US FISH & WILDLIFE SERVICE--ALASKA
3 4982 00028070 0

1216

A Special Report on Fishery Resources

of the

KENAI PENINSULA

February 1957

FWLB
1216

FWLB
1216

US FISH & WILDLIFE SERVICE--ALASKA
3 4982 00028070 0

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

JUNEAU, ALASKA

A Special Report on Fishery Resources

of the

KENAI PENINSULA,

Territory of Alaska

February 1957

For Administrative Use Only

Merged With
A.R.L.I.S.
ANCHORAGE, ALASKA
Est. 1975
LIBRARY
USFWS
Anchorage
GL1216

ARLIS
Alaska Resources
Library & Information Services
Anchorage Alaska

TABLE OF CONTENTS

PREFACE II

GENERAL 1

Location and Topography 1
Climate 1
Hydrology 2
Settlement and Resources 2
Minerals 4
Forests 4
Agriculture 5
Transportation 5
Population 6

COMMERCIAL FISHERY 7

General 7
Method Used 7
Miscellaneous 14

SPORT FISHERY 16

Area Covered 16
Method Used 16
Areas Checked 17
Other Sport Fishery Areas 25

CONCLUSION 26

REFERENCES 27

P R E F A C E

Since the cessation of hostilities in 1945, Alaska has experienced a rapid growth of both population and industry. Concommitant with this development has been an ever increasing demand for hydro-electric power and during more recent years, for other industrial and land-use development. The Greater Anchorage area, which has a population in excess of 100,000 during the summer months, is most in need of the hydro-electrical development, while the entire area, and in fact the Territory of Alaska, is requesting industrial and land-use developments.

Most of the hydro-electric sites in the immediate Anchorage area have been developed or have been found unsuitable for power production. Recently the Kenai peninsula to the south of Anchorage has been investigated for such developments, primarily to serve the Greater Anchorage area.

Although hydro-electrical projects are not necessarily detrimental to the fishery resources of an area, sites on the Kenai which have been and future areas where projects might be licensed, may greatly affect the over-all fishery resources of the Kenai peninsula and surrounding waters. Similarily, various land-use or industrial development programs may als o materially affect such fishery resources. The clearing, grazing and farming of land; exploration and development of oil; mining; and in fact, almost any development program may adverseley affect natural aquatic resources by pollution, stream water, etc., unless provisions for the safeguarding of such resources are recognized and incorporated into such programs in the planning stage.

This report attempts to evaluate the existing fisheries from an over-all standpoint. It strives to be an objective evaluation and is broken down into two primary sections, values associated with commercial fishery resources, and the value of the sport fishery. It has not been prepared to determine or compare the relative values of sport or commercial fisheries, but rather the comprehensive values of all fisheries in order that these resources may be adequately considered during the course of various hydro-electric, industrial, and land-use development programs, and their more specific impact upon such resources.

Special acknowledgment is due Messrs, Mahaffey and Skerry, Fishery Management Biologists for Cook Inlet, and Carl Elling, Fishery Research Biologist with the Pacific Salmon Investigation Branch, for their considerations of the commercial aspects of the fishery; Roger Allin, Fishery Management Biologist, Section of Federal Aid in Game Fish, for contributions on sport fishing pressure; Robert F. Scott, Supervisor, Game Restoration, for help in the statistical analysis; and others too numerous to list, but who materially contributed to this report.

GENERAL

Location and Topography

The Kenai Peninsula is located in south-central Alaska between 148° and 152° west longitude, 59° and 61° north latitude. The western part of the Kenai Peninsula bordering Cook Inlet is a low alluvial plain extending from the water to the mountains and averaging 30 miles in width. The Kenai Mountains cover the eastern and southern part of the peninsula from Turnagain to Kachemak Bay. In the southern portion of the peninsula are many high, steep, precipitous areas, many of which are perpetually covered by glacial fields.

Climate

Climate of the Kenai Peninsula may be classified as humid sub-artic. Temperature, precipitation and other climatic elements are transitional in the west, mild coastal regions bordering the Gulf of Alaska and the cold, dry interior north of the Alaska Range. The extensive coniferous forests (found inland from Cook Inlet) with heavy underbrush, characteristic of the lower elevations, have a taiga-type climate. With increasing elevation, the climate becomes progressively more severe and much of the higher portion has a tundra-type climate with lower vegetation forms such as bushes, mosses and lichens. Northward sloping areas of the highest peaks have quasi-permanent snow fields indicating that a polar type climate may be approached.

Principal climatic controls are the topography, the proximity to the Pacific Ocean and the Gulf of Alaska and the general atmospheric circulation over the area. The Aleutian low, a semi-permanent low pressure trough which persists over the general north Pacific Ocean region, is the most significant atmospheric circulation feature affecting the area. It tends to follow the annual march of the solar altitude, weakening and moving northward into the Bering Sea in the summer and strengthening and moving southward into the Gulf of Alaska in the winter. The general storminess of the region is due to cyclonic storms associated with the Aleutian low and the tendency is for successive storms to cross the area in a series in a generally west-to-east direction. Normally these storms follow a path somewhat to the south of the Kenai Peninsula, but occasionally

the storms move directly over the peninsula or to the north into central Alaska. Although the Kenai Peninsula is subject to frequent fog and winter cyclonic storms, thunderstorms are rare and tornadoes and hurricanes are unknown.

April through July is normally the period of least precipitation and September and October the months of greatest precipitation. Frequently, over half the annual precipitation occurs in the four month period September through December. Much of this late summer and early winter precipitation is directly associated with the renewed activity of the Aleutian low with south or southeast winds importing moisture laden air from the Gulf of Alaska. A substantial portion of the winter precipitation falls in the form of snow, much of which is retained in natural storage in that form until the following summer. About three-fourths of the precipitation above elevation 2,500, which comprises a major portion of the peninsula, falls as snow.

Considering all the stations in the Kenai Peninsula, Cook Inlet area minimum temperatures of record are generally between -30°F. and -50°F. Extremely cold periods are generally caused by a high pressure area stagnating over center Alaska and expanding to dominate the circulation over the Kenai Peninsula. December, January and February are the favorite months for extreme cold spells which are usually of three to ten days duration over the Kenai and contiguous areas. Table 1 shows pertinent climatological conditions.

Hydrology

The stream flow regimen on the Kenai Peninsula differs considerably from the annual precipitation pattern in that peak run-off normally occurs in June or July at which time the precipitation is usually low. The summer freshet is produced largely by snow melt run-off and is therefore characterized by a slow gradual rise and recession, often extending over a period of several weeks. Minimum flows usually occur in the late winter or spring season before the advent of the summer heat necessary to melt the snow.

Settlement and Resources

Settlement of the Kenai Peninsula area began in 1788 by the Russian colonists of Kasilof, Kenai and in the Kachemak Bay area. However, it was only in 1880 that considerable activity in gold mining and salmon fishing began to

TABLE 1

CLIMATOLOGICAL SUMMARY FOR SELECTED LOCATIONS

KENAI PENINSULA

Station	Period of Record (Years)	Average Annual Precipitation (Inches)	Precipitation Min.	Precipitation Max.	Average Snowfall (Inches)	Average Growing Season (Days)	Average Temperature Data (in degrees F.) Jan.	May	Jul.	Sep.	Ann. Mean	Max.	Min
Homer	11	27.2	17.1	32.3	61.5	114	24.0	43.2	53.5	47.1	38.1	79	-38
Kasilof	10	17.8	5.9	22.0	59.6	84	13.8	43.3	54.6	47.0	35.0	79	-38
Kenai	14	18.8	18.9	19.5	66.8	94	11.4	43.5	53.9	46.1	33.8	78	-35
Seward	32	68.8	50.1	93.0	86.7	131	23.2	44.6	55.3	49.0	39.2	85	-20
*Anchorage	29	14.6	10.5	18.9	59.0	121	11.6	45.0	57.0	47.8	35.0	92	-36

*Typical of northern Kenai Peninsula

bring populations into the area. In 1903, the construction of a railroad from Seward to the Mantanuska coal fields was started but ended in failure. In 1914, the Federal Government began construction of what is now the Alaska Railroad, running from Seward on the Kenai Peninsula to Fairbanks, north of the Alaska Range.

Minerals

It is generally believed that the entire peninsula is well mineralized. However, emphasis of commercial mining -- reflecting traditional interest -- has been for gold, coal, and more recently for chromite. In addition, clay, copper, granite, gravel, gypsum, lead, limestone, molybdenum, platinum, pumice, sandstone and tungsten are known to exist in the area. In the Homer area at the southern end of the Kenai is a coal field with the major portion of the coal ranking from bituminous to sub-bituminous with some anthracite. Across Kachemak Bay from Homer are extensive deposits of chromite. These have been known and recognized for a number of years as the only important source of metallurgical "lump" chromite available to the United States within its own confines. During the past two years an active mining operation has been shipping high grade ores for government stockpile purposes. It has been estimated that a very substantial quantity of lower grade ore exists in the area. Also, in Kachemak Bay are limestone deposits known to have some important extent. Recent unofficial reports indicate possibilities of massive quartzite deposits.

For the past two or three years there has been tremendous exploratory and land-leasing activities on the part of major oil companies. These companies have carried out extensive programs of geophysical work, particularly starting with 1955, and have undertaken major programs of drilling to very great depths. This activity has been centered to no small extent along the west coast of the Kenai Peninsula on Cook Inlet.

Forests

Forest resources of the area are partially in the Chugach National Forest and the National Moose Range, a refuge of the U. S. Fish and Wildlife Service. On the extreme southern tip of the Kenai Peninsula on Kachemak Bay, are stands of hemlock and spruce. These species are also found in the Chugach Range lowlands from Skilak Lake northward to Turnagain Arm

and eastward to Prince William Sound. These hemlock and spruce of the Kenai Peninsula, as well as some of the spruce-birch stands, are of the greatest commercial interest. However, present utilization is in small sawmills scattered in various parts of the area in proximity to population centers.

Agriculture

Agriculture utilization of the land on the Kenai was started on a very small scale by Russian colonists in the Kachemak Bay area in 1793. Presently, farming on the Kenai Peninsula is limited to the Homer, Ninilchik and Kenai sections. The Soil Conservation Service estimates 155,000 acres may be suitable for crops, while another 132,000 acres may be utilized for grazing and pasture. Principal vegetable crops successfully grown include potatoes, beets, carrots, turnips, rutabagas, onions, radishes, cabbage, celery, lettuce, cauliflower, broccoli, green peas and rhubarb. Dairying has developed to be an important farming activity in some areas. In 1954, it was estimated by the Alaska Agricultural Experiment Station that dairy products, livestock, poultry and vegetables had a total value commercial production of about $156,000.

Transportation

The Alaska Railroad, a modern facility now completely Dieselized, crosses the Kenai Peninsula from the year-around ice-free ports of Seward and Whittier, the latter port being a strictly military installation. Presently, ocean borne cargo is discharged at both of the terminii for rail transportation to various railbelt points along the Kenai Peninsula route to Anchorage. Trucking companies handle ocean borne cargo to and from Seward. Sea-train operations are expected to begin in the near future, from Seattle to Seward and Whittier with roll-off operations to the Alaska Railroad. The two principal companies engaged in ocean transport are the Alaska Steamship Company and Coastwise Lines.

Highway and road systems serve much of the Kenai Peninsula. From Seward to Anchorage, a modern, paved highway covers the Kenai Peninsula for some 140 miles serving Moose Pass, Lawing, Portage and Girdwood. From Homer, at the western extremity of the Kenai Peninsula, the Sterling Highway - a good gravel road partially hard surfaced and soon to be completely hard topped and approximately 130 miles long - follows the western shore of the peninsula along Cook Inlet providing access to the communities of that area including Ninilchik, Cohe, Kasilof, Kenai, Soldotna and Cooper Landing. It joins the Seward Highway about 13 miles from Cooper Landing. Airplane transportation is highly developed in the

general area, and Anchorage to the North across Turnagain Arm is considered the hub for the facility. Kenai, Seward and Homer are served daily by major airlines with charter trips available at almost any time to any area of the Kenai.

Population

In the past 10 years, the population of the Kenai Peninsula has increased substantially. The 1950 census revealed the population shown in Table 2.

TABLE 2. 1950 POPULATION - KENAI PENINSULA

Town	Population
Anchor Point	65
Cooper Landing	60
Homer	1,214
Hope	63
Kasilof	62
Kenai	321
Moose Pass	70
Ninilchik	97
Portage	34
Seward	4,822
Total	6,808

In addition, the Anchorage area, just north of the Kenai Peninsula supports a winter population of about 60,000. In the summer construction period and including military personnel, it is estimated that more than 100,000 people reside in the greater Anchorage area.

COMMERCIAL FISHERY

General

The commercial fishery associated with the Kenai Peninsula constitutes the most important resource and industry yet developed in the area. All five species of salmon, reds (Oncorhynchus nerka), kings (O.tshawytscha), chums (O.keta), cohos (O.kesutch), and pinks (O.gorbuscha), spawn in the streams of the peninsula. The data regarding these runs were obtained from the annual reports of the Fishery Management Biologists for the Cook Inlet district, Cook Inlet Lake and Stream Records, 1927-1955, as compiled by the Fish and Wildlife Service and Fishery Research Institute of the University of Washington.

Method Used

In essence, the primary purpose of this report is to determine quantitatively, the value of the Kenai Peninsula fisheries. To fulfill such a requirement for the commercial aspects of the fishery, it was necessary to determine the percentage of the Cook Inlet pack of canned salmon attributable to the waters of the Kenai. Unfortunately, there exists at present no precise method of making such a determination. The premise was used that annual escapement to the streams is proportionate to annual pack -- the percentage of the total Cook Inlet escapement that was found in the waters of the Kenai was assumed to be the same percentage the Kenai Peninsula streams contributed to the Cook Inlet pack. An example would be the Upper Kenai which contributes 3% of the observed escapement of the Inlet. Therefore, it was assumed that this area produced 3% of the Cook Inlet pack. Although errors may be introduced by this method, it is the best yet known. Table 3 gives the breakdown by species for all areas of Cook Inlet and the percentage by the Kenai Areas.

TABLE 3. COOK INLET SPAWNING AREA CONTRIBUTION

BY SPECIES (IN PER CENT)

Area	Reds	Kings	Cohos	Chums	Pinks*
Susitna	14.0	61.0	53.0	34.0	43.0
West Side	7.0	8.0	11.0	14.0	15.0
Upper Inlet	17.0	3.0	12.0	10.0	10.0
Upper Kenai	3.0	5.0	6.0	9.0	5.0
Lower Kenai	27.0	18.0	10.0	21.0	22.0
Kasilof Drainage	28.0	5.0	5.0	7.0	4.0
Resurrection Bay	0.5	0.0	2.0	2.0	0.5
English Bay	3.5	0.0	1.0	1.0	0.5
TOTAL	100.0	100.0	100.0	100.0	100.0
KENAI PERCENT	62.0	28.0	24.0	40.0	32.0

*Even years only, odd years 90% Lower Kenai fish.

Data for the red salmon escapement is based on information compiled from 1952-1955 by the U. S. Fish and Wildlife Service and Fishery Research Institute. Percentages for the other four species is based on annual reports of the Fishery Management Biologist for the Cook Inlet district and the estimates of Carl Eiling, John Sherry and Robert Mahaffey, the research and management biologists of the district.

After escapement percentages were determined, a tabulation was made of the past 10 year pack of Cook Inlet by species and values. (Value in this case are the opening prices or on prices at which the bulk of the pack was sold. It is recognized that this "Value" does not represent the "final value" of the product since the retail market value is much higher due to additional marketing costs.) The last 10 years were used to determine the average annual pack and value since it is believed that period indicates a better representation of current value and pack than the longer period of record available. These data are shown in Tables 4, 5, 6, 7 and 8, and reveal that 48.5% of all salmon packed in Cook Inlet are dependent on the Kenai waters.

TABLE 4

RED SALMON

YEAR	TOTAL COOK INLET CASE PACK	CASE VALUE	TOTAL VALUE COOK INLET PACK	COMPUTED KENAI CASE PACK	TOTAL VALUE KENAI CASE PACK
1955	79,006*	$ 33.00	$2,607,198.00	48,984	$1,616,472.00
1954	111,228*	28.75	3,197,230.00	68,961	1,982,629.00
1953	122,262	28.50	3,484,467.00	75,802	2,160,357.00
1952	94,943	28.60	2,715,370.00	58,865	1,683,539.00
1951	177,516	31.85	5,653,885.00	110,060	3,505,411.00
1950	207,032	29.43	6,092,952.00	128,360	3,777,635.00
1949	165,588	26.36	4,364,900.00	102,665	2,706,249.00
1948	133,828	26.55	3,553,133.00	82,974	2,202,960.00
1947	106,180	23.38	2,482,488.00	65,832	1,539,152.00
1946	105,065	19.55	2,054,021.00	65,140	1,273,487.00
TOTAL	1,302,648		$36,205,644.00	807,643	$22,447,891.00
AVERAGE	130,265	$ 27.79$	3,620,564.00	80,764	$ 2,244,789.00

TABLE 5

KING SALMON

1955	15,006*	$ 17.50	$ 262,605.00	4,202	$ 73,535.00
1954	23,996*	24.50	589,902.00	6,719	164,616.00
1953	29,186	27.64	806,701.00	8,172	225,874.00
1952	22,898	26.76	612,750.00	6,411	171,558.00
1951	59,955	28.41	1,703,322.00	16,787	476,919.00
1950	34,247	28.54	977,409.00	9,589	273,670.00
1949	31,234	25.17	786,160.00	8,746	220,137.00
1948	32,688	28.94	945,991.00	9,153	264,888.00
1947	30,719	27.54	846,001.00	8,601	236,872.00
1946	17,191	21.25	365,309.00	4,813	102,276.00
TOTAL	297,120		$7,896,150.00	83,193	$2,210,345.00
AVERAGE	29,712	$ 26.58$	789,615.00	8,319	$ 221,035.00

*Case values for years 1954-1955 are computed from Pacific Fisherman Yearbook computations and are based on opening prices or on prices at which the bulk of the packs were sold. Case values for years 1946 through 1953 are taken from Alaska Fishery and Fur-Seal Industries Reports.

TABLE 6

COHO SALMON

YEAR	TOTAL COOK INLET CASE PACK	CASE VALUE	TOTAL VALUE COOK INLET PACK	COMPUTED KENAI CASE PACK	TOTAL VALUE KENAI CASE PACK
1955	13,698*	28.50	$ 390,393.00	3,288	$ 93,708.00
1954	32,956*	23.50	774,466.00	7,909	185,862.00
1953	19,883	19.67	391,099.00	4,772	93,865.00
1952	20,206	21.34	431,196.00	4,849	103,478.00
1951	27,786	25.28	702,430.00	6,669	168,592.00
1950	63,565	26.43	1,680,023.00	15,256	403,216.00
1949	26,783	20.82	557,622.00	6,428	133,831.00
1948	29,462	25.55	752,754.00	7,071	180,664.00
1947	34,430	22.68	780,872.00	8,263	187,405.00
1946	35,835	17.30	619,946.00	8,600	148,780.00
TOTAL	304,604		$7,080,801.00	73,105	$1,699,401.00
AVERAGE	30,460	$23.24	$ 708,080.00	7,311	$ 169,940.00

TABLE 7

CHUM SALMON

1955	29,450*	$20.50	$ 603,725.00	11,780	$241,490.00
1954	91,979*	15.50	1,425,675.00	36,792	570,276.00
1953	41,557	13.43	558,111.00	16,623	223,247.00
1952	30,099	15.66	471,350.00	12,040	188,546.00
1951	23,741	15.18	360,388.00	9,496	144,149.00
1950	52,572	19.55	1,027,783.00	21,029	411,117.00
1949	21,844	15.17	331,373.00	8,738	132,555.00
1948	38,086	20.33	774,288.00	15,234	309,707.00
1947	21,183	17.64	373,668.00	8,473	149,463.00
1946	31,593	10.53	332,674.00	12,637	133,068.00
TOTAL	382,104		$6,259,035.00	152,842	$2,503,618.00
AVERAGE	38,210	$16.38	$ 625,904.00	15,284	$ 250,362.00

*Case values for years 1954-1955 are computed from Pacific Fisherman Yearbook computations and are based on opening prices or on prices at which the bulk of the packs were sold. Case values for years 1946 through 1953 are taken from Alaska Fishery and Fur-Seal Industries Reports.

TABLE 8

PINK SALMON

YEAR	TOTAL COOK INLET CASE PACK	CASE VALUE	TOTAL VALUE COOK INLET PACK	COMPUTED KENAI CASE PACK	TOTAL VALUE KENAI CASE PACK
1955	62,454*	$22.50	$1,405,215.00	56,209	$1,264,703.00
1954	135,353*	21.00	2,842,413.00	43,313	909,573.00
1953	27,687	17.59	487,014.00	24,918	438,308.00
1952	127,926	18.52	2,369,190.00	40,936	758,135.00
1951	22,804	20.84	475,235.00	20,524	427,720.00
1950	62,528	23.42	1,464,406.00	20,009	468,611.00
1949	19,139	16.00	306,224.00	17,225	275,600.00
1948	75,678	22.65	1,714,107.00	24,217	548,515.00
1947	30,072	17.92	538,890.00	27,065	485,005.00
1946	60,101	10.67	641,278.00	19,232	205,205.00
TOTAL	623,742		$12,243,972.00	293,648	$5,781,375.00
AVERAGE	62,374	$19.69	$ 1,224,400.00	29,365	$ 578,138.00

*Case values for years 1954-1955 are computed from Pacific Fisherman Yearbook computations and are based on opening prices or on prices at which the bulk of the packs were sold. Case values for years 1946 through 1953 are taken from Alaska Fishery and Fur-Seal Industries Reports.

TABLE 9

CONTRIBUTION OF KENAI RIVER TRIBUTARIES

TO KENAI RIVER RED SALMON

(In Percentages)

LOWER RUSSIAN RIVER	23.1
UPPER RUSSIAN RIVER	10.9
UPPER RUSSIAN LAKE	14.4
UPPER RUSSIAN CREEK	30.0
UPPER KENAI RIVER	0.7
MOOSE CREEK	1.7
CARTER CREEK	0.1
HIDDEN LAKE	7.7
HIDDEN CREEK	2.1
QUARTZ CREEK	3.9
MUD LAKE	0.9
GRANT CREEK	T
TRAIL RIVER	T
JOHNSON CREEK	T
PTARMIGAN CREEK	1.8
JEAN LAKE	0.5
JEAN CREEK	1.2

The Kenai River system has recently been the subject of semi-intensive investigations for hydro-electric development. Since this drainage supports about 27% of the Cook Inlet red escapement and pack valued at about $606,000 annually (27% x $2,244,789), this drainage has been further subdivided to show where the component escapement and spawning takes place. By this method, information is immediately available as to the approximate worth of streams in this drainage. Table 9 reflects these various streams' percentage escapement.

Miscellaneous

In addition to the case pack value of salmon, other facets of commercial nature are developing. Shell fish, including King crab, shrimps, and clams are marketed from Kachemak Bay and the west coast of the Inlet. Frozen and fresh king salmon find a ready market in the immediate area and elsewhere additionally, reduction of salmon parts takes place for oil and meal to a limited extent. Pertinent data are shown in Table 10.

TABLE 10. MISCELLANEOUS COMMERCIAL PRODUCTS

KENAI PENINSULA - 1955

Item	Amount	Unit Value	Total Value
King Crab	1,212,348 lbs.	.095 lb.	$115,173
Shrimp	32,176 lbs.	.25 lb.	8,044
Clams	6,161 lbs.	1.25 lb.	7,701
King Salmon (frozen)	64,450*		
28%	18,046 lbs.	.32 lb.	5,755
Salmon Oil	11,100 gals **		
Salmon Meal	109 tons **		
48.5% of all salmon to Kenai	5,384 gals	.62 gal.	3,338
	52.9 tons	11.89 ton	6,983
TOTAL			$147,014

*28% of kings spawn in Kenai waters, therefore 28% attributable to Kenai.

**48.5% of all salmon spawn in Kenai waters; 48.5% attributable to Kenai.

Summary of Commercial Fishery Values

Table 11 is a summary of average annual values for commercial fishery products of the Kenai Peninsula.

TABLE 11. SUMMARY OF VALUE

Item	Case Pack	Value
Red Salmon	80,764	$2,244,789
King Salmon	8,319	221,035
Coho Salmon	7,311	169,940
Chum Salmon	15,284	250,362
Pink Salmon	29,365	578,138
Miscellaneous (1955)		147,014
TOTAL	141,043	$3,611,278

SPORT FISHERY

Area Covered

The areas covered for the sport fishery economic analysis were Anchor River; Cooper Creek; Crescent Creek; Deep Creek, Hidden Lake; the Kenai River in three sections, that portion between Skilak Lake to Kenai Lake, the area from Skilak Lake to the Moose River junction, and from the Moose River to Soldotna. Other areas included the specific confluence of the Moose River with the Kenai River; Ninilchik River; Quartz Creek; Starisky Creek; and the Lower Russian River. Many other areas which are fished were not covered either because of relative isolation or the limitations of time and manpower. However, comparison between these existing but unchecked areas were similar to some of the areas which were investigated. Therefore, these areas may be generally evaluated.

Method Used

The creel census clerk located the fisherman, contacted him to find out how many people were in his particular party, the point of origin of this trip, days per trip, costs of their particular trip for fishing, broken down by transportation, food, lodging, rental of boat and motor, cost of bait, miscellaneous costs such as camping site fees, and other miscellaneous expenses incurred during the fishing trip.

Upon completion of the field work, the data for the economic portion were tabulated with the basic unit being man-days per trip. Each sheet was summarized by total man-days on that sheet. Total expenditures on that sheet were averaged which resulted in an average trip expenditure per man-day. The total expenditures for all sheets for a given area were divided by the total number of man-days for all sheets to give a mean figure in dollars and cents for average trip costs per day per person, which was then statistically analyzed. All pertinent figures are shown in the following pages of the report.

Investment costs (such as equipment, clothing, etc.) was taken from a report by Dr. John Buckley of the University of Alaska based on his Territorial Survey Fiscal Year 1952. It is believed this 1952 investment cost of $6.79 per day is conservative for 1955 due to the increased costs which have accrued in that period.

As stated previously, the task of computing total man days for each particular stream or site was determined by the Branch of Federal Aid. The total calculated number of fishermen (determined by D-J) was multiplied by the total number of days on a trip to give the total number of man-days on any particular area during the summer. Actually about 17.5% of the calculated fishing pressure was checked by the Creel Census Clerk. The various sites are shown in Figure 1 and the estimated fishing pressure and expenditures are summarized in tables 12, 13 and 14. Salient physical characteristics of the individual streams are as follows:

QUARTZ CREEK - Quartz Creek enters Kenai Lake approximately four miles east of Cooper Landing. It is a stream of good size and moderate gradient. In the upper limits of the stream the water is clear, however, the portion below the confluence with Crescent Creek is glacial. The average width of Quart Creek is 50 feet with an average depth of 30 inches. The lower portion of Quartz Creek has been developed into several camp sites and there are many summer homes in the vicinity. Consequently this particular stream has become an important recreational area.

Kings, Cohos and a few pinks have been observed in this stream as well as red salmon, with Dolly Varden and rainbow being the two principal sport species.

CRESCENT CREEK - Crescent Creek joins Quartz Creek near the Sterling Highway above Kenai Lake. It is a moderate sized stream with turbidity varying from glacial to clear depending on weather conditions. It has an average depth of about 18 inches, averages about 30 feet in width and has a moderate to steep gradient.

Dolly Varden, king, a few reds and coho salmon have been observed in this creek.

COOPER CREEK - Cooper Creek enters the Kenai River about 2 miles west of Cooper Landing adjacent to the Sterling Highway. It is a moderate sized, clear stream with a steep gradient averaging about 23 feet in width and has an average depth of about 18 inches. A trail follows the stream for about a mile upstream from the road crossing, however, beyond this point, going is extremely difficult since the stream cuts through a narrow canyon and the banks are steep on

both sides. There are several excellent camp sites near the mouth of the stream at the Kenai River, all accessible by road.

Species known to be present in Cooper Creek are kings, cohos and red salmon. Dolly Varden are the only trout which have been observed in the stream although one lake trout was taken in 1952.

LOWER RUSSIAN RIVER - The Lower Russian River is a rather large, clear stream which drains lower Russian Lake. It has an average width of about 60 feet, an average depth of about 30 inches, a steep gradient and is accessible for about four miles. It enters the Kenai River at Hanton's Kenai Lodge, 16 miles west of Cooper Landing.

Species known to be present are red, king, cohos and a few pink salmon, as well as Dolly Varden and rainbow or steelhead trout.

HIDDEN LAKE - Hidden Lake lies in a valley just north of Skilak Lake. It is approximately five miles long and one and one-half miles wide and is a clear lake with fair beaches. There is a new road which connects the lake to the Sterling Highway. This road travels north along the east side of the creek and ends approximately 1/8 of a mile from the outlet of the lake. Boats are presently carried in the remaining distance.

Lake trout and red salmon are the principal species found in this lake.

UPPER KENAI RIVER - The Upper Kenai River is that portion of the Kenai River between Kenai and Skilak Lake. It is a large glacial stream with a moderate gradient and has an average width of about 275 feet, having an average depth of about 60 inches.

The species known to be present are kings, reds, and coho salmon, as well as Dolly Varden and steelhead or rainbow trout.

MIDDLE KENAI RIVER - The Kenai River below Skilak Lake is similar in character to that portion from the Upper Kenai River between Kenai and Skilak Lakes. There are several summer cabins located in this portion of the river accessible only by boat or by air.

KENAI-MOOSE CONFLUENCE - The Moose-Kenai River junction is located near the town of Sterling. Moose River is a rather large, slow moving stream draining a comparatively extensive area. There are tourist facilities and camp grounds available on a rental basis.

NINILCHIK RIVER - The Ninilchik River enters Cook Inlet near the town of Ninilchik, south of Kenai, Alaska, averaging 15 to 30 feet in width and one to four feet in depth. Its lower reaches are characterized by extremely brushy banks with a heavy stand of willow and thick grass. Since there are few or no gravel bars exposed except near the mouth, this condition, together with brush banks and small size, renders this stream extremely difficult to fish. The upstream area is accessible only by trail.

King salmon, Dolly Varden, steelhead and silver salmon are the known species in the Ninilchik River.

DEEP CREEK - Deep Creek is located about one mile south of the town of Ninilchik, Alaska. The stream averages 30 to 50 feet in width and one to six feet in depth. Wide gravel bars and passable trails leading through the stream - side growth of brush enable the angler to fish most stretches of the stream on one side at least. Camp sites are undeveloped. All of the land from which Deep Creek is accessible by car as well as the stream side camp sites are privately owned by one individual.

Silver salmon and Dolly Varden as well as a few king salmon are the species present in Deep Creek

STARISKY CREEK - This creek, located south of the Ninilchik River, averages 10 to 20 feet in width and one-half to four feet in depth. There are almost no gravel bars and the banks are brushy - a situation which is not desirable from the standpoint of the angler. There are few attractive camp sites in the area.

Species present are the same as those in the Ninilchik River.

ANCHOR RIVER - Anchor River headwaters in the tundra plateau behind Homer, Alaska, on the southern tip of the Kenai Peninsula. The river flows westerly, generally following the contour of the coastline and empties into Cook Inlet at Anchor Point. The main

stem of the river is about 30 miles in length; the north fork is about 15 miles in length. The lower third of the river is characterized by 30 to 80 feet widths, gravel and rubble bars, excellent pool-riffle development, cut banks and steep, high valley walls. The watershed in this sector is compost predominantly of spruce forests, forest grasses and bog. The central portion of the river is from 10 to 30 feet wide and has fewer and smaller pools. There are few gravel bars. A thin line of willow and cottonwood borders the river in this sector. The upper third of the river is like a meadow creek in appearance with an average width of five feet or less and an average depth of less than one foot. Stream banks are one to two feet high. The stream, at its headwater extremeties, is at an elevation of 1,600 feet. In spite of grassy character of the area the "horizon" is rapidly saturated with water and marked fluctuations of water level from the run-off waters of even moderate precipitation. The gradient is estimated at from 17 to 26 feet per mile.

Species of fish known to exist in Anchor River are king, silver and pink salmon, Dolly Varden and steelhead trout. Although other species may be present, the above constitute those for which sport fishing takes place.

Total values recorded for these 13 locations are recorded at $781,510 for trip expenditures and $565,757 for investment cost or an over-all value of $1,347,267. The mean trip expenditure per man day for the entire Kenai was $9.10. It was computed that 20,450 fishermen spent 83,322 man days on fishing trips associated with these 13 areas.

TABLE 12

SUMMARY OF FISHERMEN INTERVIEWED

KENAI PENINSULA - 1955

Area	Man Days Per Trip	No. of Parties	No. of Fishermen	People/ Party	Days/Person Per Trip
Anchor River	3,818	254	736	2.9	5.2
Cooper Creek	399	30	110	3.7	3.6
Crescent Creek	68	5	19	3.8	3.6
Deep Creek	3,413	140	452	3.2	7.5
Hidden Lake	32	5	15	3.0	2.1
Kenai River abv Skilak	107	13	48	3.7	2.2
Kenai Riv below Skilak	963	114	361	3.3	2.5
Kenai Riv at Soldotna	191	40	114	2.9	1.7
Moose-Kenai Junction	2,443	384	803	2.1	3.0
Ninilchik River	1,057	52	185	3.6	5.7
Quarts Creek	509	61	213	3.5	2.4
Starisky Creek	155	14	45	3.2	3.4
Russian River	1,097	148	456	3.1	2.4
Totals	14,252	1,260	3,577	2.8	4.0

TABLE 13

TRIP EXPENDITURES PER DAY

KENAI PENINSULA - 1955

AREA	MEAN	STAND. DEV.	STAND ERROR	95% CONFIDENCE
Anchor River	$ 9.93	3.44	0.06	± 0.12
Cooper Creek	4.54	1.46	0.07	± 0.14
Crescent Creek	2.52	1.90	0.23	± 0.46
Deep Creek	10.47	4.46	0.08	± 0.16
Hidden Lake	6.25	2.76	0.49	± 1.00
Kenai R abv Skilak	6.00	0.66	0.06	± 0.12
Kenai R below "	6.37	2.78	0.09	± 0.18
Kenai R at Soldotna	4.51	2.21	0.16	± 0.41
Moose R-Kenai June.	8.79	5.49	0.11	± 0.22
Ninilchik River	7.80	1.81	0.53	± 1.04
Quartz Creek	5.45	1.49	0.06	± 0.12
Starisky Creek	14.32	11.89	1.16	± 2.30
Russian River	10.45	9.15	0.28	± 0.55
Weighted Mean/Man Day for all Kenai Locals	9.10	2.24	0.02	± .04

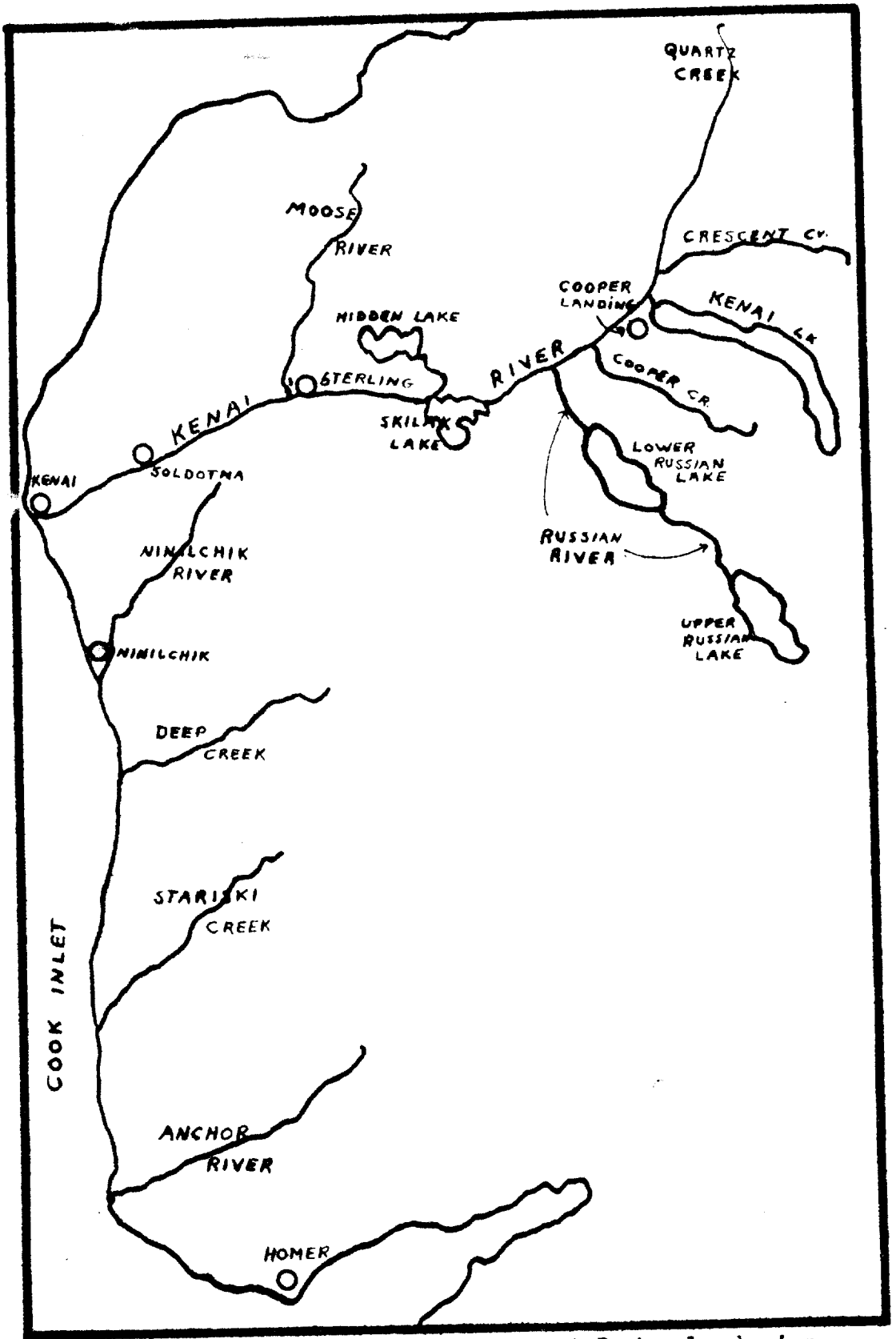

Figure I. Diagrammatic sketch map of Kenai Peninsula showing area of Fxpenditure Survey - 1955.

TABLE 14

TOTAL FISHING PRESSURE & EXPENDITURES

KENAI PENINSULA - 1955

Area	Total Calculated No. Fisherman	Days per* Fisherman Trip	Total Calculated Man Days on Trip	Mean Cost/Day Trip	Mean Cost/Day Invest.	Trip Cost	Investment Cost
Anchor River	5,228	5.2	27,186	9.93	$6.79	$269,957	$184,593
Cooper Creek	342	3.6	1,281	4.54	6.79	5,589	8,358
Crescent Creek	220	3.6	792	2.52	6.79	1,996	5,378
Deep Creek	2,491	7.5	18,683	10.47	6.79	195,611	126,858
Hidden Lake	592	2.1	1,243	6.25	6.79	7,769	8,440
Kenai R abv Skilak	591	2.2	1,300	6.00	6.79	7,800	8,827
Kenai R below Skilak	869	2.5	2,173	6.37	6.79	13,842	14,755
Kenai R at Soldotna	361	1.7	614	4.51	6.79	3,769	4,169
Moose Kenai Junction	2,712	3.0	8,136	8.79	6.79	71,515	55,243
Ninilchik River	1,432	5.7	8,162	7.80	6.79	63,664	55,420
Quartz Creek	636	2.4	1,526	5.45	6.79	8,317	10,362
Starisky Creek	334	3.4	1,136	14.32	6.79	16,268	7,713
Russian River	4,642	2.4	11,140	10.45	6.79	116,413	75,641
Totals	20,450		83,322			$781,510	$565,757

TOTAL $1,347,267

*Days spent on fishing trips which is different than days spent fishing on trip.

Other Sport Fishing Areas

Not all sites of sport fishing were covered during the 1955 season. However, such areas are known and may be compared to areas checked. Table 15 lists such areas and approximate expenditures as estimated by personnall of D-J.

TABLE 15

SPORT FISHING AREAS NOT SAMPLED AND EXPENDITURES

KENAI PENINSULA - 1955

Location	Man Days	Expenditure per Day	Total Expenditure
Alcatraz Lake	400	$15.89	$ 6,356
Bear Creek	75	15.89	1,191
Daniels Lake	300	15.89	4,767
Island Lake	100	15.89	1,589
Ptarmigan Creek	135	15.89	2,145
Resurrection River	1,000	15.89	15,890
Six-Mile River	100	15.89	1,589
Misc. Fly-in Lakes at north end of Kenai Peninsula	500	15.89	7,945
TOTAL	2,610		$41,473

A value of $41,473 is assigned these areas (2,610 man days times $15.89, the combined average trip and investment expenditure).

CONCLUSION

The Commercial Fishery resource of the Kenai Peninsula has an average annual value of $3,611,000. In addition a Sport Fishery of considerable importance exists in the area. Since the sport catch ordinarily is not sold in the commercial market, no evaluation comparable to that given above for the commercial fishery is available for the sport fishery. Although the sport fishery does not approach the value of the commercial fish as an economical necessity, the importance of this fishery is indicated by the fact that an estimated 20,450 fishermen spent about 83,000 days engaged in this pursuit during 1955, and spent about $1,389,000 for equipment, lodging, transportation and other items in connection with their fishing trips. When it is remembered that this wealth is a result of a renewable resource, its continuing value must be clearly and objectively evaluated in connection with any other resource development program.

REFERENCE

Anonymous

1923-1953. Alaska Fishery and Fur Seal Industries Reports. Washington, D.C.

Anonymous

Annual Fishery Management Biologist Reports for Cook Inlet District.

Anonymous

Climatological Data - Alaska. Monthly Summaries Weather Bureau, U. S. Department of Commerce, Ashville, North Carolina.

Anonymous

Cook Inlet Lake and Stream Records, 1927-1952, with accompanying description materials, compiled by U. S. Fish and Wildlife Service and Fishery Research Institute, University of Washington.

Anonymous

Cook Inlet Lake and Stream Records, 1953, 1954, 1955 (as above).

Anonymous
1950

Interim Report No. 2. Cook Inlet and Tributaries, Alaska District Corps of Engineers, Anchorage, Alaska.

Anonymous

Quarterly Reports of Federal Aid in Fish Restoration, Project F-1-R. Fish and Wildlife Service, Juneau, Alaska.

Anonymous
1952

Reconnaissance Report on the potential development of water resources in the Territory of Alaska. Bureau of Reclamation, U. S. Department of the Interior, Washington, D. C.

Anonymous
1952

The 1950 Population - Alaska. Report P-A51, Bureau of the Census. U. S. Department of Commerce, Washington, D. C.

Anonymous

Unpublished date, Alaska Agriculture Experiment Station and Alaska Department of Agriculture.

Buckley, John L.
1955.

Wildlife and the Constitution, mimeographed, University of Alaska, College, Alaska.

Buckley, John L.
1955.

Wildlife in the Economy of Alaska. University of Alaska Press, Fairbanks, Alaska.

Day, Stephen R.
1940.

Geology of the Alaska Railroad Region, Geological Survey Bulletin 907. U. S. Department of the Interior, Washington, D. C.

Kellog, C. E. and Iver J. Nygard
1951.

Exploratory Study of the Principal Soil Groups of Alaska. Agriculture Monograph No. 7, U. S. Department of Agriculture, Washington D. C.

Martin, G. C., B. L. Johnson and U. S. Grant
1915.

Geological and Mineral Resources of Kenai Peninsula, Alaska. Geological Survey Bulletin No. 587, U. S. Department of the Interior, Washington D. C.

Pacific Fisherman Yearbook, 1954.

Simpson, G. G. and Anne Roe
1939.

Quantitative Zoology. McGraw-Hill Book Company, New York and London.

Snedecor, George W.
1946.

Statistical Methods. Iowa State College Press, Ames, Iowa.

Library Merged With
A.R.L.I.S.
ANCHORAGE, ALASKA
Est. 1997
U.S. Fish & Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

ARLIS
Alaska Resources
Library & Information Services
Anchorage Alaska