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STATE OF ALASKA

Bill Sheffield, Governor

Annual Performance Report for
ENHANCEMENT OF THE RECREATIONAL FISHING
OPPORTUNITIES IN SOUTHEAST ALASKA

By

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RESEARCH PROJECT SEGMENT

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Study No: G-III Study Title: FISHERY ENHANCEMENT OPPORTUNITIES IN SOUTHEAST ALASKA

Job No: G-III-A Job Title: Enhancement of the Recreational Fishing Opportunities in the Juneau Area.

Cooperator: Lee M. Neimark

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ABSTRACT

The Juneau Roadside Enhancement project improved fishing opportunities through education, by securing access, and with enhancement projects. A booklet was written to inform anglers about the best locations to fish in the Juneau-Yakutat area and the best techniques to use. By cooperating with city and federal agencies, a new access route was acquired to a favorite steelhead fishing area. Coho were stocked in Twin Lakes to create a very popular sport fishery.

Hatchery-reared cutthroat were stocked in Auke Lake and they comprised one third of the out-migrants from that system. An egg-take from the outmigrants failed because no sexually ripe males were obtained. Hormones may be used next year to ripen males. A steelhead egg-take also failed when the eggs were destroyed after contamination with IHN virus was suspected. Eggs will be taken again in 1984, but they will be raised in isolation until additional steelhead can be examined for IHN.

KEY WORDS

Juneau, Alaska, Auke Lake, Auke Creek, Twin Lakes, Peterson Creek, cutthroat, Salmo clarki Richardson, steelhead, Salmo gairdneri Richardson, coho, Oncorhynchus kisutch (Walbaum), enhancement, recreational fishery.

BACKGROUND

The quality of fishing along the road system has become threatened as Juneau has expanded and its population increased. Urban development

now infringes upon critical fish habitat and the growing population exerts increased fishing pressure on a limited resource. The many small streams crossed by the road system are particularly vulnerable to over-harvesting because of their size and easy accessibility (Fig. 1).

The Juneau Roadside Enhancement project was initiated in 1981 to relieve some of the excessive fishing pressure by enhancing existing fisheries and developing new fishing opportunities (Bethers, 1983).

The project's most notable success has been the creation of a popular sport fishery for landlocked coho salmon in Twin Lakes. Twin Lakes was first planted on May 25, 26, and 27, 1982, with 12,000 coho smolt (1980 Sashin Creek brood) from Little Port Walter Hatchery.

The goals of the 1983 study were broadened to include: (1) enhancement work (at Twin Lakes, Auke Lake, and Peterson Creek), (2) identification of other areas that could be improved with enhancement work or by securing better access routes, and (3) the production of an informational leaflet designed to improve fishing by instructing anglers how, where, and when to fish.

A list of common names, scientific names, and abbreviations of all species mentioned in this report is presented in Table 1.

RECOMMENDATIONS

Management

1. Encourage each area management office to develop a recreational fishing guide.
2. Cooperate with local and federal agencies to secure greenbelts and access corridors to recreational areas.
3. Establish base-line biological and physical data on local watersheds. This data will provide a firm basis for enforcing habitat regulations.

Research

1. Rear Peterson Creek steelhead eggs in isolation. Test as many Peterson Creek steelhead as possible for IHN. If any are diseased, discontinue enhancement work at Peterson Creek.
2. Use hormone injections to speed gonadal development in Auke Creek cutthroat if no ripe fish can be obtained for brood stock.

OBJECTIVES

1. To determine the enhancement potential of eight lakes and ponds in the Juneau area.

Table 1. List of Common Names, Scientific Names, and Abbreviations.

Common Name	Scientific Name and Author	Abbreviation
Arctic Grayling	<u>Thymallus arcticus</u> (Pallas)	GR
Coho Salmon	<u>Oncorhynchus kisutch</u> (Walbaum)	SS
Cutthroat trout	<u>Salmo clarki</u> Richardson	CT
Dolly Varden	<u>Salvelinus malma</u> (Walbaum)	DV
Pink salmon	<u>Oncorhynchus gorbuscha</u> (Walbaum)	PS
Sockeye Salmon	<u>Oncorhynchus nerka</u> (Walbaum)	RS
Steelhead	<u>Salmo gairdneri</u> Richardson	SH

2. To determine the feasibility of acquiring public access to potential and existing recreational fishing waters in the Juneau area.
3. To produce a free procedural handout for the recreational fishing public informing them where, when, and how to fish for various species in the Juneau area.
4. To stock approximately 4,000 juvenile cutthroat trout in Auke Lake.
5. To stock approximately 5,000 juvenile coho salmon in Twin Lakes.
6. To collect approximately 10,000 steelhead eggs from Peterson Creek and incubate them in the Snettisham Hatchery.
7. To collect approximately 10,000 cutthroat eggs from Auke Creek and to incubate them in the Auke Creek Hatchery.

TECHNIQUES USED

1. The following watersheds in the Juneau area will be examined in spring, 1984, to determine their potential to support populations of stocked fish:

- | | |
|---------------------------|--------------------------|
| 1. Salmon Creek Reservoir | 5. Mendenhall Ponds |
| 2. Peterson Lake | 6. Airport Ponds |
| 3. Mitchell Pond | 7. Peterson Creek Lagoon |
| 4. Auke Lake | 8. Duck Creek |

A large body of base-line limnological and biological data has been gathered by the Sport Fish Division's Inventory and Cataloging study. This data base will be the primary source of information, however, when data are lacking, basic water chemistry samples will be taken from potential stocking sites and minnow traps will be set to determine the presence or absence of populations of fish.

If all indicators are favorable following these investigations, a decision will be made regarding which species to stock and how many to stock. These decisions will be based on such considerations as lake size, its remoteness, the type of access, and the availability of fish for stocking.

2. Peterson Creek falls did not have complete public access.. Anglers had to travel across private property. The feasibility of re-routing the Peterson Creek trail was investigated. Meetings were held between city, state, and federal agency officials. It was agreed that the U.S. Forest Service would construct a new access trail across land owned by the Juneau City and Borough.

3. A procedural handbook on recreational fishing in the Juneau-Yakutat management area was prepared and distributed at no cost to the public. This handout contains maps of the local fishing areas, descriptions of terminal fishing tackle, discussions on how to use each type of tackle, and when and where the different species of fish occur.
4. Approximately 4,000 juvenile cutthroat trout (1982 brood) were raised in the Auke Creek Hatchery. They were released in the stream flowing into Auke Lake in August, 1983.
5. Approximately 5,000 juvenile coho salmon (1981 brood) were raised in the Salmon Creek Hatchery. They were released into Twin Lakes in September, 1983.
6. Approximately 8,500 steelhead eggs were collected from Peterson Creek in May, 1983, by spawning three females. The adults were captured in gill nets. The eggs were fertilized on site and transported to the Snettisham Hatchery. Additional eggs will be taken in the spring, 1984.
7. Approximately 10,000 cutthroat eggs will be collected from Auke Creek in the spring of 1984, by spawning six to eight female cutthroat trout. The adults will be captured at the Auke Creek Weir and the eggs will be incubated and raised at the Auke Creek Hatchery and released in 1986 into Auke Lake.

FINDINGS

Results

1. The enhancement potential study will begin on April 1, 1984.
2. A new trail was forged to Peterson Creek falls after the Alaska Department of Fish and Game (ADF&G), Sport Fish Division, encouraged the U.S. Forest Service to construct the new trailhead across Juneau City and Borough land.
3. A 24-page sport fishing guide to the Juneau-Yakutat management area was written by Bethers (1984).
4. Cutthroat trout were stocked in Auke Lake twice during 1983. Both releases occurred in Lake Creek (the inlet to Auke Lake). On April 26, 1,256 trout were released (1981 Auke Lake Brood; mean length=126mm, mean weight=20.8g). Each of these cutthroat was marked by the removal of its right ventral fin. On August 3, 4,078 were released (1982 Auke Lake Brood; mean length=97mm, mean weight=10.3g). Each of these was marked by the removal of its left ventral fin.
5. On September 21, 1983, 5,285 coho salmon smolt (1981 Montana Creek brood; mean weight 67.2g) were released in Twin Lakes. These fish

were originally hatched in the NSRAA (Northern Southeast Aquaculture Association) Salmon Creek Hatchery and reared in pens in Twin Lakes. They were not marked.

6. A total of 8,500 eggs were collected from three female steelhead at Peterson Creek on May 3 and May 5, 1983. The eggs were incubated at the ADF&G Snettisham Hatchery. Unfortunately, all the eggs had to be destroyed because a preliminary test for infectious hematopoietic necrosis (IHN) virus proved positive (the final test was inconclusive). Another egg take will be attempted in the spring of 1984.
7. Several female cutthroat, ripe with eggs, were collected in the spring, 1983, at the Auke Creek weir. These females had overwintered in Auke Lake and were moving downstream to the ocean. Unfortunately, no ripe males were captured; so, the females were released from the holding tank. Another egg take will be attempted in the spring, 1984.

DISCUSSION

Sport Fishing Guide:

The guide discusses marine and freshwater fishing opportunities near Juneau, Haines, Skagway, and Yakutat. The topics discussed include the availability of sport fish, choice of gear and tackle, popular fishing areas, transportation, lodging, and guide services. It is particularly useful for visitors and has simplified work of the management staff by often eliminating the need for lengthy correspondence and by providing an easy reference guide to commonly asked questions. Over 500 booklets have been distributed.

Peterson Creek Trail:

The new trail eliminated conflicts between private landowners and anglers seeking access to Peterson Creek falls, a prime steelhead fishing area. Perhaps even more importantly, construction of the trail demonstrated what can be accomplished if city, state, and federal governments work toward a common goal. A similar team effort should be applied to securing greenbelts and other access corridors.

Peterson Creek Steelhead Enhancement Project:

Peterson Creek and Peterson Lake have had a long history of enhancement efforts (the somewhat sketchy record is shown in Table 2). The present spawning run of approximately 100 steelhead may be descendants of steelhead that were planted in the lake and moved downstream over the barrier falls. The present contribution of lake-reared steelhead to the run has not been examined. The long journey of spawning steelhead attempting to return to their ancestral birthplace terminates at the barrier falls, providing Juneau anglers a rare fishing opportunity.

Table 2. Peterson Lake and Peterson Creek Fish Stocking Record

Date	Species	Number	Size (No./lb.)	Brood Source	Hatchery	Remarks
1919	Salmon (Pink or Sockeye)	< 3,300,000	Eyed Egg	...	...	Some of the 3.3 million were planted in Eagle River
June 17, 1941	Steelhead	8,600	Eyed Egg	Ward Lake	...	Planted in inlet to Peterson Lake
June 27, 1941	Steelhead	10,000	Eyed Egg	Ward Lake	...	Planted in inlet to Peterson Lake
1960-1962	Grayling	...	Eyed Egg	...	...
August 10, 1961	Steelhead	14,300	...	Unidentified, SE AK Lake	Auke Creek	
August 12, 1961	Steelhead	4,615	...	...	...
August 8, 1962	Steelhead	16,500	1,100/lb.	...	Auke Creek	Number stocked may have been only 6,500.
July 30, 1963	Steelhead	21,028	1,865/lb.	...	Dear Mountain	
August 7, 1964	Steelhead	17,388	700/lb.	Pleasant Bay	Dear Mountain	
August 1965	Steelhead	17,000	1,200/lb.?	...	...	Auke Creek
August 1966	Steelhead	17,000	700/lb.?	...	Auke Creek	
August 1967	Steelhead	12,000	800/lb.	...	Auke Creek	
1968	Steelhead	15,000	...	...	...

The intention of the 1983 egg-take was to examine the possibility of increasing the production of smolt through hatchery rearing. The smolt would have been released at Peterson Creek to bolster the run. A sufficiently enhanced Peterson Creek run could serve as a brood source for other local streams.

Unfortunately, all the incubating eggs were prudently destroyed when the mandatory test for IHN proved inconclusive. All eggs and sperm had been combined to maximize the likelihood of fertilization and to simplify incubation. Thus, when the preliminary test from a single female was positive, all eggs had to be destroyed. The female in question had been held overnight and she had died before her eggs were taken. Bacteria (presumably from the dead female) clouded the final test results and may have affected the initial ("presumptive") analysis. In the future, gametes must not be taken from dead fish. If the test was accurate, IHN may have been introduced into the population when steelhead eggs were raised in the Auke Creek Hatchery (Table 2), since Auke Creek contains sockeye salmon, common carriers of IHN.

The test for IHN requires samples of fluid from the ovaries or testes of a mature fish. While the test can prove the presence of IHN, it cannot prove the absence of IHN in males. Thus, a steelhead population can be considered IHN-free only after a large number of steelhead (at least 60) have been tested. It is essential that the Peterson Creek steelhead be free of IHN, if they are to be used for brood stock for other systems. Eggs collected in 1984 must be incubated in isolation and the hatchlings should be reared in isolation to prevent the possibility of hatchery contamination. Gonadal fluid samples should be obtained from at least 30 adults. (Twenty-eight adults were captured in 1982, but fluid samples were taken only from the gamete donors). If any of those adults has IHN, the entire brood should be destroyed and the experiment terminated. Similar precautions should apply to a 1985 egg-take. If any of the samples collected in 1985 has IHN, both the '85 brood and the '84 rearing fish should be destroyed. The Admiralty Creek and Bear Creek steelhead populations on Admiralty Island might serve as alternate brood sources if the Peterson Creek stock is diseased.

Auke Lake Cutthroat Enhancement:

The seaward migration of cutthroat began on April 6 and ended on June 22. During that period, 227 cutthroat passed the weir at the creek mouth; 77 of these were hatchery-reared fish planted in April (Taylor, 1983). Thus, the enhancement project contributed to one-third of the total seaward run, though there were no reports of hatchery-reared fish being harvested (Neimark, in press). Later in the season, at least 147 cutthroat, including some hatchery-reared fish, moved back into Auke Creek (Taylor, 1983). (The Auke Creek Weir was not designed to capture all of the trout moving upstream).

None of the 1982 brood planted in August passed the weir. They were expected to over-winter in Auke Lake and emigrate in 1984. If the survival of the '82 brood is comparable to the '81 brood, which were reared for 2 years, then future broods need only be hatchery-reared for 1 year.

Currently, there are no cutthroat rearing in the Auke Creek Hatchery due to the failure of the 1983 egg-take. Eggs will be collected in the spring at the weir. If there is another shortage of ripe male cutthroat, males will be held and injected with hormones to speed gonadal development.

Twin Lakes Coho Enhancement:

Twin Lakes was one of the 10 most popular roadside fishing areas in 1983 (Neimark, in press). Anglers made over 1500 trips and harvested 1100 coho. That estimate does not include the harvest of the winter ice fishery or the children's fishing tournament.

During the 1982-1983 winter, ice conditions were favorable for about 30 days. Observations indicated that a minimum of 100 angler-trips occurred and that many of the anglers obtained their limit of 10 coho. Roughly, several thousand coho were harvested that winter. Rain put a damper on the 1983-1984 ice fishing season; yet, during a peak period, over 50 anglers were tallied in an instantaneous count. The coho harvest was not estimated.

Over 300 children participated in a children's fishing tournament held at Twin Lakes on June 18, 1983, by a local sporting goods store. Results of a creel survey indicated that the children harvested about 600 coho and 12 Dolly Varden. Measurements were taken on the coho to determine growth of the two lots of smolt planted in 1982. One lot was released directly into Twin Lakes, while the other was held and fed in a pen for 2 months prior to release. No test for significant differences can be made; however, it appears that the pen held fish retained the initial size advantage they gained during pen rearing, but this did not result in an obvious survival advantage (Table 3).

Two recent developments threaten the unparalleled success of Twin Lakes. First, the Salmon Creek Hatchery, which is rearing coho for release in Twin Lakes, shut down operations due to financial difficulties. Second, erosion from a subdivision construction site has polluted the north basin. The silt entering the basin will adversely affect the coho both directly, by clogging their gill membranes and inhibiting their respiration, and indirectly, by blocking the penetration of sunlight and limiting photosynthetic food chain production. At the insistence of ADF&G and DEC (the Alaska Department of Environmental Conservation), the contractor constructed a dike to contain the silt in the north basin and erected filter barriers to restrict additional silt from entering the lake.

Further degradation of Twin Lakes cannot be allowed and a source of coho smolt for stocking needs to be found. One possible solution for these problems would be to encourage the developer to give some financial assistance to the hatchery so that rearing operations could continue until fry, now raised in the hatchery, reach smolt size. It would be relatively inexpensive to rear the fry in raceways in Twin Lakes.

Table 3. Relative Survival and Growth of Two Lots of Coho Stocked in Twin Lakes in 1982.

Lot	Brood Stock	Hatchery	Treatment	Identifying Mark	Release Date	Number Released	# Sampled in Kid's Derby	Mean Size on 8/11/82	Mean Size on 6/18/83
1	1980 Sashin Creek	Little Port Walter	Released directly into Twin Lakes	Right Ventral fin clip	5/27/82	7,999	100	160mm	218mm (SD=31)
2	1980 Sashin Creek	Little Port Walter	Held in pens in Twin Lakes and fed from 5/27/82 to 8/6/82	Left Ventral fin clip	8/6/82	3,927	32	181mm	241mm (SD=24)
3	Wild Stock	-	-	-	-	-	31	-	156mm (SD=35)

LITERATURE CITED

Bethers, M. B. 1983. 1982 Juneau-Yakutat area management report.
Alaska Department of Fish and Game. 24 pp.

_____ 1984. Sportfishing guide to the Juneau-Yakutat sport-
fish management area. Alaska Department of Fish and Game. 24 pp.

Taylor, S. G. 1983. Annual report, Auke Creek weir 1983, operations and
fish counts. National Marine Fishery Service. 10 pp.

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