

STATE OF ALASKA

William A. Egan, Governor



Annual Progress Reports for

INVENTORY AND CATALOGING

*INVESTIGATIONS OF PUBLIC FISHING ACCESS
AND AQUATIC HABITAT REQUIREMENTS*

*DISSEMINATION OF INFORMATION
COLLECTED ON DOLLY VARDEN*

by

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RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-5 Name: Sport Fish Investigations of
Alaska

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

Job No.: G-I-H Job Title: Inventory and Cataloging of Sport
Fish Waters of the Lower Susitna
River and Central Cook Inlet
Drainages.

Period Covered: July 1, 1972 - June 30, 1973

ABSTRACT

Thirteen lakes in the Western Susitna area and six lakes in the Anchorage vicinity were test-netted for data on fish populations. Six streams in the Western Susitna area were surveyed and fish population data collected.

General characteristics of water chemistry in ten Western Susitna lakes is reported. Volumetric survey of Otter Lake shows the surface area to be 98.9 acres, and volume 754.9 acre-feet.

Rainbow trout, Salmo gairdneri, were stocked in 14 Anchorage lakes, and arctic grayling, Thymallus arcticus, were planted in one lake.

Creel census results show returns of catchable size rainbow trout to anglers on three local lakes ranged between 7.1 - 39.6% of the plant.

Eulachon, Thaleichthys pacificus, spawning in Twenty-mile River were three years of age and had a 2.8:1 male-to-female ratio. The fishery for eulachon was poor with the harvest estimated at 15,870 smelt.

RECOMMENDATIONS

1. Exploratory investigations of lakes and streams in the area west of the Susitna River be continued.
2. Evaluation of fishery resources in stream waters of the Greater Anchorage Area Borough be conducted on a continuing basis. Watersheds of special importance are Campbell Creek, Ship Creek, Chester Creek, and Eagle River.
3. Investigation of spawning runs of eulachon, their biological characteristics and the sport fishery be continued.
4. Electrofishing in semi-glacial and glacial streams of the Western Susitna area be conducted with a riverboat-mounted A-C shocking unit to evaluate the feasibility of this technique in determining the presence, distribution, and abundance of salmon stocks reportedly spawning in these waters.
5. Investigation of waters between Tyonek on Cook Inlet and headwaters of the Talachulitna River be intensified due to proposed timber sales, coal exploration and gas field development in the area which will require environmental impact analysis from the Department of Fish and Game.

OBJECTIVES

1. To survey existing and potential recreational fishing waters, establish and record their basic biological, physical, and chemical characteristics.
2. To assist in determining the status of public access on waters of the area and recommend selection of specific public fishing access sites.
3. To evaluate the impact of multiple water use and urban development projects of fisheries, aquatic life, and water quality of lakes and streams in the area.

4. To determine stocking measures, formulate management practices, and direct the course of future studies on area waters.
5. To evaluate, during the job year 1972-73, various means of obtaining sport fish harvest and angler participation rates, and recommend a creel census format applicable to conditions in the area.

TECHNIQUES USED

Fish population sampling throughout waters of the area was conducted variously by 125 x 6 foot variable mesh gill nets, Smith-Root Type V electrofisher, dip net, and hook and line methods. Measurements on fish collected included total lengths to the nearest millimeters (mm), and weight to the nearest gram (g). Scale samples from fish were pressed on cellulose acetate sheets, and projected by scale reader to determine ages. Notes on incidence of parasites and stomach contents were recorded for file records.

Water samples collected from lakes by a Kemmerer water sampler were analyzed for the water quality constituents of pH, total alkalinity, and total hardness. Depths were taken by handline and temperatures were measured with a pocket thermometer.

Surface area survey of Otter Lake was conducted during winter over the ice. Grids, 200 feet square, were laid out on the ice surface with alidade, plane table, and surveyor's chain to establish area and shore outline. Depths for completion of a volumetric map were determined by Ross P-100 fathometer on transects of the lake made by boat the following summer.

On selected area lakes and streams, creel census for data on catch rates of sport fish was conducted by angler interview. Fishing pressure was determined from instantaneous counts during the angling day on randomly selected weekend and weekdays during the census periods.

FINDINGS

Survey of Fish Populations and Environmental Characteristics of Area Waters

Experimental and Exploratory Test Fishing:

A total of 13 lakes in the Western Susitna area were test netted for species and size composition of fish populations.

Of the lakes test netted in the Western Susitna area, two had single species populations of game fish. These were Un-named #6931 which contained rainbow trout, Salmo gairdneri and Hiline Lake where Dolly Varden char, Salvelinus malma, was the only species taken in gill nets (Table 1).

Luci Lake contained only threespine stickleback, Gasterosteus aculeatus, which were observed in the shallows. As discussed later in this report, this lake apparently is quite low in dissolved nutrients.

Shell Lake (Table 1) had the most diverse fish community with seven species represented. Lake trout, Salvelinus namaycush, are the dominant game species. Test trolling with hook and line at about 30 feet of depth produced 13 lake trout for a catch rate of about 1.6 fish per hour. The potential of the lake trout in Shell Lake to support a sport fishery is high, and will be promoted as a good fly-in trip for this species.

Age of lake trout captured by gill net in Shell Lake ranged from four to six years of age. The lack of younger age classes in the catch is presumed to be because small mesh panels in the nets were not fished offshore in the deeper waters of the lake.

Threespine stickleback were confirmed in all Western Susitna lakes reported in Table 1, except Hiline Lake where an accompanying ground survey was not made.

Six lakes in the immediate Anchorage vicinity were test netted during the year. Names and locations of these lakes, data on their fish populations, and catch rates are displayed in Table 2.

The presence of Dolly Varden char, and landlocked silver salmon, Oncorhynchus kisutch, in the C Street gravel pit (Table 2), is the result of natural introduction of fish from Campbell Creek about 75 yards away. A man-made depression caused by sewer line construction produced an intermittent high water connection whereby fish may enter the gravel pit from the stream. These fish supported a small summer fishery.

Sand Lake was stocked with sport fish until 1958 by the Alaska Department of Fisheries, but due to the lack of public access has not been restocked since that time. The presence of landlocked king salmon, Oncorhynchus tshawytscha, shown in Table 2, can only be assumed to be the result of illicit private introduction since there is no connection with any king salmon spawning streams.

The six streams surveyed for sport fish populations are presented in Table 3 with locations of test fishing, species captured, lengths, and success rate shown.

Table 1 Test Netting Results - Western Susitna Area Lakes, 1972.

Lake and Location	Species *	Number of Fish	Length (mm)		Total Net-Hours	Fish/Net-Hour
			Range	Mean		
Chuitbuna T12N, R11W, S24	DV	2	134-205	170	104	0.02
	RT	52	112-400	219	104	0.50
	SK	33	170-506	317	104	0.32
	SS	8	109-138	126	104	0.08
Hewitt T22N, R12W, S13	RS	3	650-705	685	47	0.06
	RT	3	275-475	364	47	0.06
	SK	8	366-413	383	47	0.17
	SS	2	115-120	118	47	0.04
	WF	29	192-525	356	47	0.62
Hiline T19N, R12W, S14	DV	13	222-474	393	51	0.25
Jake T26N, R8W, S14	RT	1	- -	223	21.5	0.05
	SS	1	- -	226	21.5	0.05
Luci T22N, R12W, S23	NONE	0	- -	-	56	0.00
Movie T18N, R12W, S21	SK	23	- -	-	44	0.52
	SS	8	241-106	-	44	0.18
	WF	6	413-285	-	44	0.14
Neil T21N, R6W, S4	RT	1	- -	360	44	0.02
	SK	10	191-494	404	44	0.23
	SS	6	116-128	122	44	0.14
	WF	5	385-570	501	44	0.11
Onestone T21N, R12W, S7	RT	4	170-327	239	44	0.09
	SK	31	140-416	296	44	0.70
	SS	16	108-196	121	44	0.36
	WF	4	326-380	359	44	0.09
Shell T21N, R12W, S5	GR	1	- -	175	145.5	0.01
	LT	18	444-670	555	145.5	0.12
	RS	1	- -	110	145.5	0.01
	RT	8	167-283	245	145.5	0.05
	SK	77	110-499	256	145.5	0.53
	SS	10	105-317	135	145.5	0.07
	WF	95	207-386	280	145.5	0.65

Table 1 (Cont.) Test Netting Results - Western Susitna Area Lakes, 1972.

Lake and Location	Species *	Number of Fish	Length (mm) Range	Mean	Total Net Hours	Fish/Net-Hour
Trinity T19N, R12W, S33	GR	1	- -	189	79	0.01
	SK	71	185-463	363	79	0.90
	SS	27	109-133	121	79	0.34
	WF	14	199-408	259	79	0.18
Tukallah T12N, R10W, S7	KS	1	- -	555	94	0.01
	RT	30	180-411	297	94	0.32
	SK	89	171-396	279	94	0.94
	WF	5	258-430	348	94	0.05
Un-named #6931 T22N, R12W, S3	RT	147	90-435	182	142	1.04
Whiskey T22N, R12W, S13	RT	17	190-510	343	49	0.35
	SK	33	180-395	354	49	0.67
	SS	46	108-242	128	49	0.94
	WF	43	148-415	312	49	0.88

*KS - King salmon
 GR - Grayling
 DV - Dolly Varden
 RT - Rainbow trout
 LT - Lake trout
 SK - Sucker
 SS - Silver salmon
 RS - Red salmon
 WF - Whitefish

Table 2. Test Netting Results - Anchorage Area Lakes, 1972.

Lake Name	Species *	Number of Fish	Length (mm)		Total Net-Hours	Fish/ Net-Hour
			Range	Mean		
C Street Gravel Pit	DV	6	247-290	274	17.5	0.34
	SS	45	169-299	200	17.5	2.57
Clunie	KS	1	- -	447	57	0.02
	RT	10	241-348	295	57	0.17
DeLong	RT	16	147-286	253	58.5	0.27
	SS	1	- -	124	58.5	0.02
Gwen	RT	21	321-411	368	24	0.88
Otter	DV	1	- -	180	72	0.01
	RT	1	- -	409	72	0.01
Sand	KS	3	325-385	357	38	0.08

*DV - Dolly Varden, SS - Silver salmon, KS - King salmon, RT - Rainbow trout

Table 3 Streams of the Western Susitna area surveyed in 1972 for fish population characteristics.

Stream and Location	Date	Species *	Number of Fish	Length (mm)	
				Range	Mean
Chuit River T12N, R11W, S27	6/29	KS	8	630-970	709
		RT	1	- -	350
Hewitt Creek T26N, R11W, S25	7/18	GR	3	117-240	176
		RT	21	98-350	207
Lake Creek T26N, R11W, S25	8/3	GR	3	363-406	358
		RT	2	267-413	340
Peters Creek T28N, R8W, S7	8/24	DV	2	192-193	192
		GR	4	258-362	313
Sunflower Creek T27N, R12W, S15	8/3	GR	26	272-408	308
		RT	1	- -	350
Shell Creek T21N, R12W, S9	7/13	RT	6	165-370	264

*DV-Dolly Varden
 GR-Arctic grayling
 KS-King salmon
 RT-Rainbow trout

Chuit River has been closed to fishing for king salmon since 1964, but a survey of the area and test angling was performed to collect data on the current status of the king salmon run to this stream. Seven of eight king salmon taken by hook and line on June 29, 1972 (Table 1) were males of age 1.2, while a single 970 mm female was of age 1.3.

An aerial survey of Chuit River on July 24, 1972, showed 417 king salmon on the spawning grounds. The major spawning area, determined from ground survey on July 27, was within a two-mile reach of stream below the confluence of Lone Creek with Chuit River.

The physical nature of Chuit River tends to concentrate king salmon spawners and those migrating to spawning grounds within a few larger pools. This factor combined with relatively easy access to the stream from nearby roadways would result in king salmon of this system being highly vulnerable to sport angling.

Sunflower Creek, a tributary of Lake Creek, contains an excellent population of Arctic grayling, Thymallus arcticus (Table 3). Age of grayling captured by hook and line from this stream ranged between four and six years of age. Due to a nearby airstrip and lodge, the sport fishing potential of this stream may be easily developed once adequate trail marking has been made.

Lake Creek contains the largest sized rainbow trout collected by hook and line sampling on the five streams containing this species (Table 3). The locations fished are accessible only by float trip. Potential for a recreational fishery based on a float trip of this stream is high, provided appropriate access and trails discussed later in this report are developed.

The area of Peters Creek test fished at the location described in Table 3 was once the site of dredging activities for extraction of gold. Arctic grayling and Dolly Varden char were determined to be present in small numbers.

Two of the streams checked were outlet streams of lakes. Shell Creek, the outlet of Shell Lake, and Hewitt Creek, the outlet of Whiskey Lake, are inhabited by numerous small rainbow trout. Hewitt Creek also contained small numbers of Arctic grayling. Populations of rainbow trout in these two small outlet streams could easily be decimated if fishing pressure increases to any degree above the current low utilization.

Population studies on glacial and semi-glacial streams were not conducted this year due to the late arrival and unavailability of electro-fishing equipment.

Water Chemistry and Physical Surveys:

Characteristics of pH, total alkalinity, total hardness, and color of surface waters in 10 lakes surveyed within the Western Susitna area are described in Table 4. Depth of the thermocline is also reported for Luci, Shell, Hewitt, and Whiskey lakes.

Luci Lake had the lowest total alkalinity of the 10 lakes checked with 17.0 mg/l as CaCO₃ recorded (Table 4). It was also the only lake test netted this year in which no fish other than threespine stickleback were recorded. A lack of dissolved minerals and primary nutrients suggested by the low alkalinity may be a factor contributing to the absence of fish in this lake.

Highest values of total alkalinity, 68.0 mg/l as CaCO₃, and total hardness, 51 mg/l, were recorded in Hewitt and Hiline lakes (Table 4). On Hewitt Lake, the higher alkalinity may be the result of a major influx of water from the Yentna River through a temporary inlet. Waters in this lake are ordinarily clear, whereas they were a glacial gray this year (Table 4).

A surface area survey of Otter Lake was made on March 21, 1972, as part of a volume determination. Depths added to the surface survey map during the summer of 1972 was taken by portable fathometer on transects of the lake.

The surface area of Otter Lake was found to be 98.9 acres with a total water volume of 754.9 acre-feet. Another 56.2 acre-feet of water lies within adjacent low areas and swamp, bringing the total volume of water associated with the lake to 811.1 acre-feet.

The detailed morphometric map of Otter Lake is on file in the Anchorage office of Sport Fish Division.

Stocking and Management of Anchorage Area Lakes and Streams

Sport Fish Stocking:

A total of 15 lakes and one stream in the immediate Anchorage, Ft. Richardson and Elmendorf A.F.B. vicinity were stocked with game fish in 1972. Dates of stocking, species, number, and size of fish planted in each of these waters are shown in Table 5.

In recent years, stocking programs in this area have relied heavily on plants of catchable size rainbow trout. However, many lakes shown in Table 5 have the potential to produce fisheries from fry and fingerling-size plants of rainbow trout. Lakes which should be stocked with smaller rainbow trout

Table 4 General Limnological Characteristics - Western Susitna Area Lakes, 1972.

<u>Lake and Location</u>	<u>Date</u>	<u>pH</u>	<u>Total Alkalinity (mg/l CaCO₃)</u>	<u>Total Hardness (mg/l)</u>	<u>Thermocline Depth (feet)</u>	<u>Water Color</u>
Chuitbunn T12N, R11W, S24	6/29/72	7.0	34	-	-	brown
Hewitt T22N, R12W, S13	7/19/72	7.5	68	51	12	gray
Hiline T19N, R12W, S14	7/21/72	8.0	68	51	-	clear blue
Luci T22N, R12W, S23	7/19/72	6.5	17	17	18	clear green
Movie T18N, R12W, S21	7/21/72	7.0	34	17	-	brown
Onestone T21N, R12W, S7	7/11/72	7.0	34	17	-	light brown
Sheriff T21N, R12W, S5	7/12/72	7.5	34	17	12	light brown
Trinity T18N, R12W, S33	7/20/72	7.5	34	17	-	brown
Tukolah T11N, R10W, S7	6/30/72	6.5	34	-	-	brown
Whiskey T22N, R12W, S15	7/19/72	8.5	51	34	9	brown

Table 5. Fish Stocking in Anchorage Area Lakes and Streams, 1972.

<u>Lake/Stream Name</u>	<u>Species Stocked*</u>	<u>Number Stocked</u>	<u>Size (fish/lb.)</u>
1. Campbell Point Lake	RT	5,042	4.2
2. Chester Creek	RT	506	23.0
3. Clunie Lake	RT	5,184	4.0
	RT	5,058	4.1
4. Connors Lake	GR	20,000	36,600
5. DeLong Lake	RT	5,089	4.9
6. Elmendorf Cooling Pond	RT	523	2.7
7. Fish Lake	RT	1,352	6.7
8. Green Lake	RT	1,869	2.8
9. Goose Lake	RT	1,083	5.1
10. Gwen Lake	RT	1,227	3.6
11. Hilburg Lake	RT	2,653	16.9
12. Jewell Lake	RT	10,034	4.9
13. Lower Fire Lake	RT	39,900	145
14. Mirror Lake	RT	4,077	5.1
15. Otter Lake	RT	7,525	5.3
	RT	2,661	4.9
	RT	5,250	4.2
	RT	1,559	4.7
16. Thompson Lake	RT	2,551	4.7
	RT	2,512	3.9
	RT	2,274	3.6

* RT-Rainbow trout
GR-Grayling

as they are rehabilitated to remove threespine stickleback includes Clunie, DeLong, Lower Fire, and Mirror lakes.

Creel Census Program:

A creel census program to evaluate current fishing pressure levels (angler-hours) and an estimate of total harvest on Jewell, Campbell Point, and DeLong lakes in Anchorage was conducted in 1972. Information on the sport fishery characteristics and success of the stocking program on the lakes had never been collected although each one has been stocked with rainbow trout for many years. Because limited manpower was available, a creel census method permitting coverage of all three lakes on a single day was adopted.

The lakes checked are small, and anglers may be observed on all points of the shorelines from a single station on each lake. Instantaneous counts of anglers at selected hours during the census day, from 7:00 a.m. to 10:00 p.m., permitted collection of fishing pressure information on all three lakes during the creel census day. Spot checks and interviews of part of the anglers observed during each creel census period were made to obtain data necessary to calculate a success rate of fish per hour.

The creel census conducted on Jewell, DeLong, and Campbell Point lakes indicated returns of catchable trout to the creel was quite high. Estimated percent return of trout from 1972 plants to the angler was 71.4%, 65.6%, and 39.6% in Jewell, Campbell Point, and DeLong lakes, respectively. Dates of the census, number of days creel checked, total angler-hours, catch rate (mean fish per hour) and total estimated harvest are shown in Table 6.

Basically, the same procedure applied to creel census on the Anchorage lakes was applied to the eulachon dip net fishery on Twentymile River near Portage. Dip netting for smelt is essentially restricted to a 300 yard section of the river near the Seward Highway bridge, permitting easy observation of fishermen for instantaneous counts. Data on mean total angler-hours, catch rate, and total estimated harvest of smelt by this fishery are shown in Table 6, and discussed later in this report.

Lake Rehabilitation:

Jewell Lake was treated with rotenone (2.5% Pro-noxfish) at a concentration of about 1.5 ppm on October 5, 1972, to eradicate populations of threespine stickleback and Alaska blackfish, Dallia pectoralis. Although presence of stickleback was compatible with plants of catchable size rainbow being made in the lake, rehabilitation was considered desirable to remove the blackfish population as a possible focal point for spread to other waters in the vicinity.

Table 6 Fishing effort, mean success rate, and harvest of sport fish on Campbell Point Lake, DeLong Lake, Jewell Lake, and Twentymile River during 1972.

<u>Location</u>	<u>Species</u> *	<u>Census</u> <u>Period</u>	<u>No. Days</u> <u>in</u> <u>Census</u> <u>Period</u>	<u>No.</u> <u>Days</u> <u>Censused</u>	<u>Total</u> <u>Angler</u> <u>Hours</u>	<u>Mean</u> <u>Fish</u> <u>Per</u> <u>Hour</u>	<u>Harvest</u>
Campbell Point Lake	RT	6/7 to 9/3	87	23	6,363	0.52	3,308
DeLong Lake	RT	6/7 to 9/3	87	23	4,788	0.42	2,011
Jewell Lake	RT	6/2 to 9/3	93	26	17,925	0.40	7,170
Twentymile River	E	5/25 to 6/4	11	7	1,759	9.02	15,870

*RT - Rainbow trout

E - Eulachon

Chester Creek Investigation

An investigation to evaluate Chester Creek as fisheries habitat; its naturally existing fish populations, and a population of stocked rainbow trout was developed during 1972. Four 500-foot study sections were established at various points along Chester Creek, based on their degree of urban and community development in bankside areas, and relation to rainbow trout release sites.

Study Section A downstream of C Street in Anchorage, is an area where housing development abuts the south shore of Chester Creek. The north bank adjoins a city park and an area previously cleared by now substantially re-vegetated by grass, alders, and willow. The stream channel has been channeled and realigned at some time in the past, and no pools are found within Section A. The stream bed consists mostly of gravel.

Section B is located downstream of Lake Otis Parkway and about one and one-half miles upstream of Section A. Releases of about 250 rainbow trout were made approximately 300 yards upstream of Section B in each of the years 1971 and 1972. Basically, this section of stream has not been subjected to bankside development of any kind other than foot trails. Streamside vegetation consists primarily of alder, dwarfed black spruce, and willow. About 100 feet of Section B is lightly shaded, the remainder is open. Pool and riffle development are good in this section of stream and relatively clean gravels form the streambed.

Section C near Providence Hospital, is about one and one-quarter miles upstream of Section B. This section was the release site of rainbow trout in 1971 and again in 1972. Except for about 75 feet of stream affected by landscaping of a hospital lawn, the section is heavily shaded by alders and has numerous pools and logs in the stream. However, Section C has a streambed consisting of primarily fine sediments generally unsuited for salmonid spawning.

Section D is a short distance downstream from Boniface Parkway on the South Fork of Chester Creek and approximately one and three-quarter miles upstream of Section C. Section D has been re-aligned and channelized to straighten property lines and create land for housing development. Streamside vegetation is sparse and there is no shading. Although there are a few pools, bottom material is primarily sand and silt combined with debris from nearby housing development.

The afore-mentioned study sections were electrofished on September 7, 1972, to make a short term mark-recapture fish population estimate. However, due to the advent of high, turbid water after the initial electro-fishing effort, this portion of the investigation was not completed. Species, numbers, and size composition of fish taken during the single sampling period in the study sections are shown in Table 7.

Table 7 Species and size composition of fish captured by electrofishing in Chester Creek on September 7, 1972.

Study Section and Location	Species *	Number	Age	Length		Weight	
				Range	Mean	Range	Mean
A NW1/4, T13N, R3W, S19	0	-	-	-	-	-	-
B SE1/4, T13N, R3W, S20	DV	2	-	165-186	175.5	42-68	55
	RT	1	0+	-	121	-	17
	SS	9	-	77-154	125	3-38	20
C SE1/4, T13N, R3W, S28	DV	1	-	-	133	-	18
	RT	33	0+	118-145	132	-	23
	RT	1	2+	-	290	-	200
	SS	9	-	69-80	74	2-5	3
D NE1/4, T13N, R3W, S27	DV	1	-	-	174	-	44
	RT	1	0+	-	138	-	24
	SS	3	-	67-73	69	-	-

*DV - Dolly Varden
 RT - Rainbow trout
 SS - Silver salmon

No game fish were taken in Section A. Silver salmon were the most numerous wild fish in the other sections with Section B and C each having nine salmon recorded: three silver salmon were captured in Sections B, C, and D (Table 8).

Stocked rainbow trout were the most common species in the electro-fishing collection, and a total of 36 rainbow trout were captured in all sections. Thirty-four of these rainbow trout were taken at their original release site in Section C, and one each from Section B and D (Table 8).

Of the 34 stocked rainbow trout recovered from Section C, 33 were fish from the 1972 plant in that section. These fish weighed about 23 fish per pound at the time of release on August 9, 1972 (Table 4), and averaged about 19 fish per pound on September 7; a gain of about 17% in weight during a 30-day period.

Eulachon Investigations

What will become an annual investigation and monitoring of eulachon, Thaleichthys pacificus, populations and sport fisheries in streams tributary to Upper Turnagain Arm was initiated in 1972. Prior collections of smelt population data were made on Twentymile River in 1960 and 1963, and Placer River in 1962. No data on the smelt populations in Twentymile and Placer rivers after the earthquake of March 27, 1964 was available.

At Portage, which is in close proximity to the mouths of Twentymile and Placer Rivers on Turnagain Arm, the surrounding land area subsided about five feet during the 1964 earthquake (Alaska Department of Fish and Game, 1965). The effects of the earthquake are apparent today due to the sizeable tracts of dead trees killed by water table changes. The report by the Alaska Department of Fish and Game also indicated about 1-1/2 miles of Twentymile River was lost to spawning by salmon, trout, and smelt, but no comment on loss of spawning area in Placer River was made.

Although specific data is unavailable, it has been generally regarded that populations of smelt in Twentymile and Placer rivers have suffered drastic reduction in numbers during the post earthquake period. Placer River, which was a highly productive sport fishery in pre-earthquake years, had virtually no angler use in 1972 and the few fishermen checked had no smelt. However, it cannot be shown that the reduction in spawning population numbers within these streams is related to environmental changes caused by the 1964 earthquake. Until more data from successive years' sampling is available, whether the eulachon populations in streams of the Portage area are stable under present conditions or continuing to decline is a matter of conjecture.

Preliminary data indicates that water temperature checks may provide estimates of smelt run timing in Twentymile River from year to year. Twentymile River was ice free by May 14, 1972 and water temperatures were between 34° and 35° F. First report of eulachon in the river came on May 20 when water temperatures were between 37° and 38° F. The peaks of the smelt dip net fishery and the spawning migration occurred on May 28 when water temperatures reached a high of 41° F. Water temperatures then declined to 38° F. by June 4, 1972. It may be noted that Smith and Saalfeld (1955) report smelt spawning in the Columbia River and its tributaries occurs at temperatures ranging between 39° and 47° F.

Mean length (millimeters), mean weight (grams), and sex ratios (number of males per number of females) of eulachon in the 1960, 1963, and 1972 runs to Twentymile River and the 1962 run to Placer River are shown in Table 7.

Smelt in the 1972 spawning population in Twentymile River were 30.5 and 11.1% greater in mean weight than the 1960 and 1963 fish respectively (Table 8). If the larger size smelt in Twentymile River during 1972 is significant or merely within the normal range of size variation of the spawning runs must be determined from data collected in succeeding years. Females in the spawning population during all years were smaller than the males.

Sex ratios of eulachon in Twentymile River show an apparent decline from 118:1 and 37:1 in 1960 and 1963 respectively, to 2.8:1 in 1972 (Table 8). Smelt in Placer River during 1962 had a sex ratio of 4:1 males per female (Table 8). If these observed sex ratios are within normal range for spawning eulachon populations in the area remains to be determined. Smith and Saalfeld (1955) reported that sex ratios of eulachon spawning in the Columbia River and its tributaries ranged from 12.3 to 2.8:1 males per female. The substantial difference in sex ratio of smelt in Twentymile River between the years 1960, 1963, and 1972 may be due to bias resulting from inadequate sample size, time and locations of population sampling, or other factors of this nature.

The dip net fishery for eulachon during 1972 could only be categorized as poor. Although approximately 1,759 man-hours were expended on the fishery from May 25 to June 4, 1972, only about 15,870 smelt were taken for a mean success rate of 9.02 fish per hour (Table 6).

A limited number of scales from the eulachon in the 1963 run to Twentymile River were available for aging. Spawners in 1963 were three years of age, as were smelt in the 1972 run. However, Smith and Saalfeld (1955) have noted that because of absorption of the outer scale margin during spawning migrations, otoliths are generally more satisfactory for aging eulachon. Otoliths will therefore be used for aging smelt collected in subsequent years of this study.

Table 78 Population characteristics of Eulachon spawning in Twentymile River during the years, 1960, 1962, and 1972; and in Placer River during 1963.

<u>Stream</u>	<u>Date</u>	<u>Sample Size</u>	<u>Weight (g) ^{1/}</u>		<u>Length (mm)</u>		<u>Sex ratio (male/female)</u>
			<u>Range</u>	<u>Mean</u>	<u>Range</u>	<u>Mean</u>	
Twentymile River	5/18/60	236	27-73	50	165-218	196	118:1
	5/30/63	38	45-82	64	183-231	208	37:1
	5/25 thru 6/4/72	265	35-100	72	200-250	227	2.8:1
Placer River	5/23/72	428	45-100	68	196-239	213	4:1

^{1/}Lengths in 1972 were total lengths, other years are fork lengths.

Multiple Water-Use and Urban Development Projects

During the past year, no major water-use projects affecting fish or fisheries habitat within this area have developed.

Access Investigations

Status of public access of each of the lakes and streams in the Western Susitna area presented in Table 1 and 3 was determined. Recommendations concerning access on these bodies of water, and siting of trail right-of-ways were made to the Habitat Section of the Department of Fish and Game, where the need was considered to be immediate or of benefit to fisheries development.

Access requests pertaining to Chuitbuna and Tukallah lakes were submitted on the basis of fishery potential offered by their rainbow trout populations, and road development in the area. Anglers flying to Chuitbuna Lake are able to use a nearby roadway as an easy route to Chuit River, about a 25-minute walk. This same roadway crosses Three-Mile Creek, the outlet of Tukallah Lake. A streambank right-of-way request along this stream to Tukallah Lake was made so a route to the lake from the road, as well as access for stream anglers, would be available.

Streambank right-of-ways were requested for Sunflower and Lake Creek because both streams have float trip potential and excellent fisheries for rainbow trout and arctic grayling. Requests for larger recreational tracts at the junction of Sunflower Creek, and that of Camp Creek on Lake Creek, were made also. Recommendations that trail right-of-ways be obtained from Chelatna Lake to Sunflower Creek, and from Shovel Lake to Lake Creek were submitted to Habitat Section in a move to establish access routes which are necessary to develop the streams' float trip potential.

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SHEEFISHING ON THE KOBUK RIVER (*photo by Amos Burg*)



ICE FISHING
(*photo by F. Van Hulle*)