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STATE OF ALASKA

William A. Egan, Governor



ANNUAL REPORT OF PROGRESS, 1962 - 1963

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-4

SPORT FISH INVESTIGATIONS OF ALASKA

Alaska Department of Fish and Game

Walter Kirkness, Commissioner

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## INTRODUCTION

This report of progress consists of Job Segment Reports from the State of Alaska Federal Aid in Fish Restoration Project F-5-R-4, "Sport Fish Investigations of Alaska".

The project is composed of 25 separate studies designed to evaluate the various aspects of the State's recreational fishery resources. While some studies are of a more general nature and deal with gross investigational projects, others have been developed to evaluate specific problem areas. These include studies of king salmon, silver salmon, grayling and State Access requirements. The information gathered will provide the necessary background data for a better understanding of local management problems and development of future investigational studies.

The assembled progress reports may be considered fragmentary in many respects due to the continuing nature of the respective studies. The interpretations contained therein, therefore, are subject to re-evaluation as work progresses and additional information is acquired.

## JOB COMPLETION REPORT

## RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations of Alaska.

Project No: F-5-R-4 Title: Inventory and Cataloging of the Sport Fish and Sport Fish Waters in Lower Southeast Alaska.

Job No: 1-A

Period Covered: July 1, 1962 to January 30, 1963.

## Abstract:

Inventory and cataloging of sport fish and sport fish waters in Southeast Alaska was continued for the third year. Standard lake and stream surveys were conducted on sixteen previously unsurveyed lakes. Twelve of the lakes showed promise for management and were more fully evaluated.

The investigation of possible steelhead and silver salmon brood stock sources was pursued. In conjunction with another project where a wier was constructed on the outlet stream of Lake Eva in Hanus Bay, steelhead were trapped and spawn taken.

Recommendations for continuing the inventory and cataloging investigations, the result of egg-taking efforts and sport angling catch statistics are given.

## Recommendations:

1. No changes are necessary in the season or bag limits on trout in the Ketchikan area.
2. Continue the sport limits on king salmon.
3. Stock the suitable waters in the Ketchikan area.

4. Approve access development to waters not now being adequately harvested.

5. Develop a spawn taking station to provide silver salmon, steelhead, cutthroat and Dolly Varden spawn.

6. Continue intensive investigation of waters which will soon be accessible from new road and trail development.

**Objectives:**

To conduct lake, stream and marine surveys and evaluate the extent, the potential and the current use of the waters readily available to the area's anglers.

To investigate the sources for providing a supply of trout, char and salmon eggs for experimental hatching and rearing.

To investigate the feasibility of, and formulate plans for, experimental rehabilitation of lakes and streams.

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

**Techniques Used:**

Past experiences and previous work have indicated a need of investigation of the full potential of waters within reach of projected future road systems in the vicinity of Ketchikan. There is also a need of the same in waters that are easily accessible by small boat in and near Ketchikan. The need has become greater as road construction contracts are being fulfilled and the number of people in the Ketchikan area increases.

A number of lakes have been noted in the above classification upon which there was no recorded data and work was initiated on these.

Information was obtained from local residents familiar with lakes in the Ketchikan area.

A number of lakes, within reasonable reach of Ketchikan, will soon be subjected to considerably more angling pressure because of easier access over trails and roads under construction. Many of these have fish populations while others are barren or need rehabilitation.

Several lakes have considerable potential recreational fishing that presently are not on the list of producers of sport fishing. Investigation of these will disclose better management practices than presently are being applied. These are being actively worked on at the present time. Others are planned for work in the near future.

Evaluation of accessibility and accommodations available at waters within the near vicinity of Ketchikan is of extreme importance with respect to required survey work. Steep and rough terrain discourages use of several potentially good waters.

Heavy sport fishing pressure is put on several species of salt water fish. These include a number of varieties of food fish that are taken for table qualities rather than for sport.

The angler use of the several species varies from one type of fish to another with many fine food fish being taken as incidental catch when in pursuit of salmon or another of the available varieties. A few fish are regarded as complete pests and are treated as such.

On salt water, accessibility is dependent on the angler's gear and finances and how inclement weather influences the comfort and safety of any particular location. The near proximity of comfortable accommodations for a visiting angler often differentiate between a fishery and none even though the fish are available.

The determination of the fish species distribution differs from marine to fresh water, and with the season of the year. There is an overlap of some species in both

salt and fresh water all year depending on the life cycle of the species. The marine fishes have many sedentary varieties among them with only a vertical movement over the year. The fresh water fishes generally occupy the entire environment and are available at any time.

With the exception of the five species of Pacific salmon, the populations of fish are climax or relatively near what their environments will support. Fishing pressures exert no strain on these food fishes. The salmon, on the other hand, are in strong demand in commercial channels as well as sport fish and have suffered by heavy exploitation of the stocks and loss of spawning ground by "development" of the watersheds they use.

The age patterns of all the food and game fish are normal for climax fish populations. The only deviation from this is the five species of Pacific salmon which have normal age group composition but they die in the spawning streams and thus present a different curve than fish that survive spawning.

Scale sampling was conducted on the salt water fishes along with creel census. Population sampling was done in lakes with experimental gill nets but more toward establishing the presence or absence of fish rather than age composition of the populations which are known to be climax. In some cases, it was not necessary to use nets and sports gear sufficed.

Creel census was pursued as opportunity permitted and by stream guards in addition to their basic duties of salmon brood stock preservation. The result was that comparatively little consistent and complete information was recorded. The one location that has data recorded is the Naha River where there was stationed a stream guard at the access point for nearly all the sport fishing in the river system. Here anglers were contacted as they finished their fishing and started home.

The physical, chemical and biological characteristics of this area are what one would expect in a newly exposed

area (from the geologic standpoint) with its precipitious land surfaces, a normal 160 inches of rain annually, the lack of soluble calcium or phosphate carrying substrates and the thin or non-existent soil covers. The land drainages have many steep watersheds containing lakes and streams of pure water.

Spawning areas are adequate for good fish populations. Rearing areas are satisfactory for the necessary recruitment. However, a number of waters are devoid of fish by reason of a combination of elevations and barriers to upstream migrants in their outlets.

An assessment of usable areas in streams by fish as well as the potential of spawning and rearing must consider winter extreme low flows and usage by the species that cannot winter in the areas that freeze. Often flows and fish usage are a parallel relationship. Barriers are numerous in the watersheds to upstream migrating fish and are often the answer to utilization or denial of waters above them.

The greater number of lakes in the district are characterized by steep shorelines, paucity of shallows, slightly acid water carrying organic color in some degree and have considerable depths. Water exchange rates are high. Whitman Lake has been bottom contoured in the course of a survey toward more complete management.

Fish productivity of the barriered lake systems is not being taxed to production capabilities and this can also be said of many accessible waters. Where production is below normal, it is usually on the commercial salmonoids which have been depleted by removal of necessary returns of adult fish to the watershed.

Characteristically, chemical analyses are very similar on most of the fresh waters of the district. Waters carry less organic color and are less acid in the higher elevations above timberline than the lower lakes and streams. There are some lakes that are remnants, that is, they have filled in with organic and alluvial material--so, being shallow, are extremely acid and of the nature of true bog lakes. These lakes produce few fish.

An effort has been made to take steelhead eggs at a number of locations with negative results in most instances. The accessible streams of the area have spawn runs of sport fish in some degree but relatively few lend themselves to a spawn taking operation. Sources for providing a supply of trout and salmon eggs are being investigated.

Two types of intensive lake and stream surveys are currently being carried on. One is on those unexplored waters close to centers of population and the other is waters close to towns but in need of rehabilitation.

The results of the previously outlined work will provide recommendations for management use and to direct the course of future studies.

#### Findings:

Background work was checked for data that applies to the present work program activity. Planting records and previous surveys have saved considerable effort and repetitious work. With the increased tempo of road construction and the population increases in the district, there has been clearly shown an increasing need for more sport fish waters accessible to the average outdoor enthusiast. Many lakes, comparatively close to Ketchikan, are unknown to this writer and most of the local anglers. An effort has been made to explore these waters and start management measures ahead of access facilities and publicity. In some instances, there has been no follow-up on previous management measures and a number of waters in this category were checked.

Waters where work has been done previously and no assessment of results made are as follows:

Honker Lake (no name on the charts) was planted with eyed rainbow eggs in 1955. Gill netting (18 days), with varying mesh nets, produced no fish and the plant is assumed to have failed. The lake has the potential to support fish and planting should be attempted again using fry.

Whitman Lake, near Herring Cove south of Ketchikan, has been previously sampled with experimental gill nets and found to have a maximum population of undesirable char.

The City of Ketchikan has a hydro-electric development in the process of planned construction on this lake and steps toward the establishment of a popular fishery in the lake should be coordinated with construction activity. Construction is expected to be initiated in 1963.

Upper Silvis Lake, above the Beaver Falls powerhouse, was planted with rainbow eyed eggs in 1955. A population of rainbow trout is now established yielding fish up to seven pounds. This population is successfully spawning in spite of a fluctuating water level.

Blue Lake, near Deer Mountain and connected by trail (4 miles) to Ketchikan, was surveyed with the U. S. Forest Service. This lake lies at 2650 feet elevation and is ice free for about four months during the year. There are no fish in the lake now but it will support a limited population of a cold water tolerant species.

A group of lakes lying between Carroll Inlet and Thorne Arm near their entrances were extensively checked for fish population and access development. Surveys or partial surveys were obtained on fifteen of these lakes. Most are without names and, as they were visited, names tentatively assigned. This group contains several more small lakes which are known to have fish. A system of trails would connect them to each other and the beach. These trailheads are within easy access of the road system of Ketchikan by skiff or other craft. They are as follows:

(1) Cirque Lake

This lake is above Trap Lake at the entrance of Carroll Inlet on Revillagigedo Island. It lies at an elevation of 774 feet and the surface area is 25.6 acres. There are falls in the outlet. The outlet has a normal water exchange of approximately 3 c.f.s. No fish were noted and a plant of rainbow (after gill netting to positively determine the absence of fish) is recommended.

(2) Cubby Lake

This lake is located on the northwest slope of Black Mountain on Revillagigedo Island at an elevation of approxi-

mately 340 feet. It is ten acres in area. There are two permanent inlets. One, at the northeast corner has a normal water exchange of approximately 1 c.f.s. The one on the east side has a normal water exchange of approximately 2 c.f.s. There are high falls in both the outlet and the inlet. The depth of this lake is less than 75 feet. Five cutthroat were taken on sport gear. No new management is necessary on this lake at present.

(3) Grouse Lake

Grouse Lake is located on the northeast shoulder of Black Mountain on Revillagigedo Island at an estimated elevation of 640 feet. It is approximately 32 acres in area and has a depth of less than 75 feet. The outlet drains into Coho Cove with a normal flow of 5 c.f.s. There is one permanent inlet with several smaller seepages. No fish were taken in 24 gill net days. It is recommended that the lake be planted with rainbow trout.

(4) Hidden Lake

This lake lies northeast of Carroll Point at the mouth of Carroll Inlet. It has an estimated elevation of 150 feet with an area of approximately 20 acres. The lake has an estimated depth of 25 feet. There are no major inlets. There are shallow steep cataracts in the outlet with the normal flow estimated at one c.f.s. No fish were caught by gill net or spin gear. Additional information should be obtained before recommending any stocking program.

(5) Honker Lake

Honker Lake is located on the northeast corner of Black Mountain on Revillagigedo Island at an elevation of 857 feet and has a surface area of 108 acres. There are barrier falls at the outlet and it drains through Grouse Lake into Coho Cove with a normal flow of 3 c.f.s. This lake was planted in 1954 with rainbow eyed eggs. Eighteen gill net days produced no fish. A fry plant should be attempted as the lake is capable of producing trout. This lake should support a desirable fish population and an experimental plant of rainbow trout is recommended.

(6) Johnson Lake

This lake lies 3 1/4 miles north of Moth Bay at an elevation of 109 feet with a surface area of 38.4 acres. The estimated depth of this lake is 100 feet or more. There are barrier falls at the outlet and it drains into Johnson Creek with a normal flow of approximately 2 c.f.s. A climax population of cutthroat is present and needs no immediate new management measures.

(7) Lone Lake

Lone Lake is located on the northwest slope of Black Mountain on Revillagigedo Island at an estimated elevation of 550 feet with a surface area of 12.8 acres. The lake is less than 75 feet in depth. Normal flow is less than one c.f.s. There are falls at the outlet which drains into Carroll Point Creek via Cubby Lake. No fish were taken in sex experimental gill net days, however, the lake will support fish. It is recommended that this lake be planted with rainbow.

(8) Loon Lake

This lake is one mile north of Black Mountain Peak on Revillagigedo Island at an elevation of 1250 feet with a surface area of 57.6 acres. The maximum depth of this lake is approximately 34 feet. There are falls in the outlet and it drains into Ouzel Lake over several high falls thence into Revillagigedo Channel. The normal water exchange is from two to three c.f.s. No fish were caught in twenty gill net days. It is recommended this lake be stocked with rainbow trout.

(9) Narrow Lake

Narrow lake lies 2 3/8 miles northeast of Black Mountain Peak on Revillagigedo Island at an estimated elevation of 140 feet with a surface area of 32 acres. There are two major inlets. One on the northwest side with a normal exchange of one to two c.f.s. The other is on the north end with a normal flow of 8 c.f.s. The outlet is very steep but passable creek near Coho Cove

of approximately 10 c.f.s. normal flow. Nineteen cutthroat and five Dolly Varden were taken in six gill net days. No new management measures are necessary on this lake at the present time.

(10) Otter Lake

This lake is two miles north of Moth Bay at an elevation of 213 feet with an area of 77 acres. The approximate depth of this lake is 100 feet. One major inlet on the southeast corner has a normal flow of 2 c.f.s. The outlet, with a normal flow of 8 c.f.s. is on the southwest corner and drains into Coho Cove. Ten cutthroat and eight Dolly Varden were caught in four experimental gill net days. No new management measures are indicated at this time.

(11) Ouzel Lake

Ouzel Lake is on the northwest slope of Black Mountain on Revillagigedo Island at an estimated elevation of 775 feet and with a surface area of 51.2 acres. The depth of this lake is approximately 100 feet. There is one major inlet on the east and with a normal flow of two to three c.f.s. The outlet is on the southwest corner and has a normal flow of 3 c.f.s. There are falls in both the outlet and inlet. This lake is isolated between the falls and is barren at present. No fish were taken in ten gill net days. It is recommended that this lake be planted with rainbow trout.

(12) Silver Lake

This lake is on the northwest slope of Black Mountain on Revillagigedo Island at an estimated elevation of 750 feet and with a surface area of 6.4 acres. The depth of the lake appears to be less than 50 feet. The outlet has a normal flow of 2 c.f.s. No fish were noted by visual inspection of this lake. It is recommended that rainbow be planted.

(13) Snag Lake

Snag Lake is located 1.5 miles east of Carroll Point at an elevation of 150 feet and with a surface area of 33

acres. The maximum depth of this lake is estimated at 75 to 100 feet. There are two permanent inlets, both are at the east end. The first has a normal flow of one c.f.s. and the second has a normal flow of three c.f.s. The outlet drains into Carroll Point Creek with a normal flow of five c.f.s. There are falls in both the outlet and inlet. Five cutthroat were taken on one visit with sport gear. No additional management is necessary on this lake at present.

(14) Trap Lake

This lake is located east of the entrance of Carroll Inlet. The estimated elevation is 435 feet and the surface area is approximately 41.6 acres. The lake is approximately 100 feet deep. There is one major inlet from Cirque Lake above. The normal flow is 3 c.f.s. The outlet drains into Carroll Inlet opposite California Cove and there are three very high falls in it. The estimated normal flow is 5 c.f.s. Dolly Varden were taken with sport gear. Possibly a rehabilitation is in order at a future date for this lake.

(15) Blue Lake

Blue Lake is located at the back of Deer Mountain in the head of the Whitman Lake drainage. Elevation is 2650 feet and the estimated surface area is 25 acres. Maximum depth of this lake is estimated at 75 feet. The inlets consist of several small streams and three drain snowfields. The outlet has a normal flow estimated at 2 c.f.s. through a lower lake and then through Whitman Lake. The surface temperature of this lake was 49° F. at 1430 hours on September 18. The lake is barren although it is capable of supporting fish. Planting with a cold-water tolerant fish, such as grayling, is recommended.

Sport fishing in salt water is different than the relative confines of most fresh water. Certainly a few sport fish distributed over a wide expanse of water would make them relatively unavailable to the sport-gearred angler. Where fish migration travel through a narrow pass or around a point they become somewhat concentrated and the anglers chances of taking them are considerably greater.

The locations at which sport gear takes salmon in the Ketchikan district fit the above description. Many of these bear the names of headlands such as Point Alava, Point Sykes, Mountain Point and Vallenar Point. Others bear the names of islands such as Grant Island, High Island, Grindall Island and Slate Island. Some narrow channels which concentrate salmon are Bell Island Narrows (Behm Narrows), Short Pass, Clover Pass and Nichols Entrance.

King salmon are to be found all year long but in May and June the mature fish travel to their selected spawning streams and thus these large adults concentrate along the migration routes. Here anglers intercept them with greater success than at other times of the year. The same is true for silver or coho salmon except that these "run" in July, August and early September. Halibut move inshore during the warm summer months and may be taken in quite shallow water. Rockfish and ling cod seem to be sedentary and are usually found in the same locations over or along rocky reefs or shorelines at any time.

The accessibility of fish in this area depends on weather and how well equipped the angler is with boat and motor. On calm days much of the area normally fished can be covered with a rowboat. On stormy days most of this area cannot be fished with any sort of craft. Between two extremes lies the ability of the angler to handle his boat, the limits of safety of the boat and the degree of ardor of the angler.

Accommodations for anglers are scarce as compared to fishing areas in the lower 48 states. Cabins are available at Clover Pass and hotel accommodations are available in Ketchikan. Some anglers charter boats with full accommodations aboard and are thus able to fish more distant locations without loss of running time.

The species distribution of fish taken on sport gear varies for the seasons of the year, the species in question and the scope of operation of a commercial fishery working on the same species as occupies the sport fishery. These may be separated into groups of marine, anadromous and fresh water fish.

The most popular salt water fishing is for king salmon followed by coho or silver salmon. Generally all other marine fish are taken while angling for those two. This then times the incidental catch with the salmon when they are migrating to the spawning grounds and "run" past specific locations. However, there are king salmon in the district waters all year long. These "feeders" are available to those who will fish them. It is the large adult fish which bring out the angler pressure and the months of May, June and July cover the appearance of these mature fish. Also, schools of bait fish generally have salmon with them wherever they occur. The other marine fish that enter the take-home sport catch are sedentary with the exception of halibut. A person trolling along rough shores or over reefs may expect to take these incidental fish anytime. They are mostly rock-fishes (Sebastes) and ling cod. Halibut will pursue bait from the bottom almost to the surface and are not confined to smooth bottoms. They may also be taken on a trolled bait in a manner indicating they were not on bottom as their build would suggest. Other fish are regarded purely as pests. Among these are turbot (Arrowtooth Flounder) dogfish shark and Irish Lords (any cottidae).

The numbers of the marine fish taken on sport gear are maximum except for the salmon and halibut. Salmon and halibut support a large commercial fishery and do not seem to be of normal population levels. None of the others are harvested heavily and populations are not noticeably affected by the sport gear fishery. No direct attempt was made to assess the numbers of any of the marine fish.

The anadromous fish distribution has been covered for marine areas. In fresh water they may be found in the accessible streams which have spawning gravels to suit them. Depending on the stream and lake, one or more species are present in fresh water throughout the year. The residency of some species varies with individual fish, particularly the trout and char.

Some species, such as the pink and chum salmon do not depend heavily on food chains in fresh water and these species have declined by the commercial take of necessary brood stock

requirements. However, populations of cutthroat, Dolly Varden and steelhead are at the peak of production in most instances. Rainbow trout are present wherever there is a steelhead run and productivity of the particular stream system controls the numbers of these fish residing in it. A climax status describes the population balances for most accessible streams in the district for the trout-char-salmon-forage fish relationship.

The fresh water resident sport fish are found in lakes or lake connecting streams. The winter environmental factors of low food production with low temperatures and the low water flows have caused this. Game fish are cutthroat, rainbow, Dolly Varden and eastern brook trout. There are sockeye populations (Kokanee) which exist in lakes above barriers to fish migration. These fish are isolated by the geologic upheaval which established the barriers in the streams below the lakes.

Many adaptations to particular environments may be noted in the district by the indigenous fish. "Stunted" populations of Dolly Varden are common. Cutthroat seem to dominate Dolly Varden which then exist as a forage fish. Eastern brook trout will climax out sooner than any of the native species. They will completely suppress a rainbow population. Eastern brook trout interbreed with the Dolly Varden, the resulting hybrid is a credit to neither parent species. Kokanee are a forage fish for cutthroat. The salmon is not found without the cutthroat also in residence and produce the largest trout.

The numbers and age cross sections of the sport fishes in the district are normal for maximum populations with the exception of those anadromous species that also support a commercial fishery.

The age patterns are normal but the salmon and steelhead numbers are considerably below what they once were. No aging has been done from the scales taken the past season. Work previously done is the source from which the above statements have been made. There has been no significant changes in populations to alter the original findings.

Fish population sampling was conducted by means of sampling gill nets and spinning gear. When an hour or two of spinning gear effort failed to produce fish, gill nets were set in. A period of six gill net days was adequate to confirm or disprove what the spin gear indicated. When the spinning gear took fish, it was judged adequate evidence of the presence of a fish population and no further attention was given the water.

No attempt was made to establish population estimates by gill nets or other means. It was accepted that where fish were located by sport gear and there was no indication of fishing pressure (paths, litter, old camp fires, etc.), the lake was adequately stocked. No comprehensive samples were collected.

Creel census was conducted on the salt water fishery and, in one instance, where a stream guard was stationed on a popular sport fishing location twenty-one miles from Ketchikan.

Fishing pressures are not heavy by most standards particularly on the fresh water. The salt water effort is concentrated in the area adjacent to Ketchikan by a salmon derby which is not enjoying the patronage it formerly had. This is due to fewer king salmon and lack of angler interest.

An analysis of the saltwater creel census data is given in Table 1 below. The data is from checked sport geared anglers only. The areas covered are Mountain Point and Clover Pass vicinities where the greatest part of the salt water fishing from Ketchikan takes place. The time period is from May 15 to September 8.

Table 1

Month	Boat Days	Angler Days	Kings	Coho	Pinks	Chum	Hali-but	Rock fish	Angler Hours
May	34	66	8				3	11	454.5
June	57	116	18	10			3	16	772.0
July	36	60	5	18	26			7	250.0
August	31	59	4	61	41	2	1	2	477.0
Sept.	6	14	2	31	4				109.5
Totals:	164	315	37	120	71	2	7	36	2063.0

The number of boats observed fishing was in the ratio of 9.9 to 1 checked. The estimated season total is given in Table 2.

Table 2

Boat Days	Angler Days	Kings	Coho	Pinks	Chums	Halibut	Rockfish	Angler Hours
1615	3103	364	1182	699	20	69	355	20,321

Data indicated that the average angler day was 6.5 hours. It took 55.8 hours to catch a king salmon for a catch per unit effort of .02 fish per hour. The mean weights for king and silver salmon were 21.5 and 7.9 pounds respectively.

Figure 1 is a bar graph of the count of boats fishing salmon in the Ketchikan vicinity. The data is plotted by weekly intervals. The two long bars for the weeks of May 16-22 and May 30-June 4 show the pressure the Ketchikan King Salmon Derby induces. The beginning of an increase in pressure in the last of August and early September is largely sport geared commercial fishing on coho salmon induced by a surge of cohos and a high market demand for the fish.

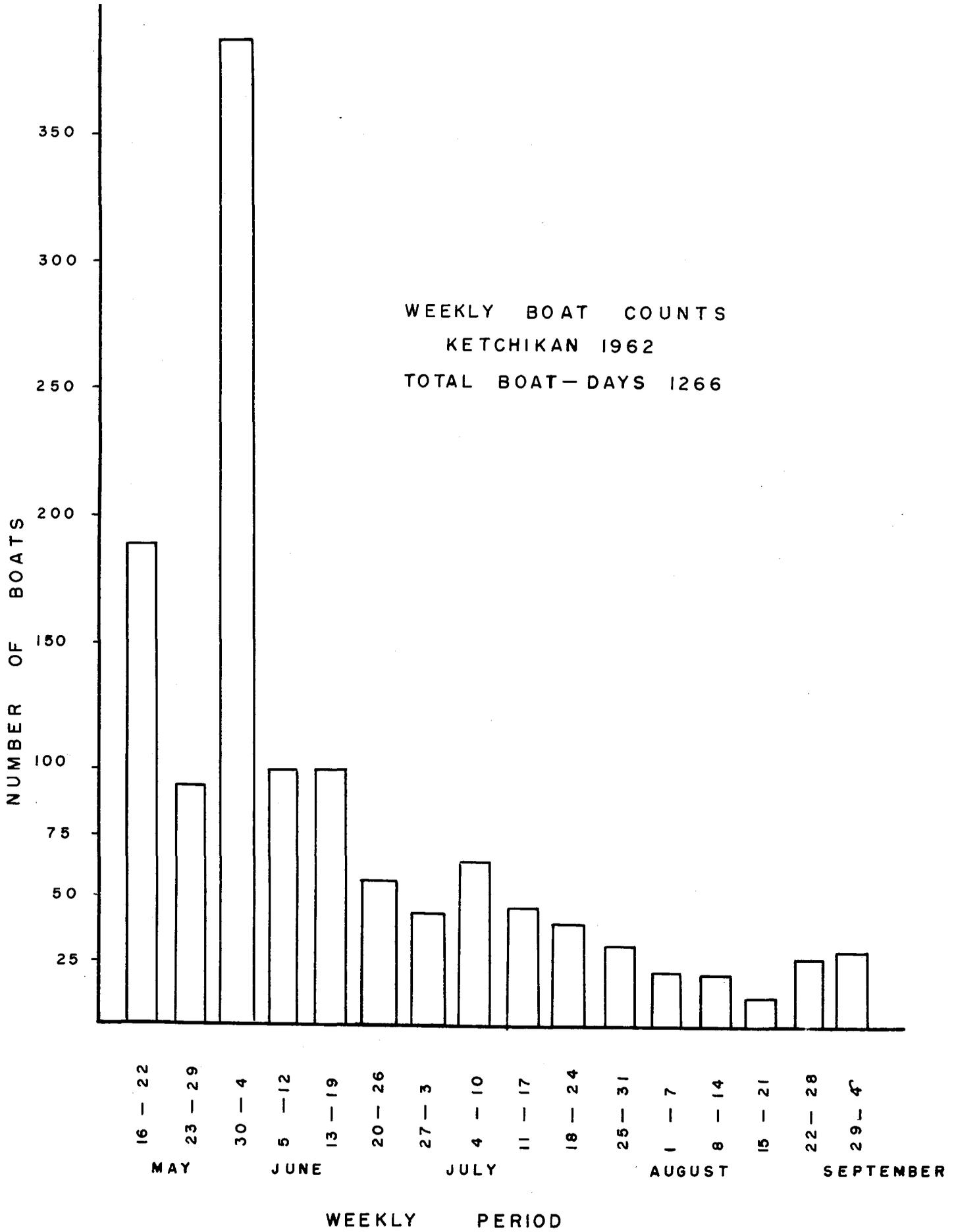


FIGURE 1  
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The sport-gearred fishing in the Ketchikan vicinity took an extrapolated total of 364 king salmon at average weight 21.5 pounds, ranging from 7.0 pounds to 43.0 pounds. The data period is May 15 through September 7. Included in the catch were 1182 silver salmon, 699 pinks, 69 halibut, 20 chum salmon and 355 rockfish. The total of angler days is figured to be 3, 103 and the effort is 20,321 angler hours in 1615 boat days.

The sport-gearred salmon fishery in the Bell Island area in North Behm Canal and 45 miles from Ketchikan is different than the Ketchikan vicinity fishery. The fish are migrating through Behm Narrows which concentrates them. During the time of the run of king salmon at Bell Island, the area is closed to commercial salmon fishing and the limit of one king salmon per angler per day is in effect. A summer temporary enforcement employee is stationed at Bell Island Resort during the restricted fishing period. He recorded the catch landed at Bell Island. Much of the angling effort is by non-residents.

A total of 121 angler days of which 42 were put in by non-resident anglers produced 65 king salmon ranging in size 8 to 42 pounds. The average weight for these fish was 22.6 pounds. There were very few immature fish in the catch. The period of this data is from June 2 through August 20. No king salmon were taken after July 16. It is estimated that less than 100 king salmon were taken at Bell Island.

Notable in the creel census on salt water is the number of rockfishes and halibut. The rockfishes are of a size that the angler can handle on the usual sport gear. Halibut, on the other hand, often occur as customers that salmon gear was never meant to deal with. The result is that relatively few halibut over 100 pounds are brought in on sport gear.

Scale samples were obtained from fresh and salt water fish. To date, none of these scales have been read. The samples will be read as opportunity permits and reported at a future date.

Creel Census on fresh water angling was limited to information recorded by enforcement summer employees. These

people were placed on locations that pose a temptation to net fishermen because of salmon concentration. Sport fish also collect at these places and, in some instances, are utilized by rod and reel anglers. The only location that yielded appreciable data was the Naha River which is 21 miles from the center of Ketchikan. Here a public moorage is provided by the U. S. Forest Service which greatly facilitates the angler use of the Naha drainage. Another location, Kegan Creek, on Moira Sound, Prince of Wales Island, is also a good sport fishing spot. However, the Kegan Creek system gets only occasional use because of the open water-weather hazard imposed by Clarence Straights which must be crossed. This can get very rough for small boats. No significant data was collected at Kegan Creek. Stream guards were few for the 1962 season and no other sport "productive locations" were effectively covered for sport catch data.

Examination of the Naha data reveals inaccuracies by knowledge of the river system. Also, certain parties of anglers are listed with no catch noted and is in error. There is a summer camp on the river 2 1/4 miles from the check point of the moorage. None of the anglers at the camp were checked as it was not compatible with the stream guard's basic job. Considerable subsistence fishing for salmon by net was done and is not included in the sport fishing information drawn from the recorded raw data.

The following numbers indicate the trend of the sport fishing effort in the Naha River and is exemplary of the Ketchikan area.

Table 3.

Month	Fishing Days	Angler Days	Angler Hours	Catch
June	10	39	274	52 trout*
July	7	31	238	89 trout 8 pink salmon
August	1	2	14	0
September	2	8	66	35 trout*

\* Trout here includes rainbow, cutthroat and Dolly Varden as some anglers are unable to distinguish one for the other.

Little or no fishing takes place in the Naha River after September 15. This includes the winter steelhead fishery which enjoys limited popularity. The low pressure shown for August and September is related to the opening of the deer season on August 1, and not to the availability of fish in the river.

Past work on the physical, chemical and biological characteristics of waters in the Ketchikan area have shown the status quo under the existing natural conditions. Most of the area is quite steep with comparatively insoluble substrates of non-calcareous rock. The normal 160 inches of rain per year flushes the watersheds heavily and allows little collection of the meager soluble soil minerals. Soil covers are thin or non-existent. Dissolved solids are less than 20 parts per million. Oxygens are close to saturation as a rule for all but shallow muskeg ponds. The alpine lakes are less acid and of softer water than the lowland waters. Plankton production under such conditions is understandably low with corresponding low fish population densities of resident species.

An attempt was made to obtain steelhead eggs at the Lake Eva weir on Baranof Island. Either the run was lower than usual or part of it was missed as relatively few fish were taken resulting in a total take of 25,000 eggs. The pickoff was high on these due to over-retention of the adult fish and "dry" males encountered during the final egg take. The promise of a possible take of eggs from cutthroat was worthy of note. It was expected that adequate numbers of silver salmon for a limited egg take would appear at this weir. The subsequently proved true. Also, Dolly Varden spawn will be available at this site when the technique of handling these fish is fully understood.

A number of other locations have been assessed of their potential as a further source of eggs. Also, as new waters are surveyed, note is made of possibilities along this line.

The lake and stream survey activity has been previously covered in this report. The number of lakes in the vicinity of Ketchikan is unknown and beyond comprehension by most people. There will be waters to survey for many

years to come. As the projected road systems approach reality, many waters now inaccessible will be within easier reach of the outdoor enthusiast and must be ready for him. Work is proceeding to meet this need.

Examination of the fishing pressure and catch data of the trout fishery for the Ketchikan area indicates that sport anglers are not taking what the waters will produce. Present regulations on this fishery are designed to give the angler ample fish for home consumption and prevent waste in a manner that can be enforced. No change is necessary in the current trout fishery regulations. The salt water fishery in the Ketchikan area is another matter, however. The more important salmonoids are in critical condition due to over-harvest. Management here shall be dictated by the requirement for species perpetuation and the surplus for harvest. The utilization of fish above the brood stock need shall be cooperatively determined by the management agencies charged with species perpetuation, and the harvest regulated to do the greatest good for the greatest number of people. Marine fish, other than salmonoids which are taken on sport gear are not depleted or in need of further management at the present time.

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