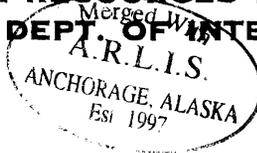


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STATE OF ALASKA

William A. Egan, Governor

Alaska Department of Fish and Game

C. L. Anderson, Commissioner

Sport Fish Division

E. S. Marvich, Director

ANNUAL REPORT OF PROGRESS, 1959-1960

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-1

SPORT FISH INVESTIGATIONS OF ALASKA

ARLIS

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Introduction

This report of progress consists of the Job Completion Reports from the State of Alaska's Federal Aid in Fish Restoration Project F-5-R-1.

In 1959 the Alaska Department of Fish and Game, as an agency of the new state, became eligible for participation in the program. Prior to this time the Federal Aid in Fish Restoration activity in Alaska had been a function of the Fish and Wildlife Service. During territorial status the federally conducted operation was appreciably less than the program now possible as a state.

The new state program under the Dingell-Johnson Act was activated July 1, 1959. Eleven separate studies made up the "Sport Fish Investigations of Alaska" project. Eight of the eleven were designed to reconnoiter the state's recreational fisheries resource and to provide background for the development of specific investigations as the need became apparent. Three problems of immediate concern appeared sufficiently defined and full scale investigations were mounted to explore their management implications. These included studies of Arctic grayling, Southeastern king salmon and recreational fishing access.

All of the investigations pose problems unique to Alaska in some respects and all provide ample scope for original work in the fisheries field. The recreational fishing access study is an example. Most of Alaska's fishing waters are still in the public domain and unfettered by private holdings-- a unique situation. Successful prosecution of this activity now and in the immediate future can forestall many of the serious recreational use problems currently facing other states.

The various studies were staffed as personnel were recruited. Field work began as the supplies and equipment were procured. Initial progress was slowed somewhat by this and the necessary period of personnel indoctrination. A "cutoff" date for each job from one to three months before July, 1960 shortened the period covered. As a result, these first reports encompass an effective working period of considerably less than one year.

The enclosed progress reports are fragmentary in many respects and the interpretations contained therein are subject to re-evaluation as the work progresses.

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECT
COMPLETION OF 1959-1960 SEGMENT

State: ALASKA

Project No: F-5-R-1 Name: Sport Fish Investigations
of Alaska

Job No: 1-A Title: Inventory and Cataloging of
the Sport Fish and Sport Fish
Waters in Southeast Alaska

Period Covered: July 1, 1959 to April 15, 1960.

Abstract:

Information obtained from other agencies, primarily the Fish and Wildlife Service, was utilized in initiating the survey and cataloging of Southeast Alaska's recreational fishing waters. Twenty-seven lakes and streams were surveyed including population sampling, spot creel census and observation of physical characteristics recorded on standard forms and augmented by the previously collected data. Thinly scattered angling pressures and transportation problems peculiar to the area resulted in few fishermen contacts.

Six moderately high lakes showed promise for management and were more fully evaluated. The increasing need of sources of suitable indigenous salmonoids for artificial manipulation resulted in steps to initiate pilot egg takes on steelhead and silver salmon. The criteria used for evaluating the stocks are listed. Preliminary evaluations for a pilot egg take were made on seven streams, all near Ketchikan. Preparations were completed for the first attempted egg take on Spit Point Creek.

Recommendations for continuing the inventory and cataloging investigation and to delineate the activities into more fully defined channels are given.

Objectives:

To evaluate the extent, the potential and the current use of the waters readily available to the area's anglers.

To determine the relative need for further management investigations and to direct the course of such studies.

Introduction:

Southeastern Alaska comprises the lands and waters of the south and east part of the state commonly referred to as the "Panhandle". This area is bounded by the Canadian Border and the Pacific Ocean as far north as the eastern drainages into Yakutat Bay. The district is approximately 500 miles long and 100 miles wide; an area of rugged mountains with many glaciers, lakes, streams, and mostly heavily forested. The annual rainfall varies as to locality from a low of 50 inches per year to 250 inches per year. Transportation is primarily limited to boat or plane travel as the roads are few and found only in the immediate vicinity of the centers of population.

Techniques:

Information from previous work by the Fish and Wildlife Service and the Alaska Department of Fish and Game was evaluated along with personal local knowledge in the initial phases of the investigation. Similar work previously conducted by the Bureau of Sport Fisheries as a Federal Aid in Fish Restoration Project provided the larger part of the available information. A good deal of this data has only recently been received and it is still in the process of compilation.

Standard lake and stream survey techniques adapted to the varied conditions of Southeast Alaska formed the basic means of collecting data. Species composition and distribution were ascertained by spot check creel census, sampling gill nets, hook and line and visual observation. The sampling nets are 125 feet in length, 6 feet in depth and rigged to sink. There are 5 panels of web, the smallest being 1 1/2 inches stretch mesh and the largest 4 inches stretch mesh.

The material is of twisted nylon and dyed a light green. No seining was done for survey data as all the fish that could not be confirmed present with the gill nets were visible in the shallows.

The low angling pressure found in Southeast Alaska, particularly in the more inaccessible waters, precludes collecting appreciable amounts of data from sporadic creel census activities. Hook and line fishing, carried on in conjunction with other investigational activities was utilized as time permitted to augment the scanty creel census returns. Visual observation proved particularly rewarding in arriving at estimates of the numbers and movements of migrating salmon. Foot travel and actual visual count worked best on steelhead. Gill nets set in areas having a high use by the fish population of a lake gave an easily obtained indication of species composition and some indication of the size groups present. Spawning escapement enumerations were made by visual methods during the day on salmon and steelhead although cutthroat and dolly varden proved too shy for this method. Problems of transportation prevented a schedule which fully utilized population estimate techniques.

Information on relative depths, surface area, water exchange-fluctuation and temperature, spawning grounds, type and extent of littoral zones, cover and so forth were recorded. Critical dissolved oxygen and pH levels are rare in the district and water analysis was not incorporated in the initial surveys. The three modes of transportation common to the district, boat, plane and automobile, were used. In some instances where weather and/or expense posed a problem, boat transportation and backpacking from saltwater put equipment and personnel on location.

Particular attention was given to some types of waters. Prior work and preliminary evaluation indicated numerous non-producing lakes at moderate elevations (under 2500 feet) but above natural barriers which might prove well adapted for introduction of sport fishes. Emphasis was placed on the investigation of these lake systems.

The increasing need of suitable salmonoid broodstocks for both replacement stocking and to develop recreational fisheries in non-producing waters became the other aspect of the study receiving increased emphasis. A search for suitable sources

of silver salmon and steelhead stocks to fill this developing requirement was initiated. The investigation was limited to these two since stocks of rainbow trout, the third fish of immediate interest as a brood stock source, appeared more readily available from other areas of the state.

The ramifications of a search for a "suitable" native brood stock are many and varied. The adaptability of various stocks to artificial propagation can only be determined by trial and error. The two involved, silver salmon and steelhead, have a history of comparative adaptability in other states. This, coupled with the limited background experience in Alaska, indicated these two as a promising choice. Other criteria used in the investigation were:

1. A race with a lake rearing background in the lifecycle since it is anticipated a majority of the stocking, whether for a resident (land-locked) or anadromous purposes would utilize lake rearing.
2. Fish from waters of a type common throughout large portions of the state was also advisable in order to broaden the field of potential use.
3. A location for economical installation of collecting, holding and egg-taking facilities.
4. A location readily and economically accessible by existing means of transportation.
5. A source of supply not in conflict with existing use, either commercial or recreational.
6. Racial characteristics of rapid growth, good condition factor and sporting qualities.
7. A strain that does not "climax" with a large population of small fish.

The initial investigation was designed to carry the search through a pilot egg taking operation and at least one season of observation on the succeeding steps including transportation of eggs and fry, incubation and rearing to advanced fry and one fullgrowing season in waters of the type anticipated for general use in natural rearing.

Findings:

The following waters were included in the general inventory and cataloging information recorded on the Department's Standard Lake and Stream Survey forms. They are listed in order of their geographic location from north to south.

<u>BODY OF WATER</u>	<u>LOCATION</u>	<u>NEAREST COMMUNITY</u>
1. Chilkat Lake	Chilkat Valley	Haines
2. Peterson Lake	Tee Harbor	Juneau
3. Juneau Airport Ponds	Mendenhall Flats	Juneau
4. Auke Lake	Auke Bay	Juneau
5. Turner Lake	Taku Inlet	Juneau
6. Sweetheart Lake	Port Snettisham	Juneau
7. Hasselburg Lake	Admiralty Island	Juneau
8. Thayer Lake	Admiralty Island	Juneau
9. Swan Lake	Baranof Island	Sitka
10. Rezanof Lake	Sitka	Sitka
11. Crystal Lake	Blind Slough	Petersburg
12. Virginia Lake	Blake Channel	Wrangell
13. Thom's Lake	Zimovia Strait	Wrangell
14. Tye Lake	Cleveland Peninsula	Wrangell
15. Halfmoon Lake	Cleveland Peninsula	Wrangell
16. Upper Granite Creek Lake	Back Behm Canal	Hyder
17. Swan Lake	Carroll Inlet	Ketchikan
18. Manzanita Lake	South Behm Canal	Ketchikan
19. Wilson Lake	Smeaton Bay	Ketchikan
20. Big Goat Lake	South Behm Canal	Ketchikan
21. Upper Checats Lake	South Behm Canal	Ketchikan
22. Big Lake	Thorne Arm	Ketchikan
23. Connell Lake	Ward Cove	Ketchikan
24. Ward Lake	Ward Cove	Ketchikan
25. Whitman Lake	George Inlet	Ketchikan
26. Lake Josephine	Prince of Wales Is.	Hydaburg
27. Summit Lake	Prince of Wales Is.	Hydaburg

Six lake systems at moderate elevations and either landlocked or blocked to upstream migration showed promise for effective management during the preliminary reconnaissance. These waters were subjected to comparatively intensive study and resulted in general corroboration of the initial evaluation. These systems will be discussed individually.

Tyee Lake: This body of water is located on the mainland between the mouths of the Unuk River and the Bradfield River at an elevation of 1370 feet. It was reported barren and no fish were taken in 3 net days each at the inlet and outlet. Food organisms appeared in good number. The lake is quite deep and above timber line. It was first thought to plant rainbow trout here but a request for "different" fish from local sportsmen and a willingness to wait for them prompted the recommendation to introduce arctic grayling.

Halfmoon Lake: This lake is located on Cleveland Peninsula near the head of the drainage into Lake McDonald and Yes Bay. Its elevation is 812 feet. The water is quite clear with very little organic color even though timber line is above the lake level. The lake runs mostly to extreme depths with very little shoal area. Food production is not high by visual inspection. There are 3 more lakes below and between Halfmoon and Lake McDonald. No fish were taken in 6 net days and no evidence of them was noted. Arctic grayling are recommended for stocking when the spawn becomes available. In view of the meager food supply seen in the lake, rainbow trout would not produce the fishing it is hoped to bring about here.

Upper Granite
Creek Basin

Lake: This body of water is the highest (1348 feet) of a system containing four lakes. The lowest is 945 feet elevation. The largest (the upper) is at timber line on the mainland between Rudyerd Bay and Walker Cove. No fish were taken in 22 net days. Fish food organisms appeared to be in fair number by visual inspection of the logs and detritus of the outlet. The lake is very deep with little shoal area. A fair trial with arctic grayling in this area should include this lake as it appears very promising.

Big Goat Lake: A relatively large lake (estimated 1,200 acres) at 1775 feet elevation above timberline east of South Behm Canal and north of Wilson Lake. The water is quite clear and appears very deep. There is one major tributary which enters the lake on the northwest side and is the outlet of Little Goat Lake 275 feet elevation above. No fish were taken in 11 net days of fishing. There is no spawning ground in the outlet as the lake flows over a ledge and thence immediately over a series of high falls. The lake did not appear to be particularly fertile but it is recommended that arctic grayling be stocked in this high cold body of water.

Lake Josephine: This lake lies on the southeast slopes of Copper Mountain on Prince of Wales Island at an elevation of 1830 feet. It is above timberline but "opens" (is ice free) earlier than other lakes at the same elevation because of the influence of the warm Pacific winds. The lake is relatively large (approximately 1,100 acres) and appears quite deep. The water is clear and food organisms seem rather scarce. The outlet drops through 2 other lakes, the lower two being separated by barriers. The tributaries are steep and most of the water entering the lake is through talus. Spawning ground is available in the outlet and on the "spring shores". No fish were taken in this lake in 8 net days of fishing. It is recommended that arctic grayling be planted in this high lake.

Summit Lake: This body of water lies in the southeast pass off Copper Mountain at an elevation of 1298 feet and below but in a different drainage from Lake Josephine. The outlet flows through two other lakes all separated by barriers into Hetta Inlet in Prince of Wales Island. This lake carries some muskeg color in the water. There is spawning ground in the major inlet which drains from a lake above. Food organisms were found in fair number by visual inspection in this body of water which is approximately 950 acres. The lake is deep but has some shoal areas.

No fish were taken in 8 net days. It appears quite promising for an introduction of fish and arctic grayling are recommended for the initial plant. Should they be unsuccessful, rainbow trout may be later brought in without first having to rehabilitate the lake.

The part of the current activities concerned with the investigation and evaluation of possible steelhead and silver salmon broodstock sources was limited to waters in the vicinity of Ketchikan. The time and expense involved in the physical surveys required to broaden its scope prevented further expansion during this job segment. Review of the available recorded data on these anadromous systems was not particularly productive since acquiring information on the two species, steelhead and silver salmon, has not been the object of the intensive field surveys of spawning area, escapement, etc., conducted by the Bureau of Commercial Fisheries and the Fisheries Research Institute.

Historical information was available from local residents and from other fisheries people intimately familiar with the area. This, correlated with personal local knowledge and limited physical surveys designed to amplify the information, was used to evaluate six potential sources. These are as follows:

Naha River. This stream has a fine run of steelhead. It is 21 miles from Ketchikan and a very popular fishing spot. The steelhead enter the stream in the fall and must be held all winter. This latter point is a real problem in light of the extreme fluctuations (5 feet) of the Naha River.

Spit Point Creek. This relatively small creek in Carroll Inlet was selected for an initial steelhead egg take. There is a very negligible sport fishery on the stream. Steelhead are known to use the system and, by local reports, in considerable numbers. Two 50 foot 3 inch mesh seines were made to fish this creek for an egg take.

- Fish Creek. This stream lies above a 57 acre lake and supports a fine run of steelhead. It is 21 miles from Ketchikan and subject to considerable sport fishery. There are remnants of an old egg taking installation at the outlet of the lake. It will require a wier and trap with a holding pen to take spawn here.
- Coho Cove Creeks. Two relatively small streams reported to have steelhead runs and lying in the head of Coho Cove about 12 miles southeast of Ketchikan. A visual survey at the time the fish should have been present disclosed no fish.
- Lucky Cove Creek. A creek that could be handled with a wier but having a rather meager steelhead run. The potential of this stream to produce steelhead spawn does not appear adequate. This stream is 25 miles from Ketchikan.
- Snake Creek. This stream is at the head of Olive Cove on Zimovia Straits, 22 miles south of Wrangell. There was formerly a salmon enumeration wier installation. A known run of silver salmon and steelhead use this stream. Further evaluation of this location could possibly answer the planting needs of the district and more.
- Porcupine Creek. This tributary of the Klehini River near Haines may also hold promise as a source of spawn, particularly on dolly varden trout.

All of the locations listed present problems of one kind or another. The Naha River has a heavy sport fishery in addition to the requirement of holding a wier in the face of the 5 foot fluctuations over the winter. Spit Point Creek also fluctuates and has little area suitable for holding numbers of fish until they ripen. Fish Creek has the potential, the wier site and holding pen sites but is subjected to a heavy sport fishery. The Coho Cove Creeks and Lucky Cove Creek do not have large enough runs to meet the anticipated needs. Snake Creek needs only the installation of the wier and holding pens. Porcupine Creek is still to be investigated.

Before any of the possible locations are selected, a fuller evaluation is needed. Surveys and cost-estimates will be drawn up for those locations showing promise.

Spit Point Creek on Carroll Inlet appeared likely for a pilot egg take on steelhead. The plan is to set a seine at the outlet of the pool containing the fish and sweep the hole with another seine down into the first one. Two 50 foot seines of 3 inch mesh were made up and ready for use by April 15. Other gear such as spawn pans, egg containers, etc. were also in readiness.

Recommendations:

Continue the inventory and cataloging work through the succeeding job segment. Expand the information currently available on those waters supporting comparatively intensive fishing pressure or with indications of suitability for practicable management measures. Include comprehensive population sampling and physical surveys on these waters.

Stock arctic grayling in the following lakes as a supply of these fish become available: Tyee Lake, Halfmoon Lake, Upper Granite Creek Basin Lake, Big Goat Lake, Lake Josephine and Summit Lake.

Continue the reconnaissance of possible egg taking sources for indigenous salmonoids, with the emphasis on steelhead and silver salmon. Initiate pilot egg takes and carry through with the evaluation of the various stocks as originally planned.

Submitted by:

Approved by:

Robert T. Baade
Research Biologist
15 May 1960

Alex H. McRea
D-J Coordinator

E. S. Marvich, Chief
Sport Fish Division

ALASKA DEPARTMENT OF FISH AND GAME
Sport Fish Division

Lake Survey Form

Lake Tyee Sec. _____, Twp. _____, Rge. _____, Lat 56°15'N., Long 131°30' W.
Acreage est. 1100 Max. Depth in excess of 200 ft. Altitude 1370 ft.
Location South of Bradfield River flats Water Color (clear, silty) clear
Type of Bottom Mostly slide rock, fills of gravel & sand at tributary mouths, depths unsampled.
Inlets (name, size, permancency) One major at upper end of lake, est flow 65 ft³/sec.
Benchmark (Description) None
Outlet (size, immediate and main drainage) Normal 100 ft³/sec est at lake outfall
Barriers Series of falls, outlet is less than 2 mi. long and drops 1370 ft.
Use (Private, public, semiprivate) Prospecting, goat hunting
Public Access Site None at present, no restriction as it is in Tongass National Forest.
Facilities (Campground, roadhouse, etc) None
Native Fish Species None found in 6 net days.
Introduced Species None
Spawning Grounds Plentiful in inlet and some in outlet.

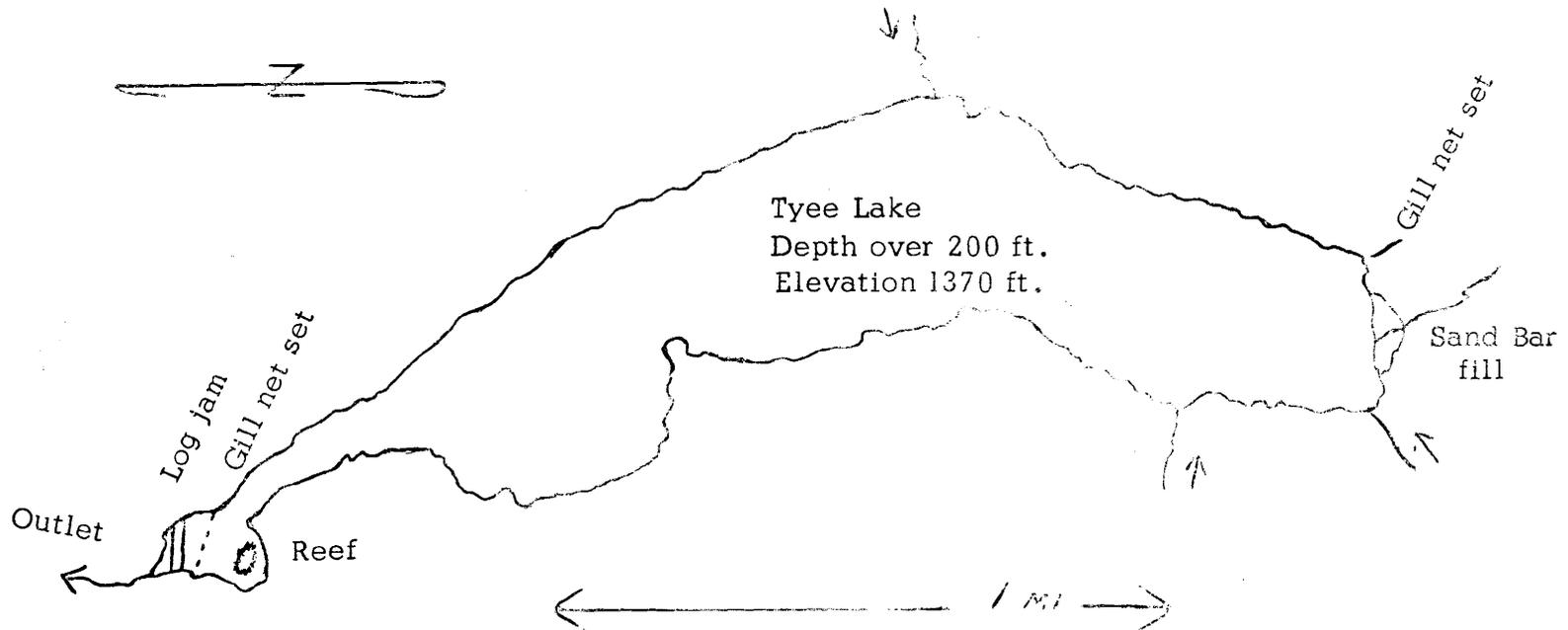
Fishing History No fish

Other Uses _____
Fish Losses _____
Character and size of watershed Alpine watershed approximately 30 mi²
Remarks Fish food organisms in good supply; lake appeared relatively rich

(over)

Description of accessibility (how reached) At present the only access is by float plane or helicopter

Sketch: showing outline of lake, depth, prominent landmarks, inlets, outlet, weedbeds, public service site location, benchmark location, etc.



STREAM SURVEY

Lucky Cove Creek

May 6, 1960

TYPE OF STREAM - Largely shallow, brown water, muskeg drainage over bedrock.

DEPTH - Few holes over 3 feet.

SURROUNDING GROUND COVER - Considerable muskeg and scrub cedar with hemlock patches.

FLOW - ($\text{ft}^3/\text{sec.}$) Max. 1200, Min. 8, Norm. 20.

BOTTOM COMPOSITION - Considerable bedrock with thin cover of gravel and sand in most stretches.

BARRIER PRESENT - A falls in two drops totalling 18-20 ft. but it may be passable by anadromous salmonoids at high water stages.

TRIBUTARIES - Several and all small - less than $1 \text{ ft}^3/\text{sec.}$

LAKES IN SYSTEM - None noted visually or seen on U.S.G.S. maps.

USED BY WHAT SPECIES - Cutthroat, steelhead, dolly varden, cottoids, 3 species of salmon (pinks, chum, coho).

WATER TEMPERATURE - 65° Max., 34° Min., 53° Normal summer (all estimates).

RESIDENT SPECIES - Rainbow, cutthroat, dolly varden, cottoids.

PLANTS - Very little as creek is largely riffles and bedrock pools with no bottom soils.

FOOD ORGANISMS PRESENT - Insects and insect larvae, spawn of each of the fish present.

SIZE & AGE OF DESIRED SPECIES - No specimens taken.

DISEASES & PARASITES NOTED - No specimens but Salmincola,
common in this type of stream

STOMACH CONTENTS OF SPECIMENS TAKEN - no specimens.

REMARKS - This survey was made in an attempt to take
steelhead spawn. Steelhead were present but few.