mainland	55°21'02"	130°12'40"	Ketchikan (B-1)
Kettle	Mainland	55°33'52"	130°36'25"	Ketchikan (C-2)
Shrew	Mainland	54°59'08"	130°27'48"	Prince Rupert (D-2)
Parrott	Dall Island	54°49'08"	132°52'12"	Dixon Entrance (D-3)

Carrie Lake (unofficial name). A lake on the mainland in the Rudyerd Bay area. The surface elevation is 518 m and the lake surface measures 52 ha. It lies 42.8 miles from Ketchikan bearing 68° True. The watershed measures 458 ha and is entirely alpine. The outlet is an unnamed creek flowing a summer estimated 85 lps into the head of Rudyerd Bay and has many falls impassable to migratory fish. Aquatic vegetation is very sparse in this lake due to the steep rocky shores. The water is quite clear. Spawning gravels in the snow melt inlets appear adequate for the limited fish population this lake could support. The lake is presently without fish. Access to date is entirely by small float plane.

Grant Lake (unofficial name). A lake on the mainland, tributary to Grant Creek and Burroughs Bay. The surface elevation is 338 m and the surface measures 54 ha. It lies 50 miles from Ketchikan, bearing 16° True. The watershed measures 603 ha, of which 20% is alpine and peaks at 1,546 m. The outlet flows a summer estimated 140 lps and has many falls impassable to migratory fish. Aquatic vegetation noted was Vallisneria sp. and Nuphar sp. in the limited shoal areas. The water has some muskeg stain. Spawning gravels appear adequate for a fish population in the inlet and outlets. The lake has no fish. Access is presently by float plane.

Blue Lake. This lake is located in the Unuk River drainage. The surface elevation is 222 m, and the lake surface measures 191 ha. It lies 72 miles from Ketchikan, bearing 22° True. The watershed measures 15,725 ha, is very rugged, and over 60% of it is alpine. Peak elevations reach over 2,000 m. The outlet is Blue River and the summer estimated flow is 2,831 lps. A barrier falls is at the point of entry to the Unuk River where the Blue River flows over lava. No aquatic vegetation was noted. The water is burdened with glacial flour and looks milky. Spawning gravels are present in clear tributaries. The lake has no fish. Access, presently, is by float plane. Stumps of trees flooded by lava can still be seen in the lake.

Upper Lake Creek Lake (unofficial name). This lake is on the mainland and is a tributary to the Unuk River via Lake Creek. The surface elevation is 76 m, and the surface measures 26 ha. It lies 63 miles from Ketchikan bearing 25° True. The watershed measures 1,127 ha and is alpine above 500 m, which is approximately 50% of the area. Peaks in the watershed peak above 1,200 m. The outlet is tributary to Lake Creek, which has an impassable barrier below its confluence. This barrier is the limit of fish migration. Aquatic vegetation is present in the limited shoal areas and Vallisneria sp. was noted. The water has a brown color. Spawning grounds appear adequate for fish populations. No fish were noted and further checks should be made. Access is presently by float plane.

Heart Lake. This lake is on the mainland in the Chickamin River drainage and a tributary of Humpy Creek. Its surface elevation is 441 m and the surface measure is 77 ha. Airline distance from the lake to Ketchikan is 46 miles bearing 38° True. The watershed measures 176 ha, is entirely alpine, and peaks at 1,035 m. The outlet flows a summer estimated 85 lps into Humpy Creek and has many falls impassable to migratory fish.

No aquatic vegetation was noted in the lake, which has very steep rocky shores. The water is clear. Spawning grounds appear adequate in the outlet and inlet for the limited fish population the lake appears capable of supporting. There are no fish in the lake. Access is almost entirely by small float plane.

Humpy Creek Lake (unofficial name). This lake is on the mainland in the Chickamin River drainage and is the source of Humpy Creek. Its surface elevation is 412 m. The surface area is 54 ha. The airline distance from Ketchikan is 48 miles, bearing 36° True. The watershed measures 1,258 ha, is almost entirely alpine, and peaks at 1,195 m. The outlet flows a summer estimated 280 lps, and is the main source of Humpy Creek. It has many falls impassable to migratory fish. Aquatic vegetation is scarce and consists of some Vallisneria sp. near the tributary creeks. The lake shores are rocky and steep, the water is quite clear, and adequate spawning grounds exist in tributary gravels for a fish population. No fish were noted and none have been reported. Access is entirely by float plane.

Gilbert Lake. There are two lakes in this group on the mainland in the Chickamin River drainage and are the source of Chacoa Creek. The surface elevations are 123 and 259 m, respectively, and the surfaces measure 52 and 62 ha for the lower and upper lakes. The airline distance from Ketchikan is 44 miles bearing 45° True. The watershed measures 2,467 ha into the lower lake and the upper lake is tributary to the lower. The drainage is very rugged, mostly alpine peaking to 1,355 m. There is some forest in the canyon bottoms. The outlet has many falls and cataracts impassable to fish. Summer estimated flow is 704 lps at the outlet of the lower lake. Aquatic vegetation is limited to rather sparse patches of Nuphar sp. and Vallisneria sp. The water has a faint muskeg stain. Spawning grounds are excellent in inlets near the lakes. The outlets are quite steep at the spill. No fish were noted, but this observation should be checked further. Access presently is only by float plane.

Mouse Lake (unofficial name). This lake is on the mainland near the southern tip of Alaska's Panhandle and drains into Fillmore Inlet. It lies at an elevation of 321 m and has a surface area of 67 ha. The airline distance from Ketchikan is 53 miles bearing 119° True. The watershed measures 375 ha, is alpine, and very rugged, peaking at 840 m. The ground cover is scrub timber near the lake and open above. The outlet has many falls impassable to migratory fish and has no known name. It is tributary to Fillmore Inlet and flows a summer estimated 280 lps at the spill. No aquatic vegetation was noted. The water has a light brown muskeg stain. Spawning grounds are adequate in the outlet and on lake shores near springs. No fish were noted and the lake is assumed barren. Access presently is only by float plane.

Wasta Lake. This is a relatively small lake toward the base of the Cleveland Peninsula near the head of Spacious Bay. The surface elevation is approximately 7 m and its surface measures 21 ha. It lies 47 miles from Ketchikan bearing 339° True. The watershed is largely muskeg, with about

20% of the area forested, measures 2,200 ha, and peaks at 690 m. The outlet flows about 1/2-mile to salt water without barriers to migratory fish, is known as Wasta Creek, and flows into the head of Spacious Bay. Estimated summer flow is 566 lps. The lake has extensive areas of Nuphar sp., Vallisnaria sp., Potamogeton sp., and Ceratophyllum sp. Spawning grounds are excellent in the outlet and inlet. The lake system hosts pink, chum, silver, and sockeye salmon; cutthroat, rainbow, Dolly Varden, and steelhead trout, as well as stickleback and cottids. Access is usually by boat 46 miles from Ketchikan, or by plane to the outlet creek mouth.

Sarkar Lake. This lake is on the northern portion of Prince of Wales Island near the south end of El Capitan Pass. It is quite low, being only about 4 m elevation. The surface measures 295 ha. It lies 74 miles from Ketchikan bearing 304° True. The watershed measures 12,620 ha, and is about 60% timbered with many muskeg areas and peaks at 560 m. The outlet estimated summer flow is 3,110 lps and flows into El Capitan Pass at Deweyville (abandoned cannery). Aquatic vegetation was common in the shallows consisting of Nuphar sp., Vallisnaria sp., and Potamogeton sp. The water is clear, but with considerable brown stain. Spawning grounds are excellent in the inlets. The lake hosts sockeye, silver, pink, and chum salmon; cutthroat, rainbow, Dolly Varden, and steelhead trout; cottids and stickleback. Access is almost entirely by float plane but is a short walk 0.3 miles from the head of Sarkar Cove.

Chuck Lake. A relatively small lake on Hecata Island, due east of the head of Warm Chuck Inlet. The surface elevation is approximately 9 m and the lake surface measures 70 ha. It lies 77 miles from Ketchikan bearing 292° True. The watershed measures 472 ha, is mostly timbered, with muskeg areas and peaks at 57 m elevation. The outlet drains into Warm Chuck Inlet and estimated summer flow is 140 lps. There are no barriers to migratory fish except low flows during extended dry periods. There are extensive areas of Nuphar sp. and Potamogeton sp., with Vallisnaria sp. in the shallows. Spawning grounds are adequate in inlets, areas of springs along the shore, and the outlet. The lake system supports sockeye, silver, pink, and chum salmon; cutthroat, Dolly Varden, rainbow, and steelhead trout; cottids and stickleback. Access is by plane, or by 0.6-mile hike from the beach at the creek mouth.

Monie Lake. One of the many lakes on Prince of Wales Island, it is located between Cholmondeley Sound and Skowl Arm, discharging into salt water 1.2 miles north of Clover Bay. Its surface elevation is approximately 18 m, and its surface measures 26 ha. It lies 21 miles from Ketchikan bearing 265° True. The watershed measures 501 ha, is mostly forested, rugged, and alpine above 360 m, peaking at 560 m. The outlet flows a summer estimated 113 lps, and has no barriers to migratory fish, except low flows during extended dry periods. There is considerable aquatic vegetation near the head of the lake and beds of Nuphar sp., Potamogeton sp., and Vallisnaria sp. The water has brown stain, but is otherwise clear. The lake hosts sockeye, silver, and pink salmon; cutthroat, rainbow, and Dolly

Varden trout; cottids and stickleback. Spawning grounds are excellent in the inlet. Access is by float plane, or a 0.6-mile hike from the beach at the creek mouth.

Lake Welcome. This lake lies on Dall Island above Welcome Cove and is 62 miles from Ketchikan bearing 247° True. Its surface elevation is approximately 12 m and the lake surface measures 124 ha. The watershed is 654 ha, mostly steep and forested, with some muskeg and peaks at 473 m. The outlet flows a summer estimated 140 lps into Welcome Cove. There are no barriers to migratory fish, except possibly during low flows and at beaver dams. Aquatic vegetation is sparse, but some Nuphar sp. and Vallisnaria sp. was noted. The water carries some brown stain. Spawning grounds are located in the inlet and along the shore in spring areas. The lake hosts sockeye, silver, pink, and chum salmon; cutthroat, Dolly Varden, and steelhead trout; cottids and stickleback. Access is presently by float plane from Ketchikan and rarely by hiking from salt water the 0.6 miles to the lake.

Devil Lake. A scenic lake on Dall Island, is located between Coco Harbor and Camp Cove. Its surface elevation is approximately 8 m, and measures 225 ha. The lake is 62 miles from Ketchikan bearing 249° True. The watershed area is 2,782 ha, mostly steep and forested, with some alpine area above 580 m and peaking at 762 m. The outlet drains into a rock slide at Devil Island, has a summer estimated flow of 198 lps, and is passable for migratory fish. Aquatic vegetation is found chiefly near the inlets and Nuphar sp., Potamogeton sp., and Vallisnaria sp. were noted. The water is clear with some brown stain. Spawning grounds are excellent in the main inlet at the head of the lake. The lake hosts sockeye, silver, pink, and chum salmon; cutthroat, Dolly Varden, and steelhead trout; cottids and stickleback. Access presently is by float plane from Ketchikan.

Tombstone Lake (unofficial name). A small lake at the head of Tombstone River, seven miles southwest of Tombstone Bay on Portland Canal. Its surface elevation is 114 m and the lake surface measures 28 ha. Airline distance from Ketchikan is 53 miles, bearing 86° True. The watershed measures 14,573 ha, is mostly very rugged, timbered below 610 m, and alpine above, peaking at 1,485 m. The outlet is not known to have barriers to migratory fish, except possibly at very low flow periods. The stream flows 7.4 miles to tidewater. Aquatic vegetation virtually covered the lake with Nuphar sp., Potamogeton sp., and Vallisnaria sp. The water is clear with little muskeg stain. Spawning grounds are good in both the outlet and inlet. The system hosts king, silver, pink, and chum salmon; Dolly Varden, steelhead, and occasionally cutthroat trout; stickleback and cottids. Access is presently by float plane and seldom visited by anglers. The lake is hardly more than a swamp.

Shrew Lake (unofficial name). This lake lies near the head of Fillmore Inlet northwest of the old Hidden Inlet cannery site. Its surface elevation is 18 m and the lake surface measures 49 ha. The airline distance to Ketchikan is 53 miles, bearing 118° True. The watershed measures 1,556 ha, and is forested up to 500 m elevation. Above that altitude is alpine and

the drainage peaks out at 1,156 m, the whole area being very rugged and scenic. The outlet flows a summer estimated 227 lps and has no barriers to migratory fish in the 1.8 miles to tide water at the head of Fillmore Inlet. Aquatic vegetation is rather sparse, but Nuphar sp., Vallisnaria sp., and Chara sp. were noted. The water is clear with some brown stain. Spawning grounds are excellent in the inlet, outlet, and along areas of springs near shore. The lake hosts sockeye, silver, pink, and chum salmon; cutthroat, Dolly Varden, rainbow, and steelhead trout; cottids and stickleback. Access is presently almost entirely by float plane, although the hike from the beach is not difficult.

Parrott Lake. A lake on Dall Island tributary to Essowah Lakes and toward the south end of the island. Its surface elevation is 129 m and the lake surface measures 407 ha. The airline distance from Ketchikan is 61 miles, bearing 232° True. The watershed measures 732 ha, is mostly scrub timber, and peaks at 470 m. Aquatic plants noted were Nuphar sp., Potamogeton sp., and soft-stem bull rush. The outlet flows a summer estimated 141 lps over many barriers impassable to migratory fish into Essowah Lake. The water color is clear, with some brown stain. Spawning grounds are located in the outlet and on spring shores. The lake hosts Dolly Varden reaching 22.4 cm in length. Access is entirely by float plane.

Creel Census:

An informal creel census was again conducted on a non-statistical basis. However, the limited number of creel checks, as noted in Table 13, was related to the consistently foul weather which prevented boat or plane access to sport fishing locations during normal high use periods.

Although meager, the checks show a steelhead fishing trend of mid-May, the cutthroat summer fishery, and the fall steelhead fishing.

TABLE 13 Creel Census Summary, Lower Southeast Alaska, 1970.

Date	Location	No. Anglers	Fish Caught*					
			CT	SH	RT	DV	SS	PS
1/ 1	Naha River	6		2				
1/ 2	Naha River	6		2				
1/ 3	Naha River	6		0				
2/13	Karta River	2		6	1			
4/ 8	Klawak Creek	3		9				
5/23	Wolverine Creek	5		1	1	2		
5/26	Port Stewart	2	4					
6/27	Winstanley Lake	2	26		4			
7/ 4	Nooya Creek	3				4		1
7/11	Port Stewart	2	8					
7/12	Port Stewart	2	7					
7/25	Winstanley Lake	2	22		8			

Prepared by:

Approved by:

Michael J. McHugh
Fishery Biologist

s/Howard E. Metsker
D-J Coordinator

Darwin E. Jones
Fishery Biologist

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

Robert T. Baade
Fishery Biologist

Date: May 1, 1971