

STATE OF ALASKA

Bill Sheffield, Governor

Annual Performance Report for

INVENTORY AND CATALOGING  
OF KENAI PENINSULA, AND COOK INLET  
DRAINAGES AND FISH STOCKS

by

Joe Wallis  
and  
Stephen Hammarstrom

ALASKA DEPARTMENT OF FISH AND GAME  
Don W. Collinsworth

SPORT FISH DIVISION  
Richard Logan, Director



## RESEARCH PROJECT SEGMENT

State: ALASKA Name: Sport Fish Investigations  
of Alaska

Project: F-9-15

Study No.: G-I Study Title: INVENTORY AND CATALOGING

Job No.: G-I-C Job Title: Inventory and Cataloging  
of Kenai Peninsula, and  
Cook Inlet Drainages and  
Fish Stocks

Cooperators: Joe Wallis and Stephen Hammarstrom

Period Covered: July 1, 1982 to June 30, 1983

## ABSTRACT

Relative growth and survival rates, determined by fall gill-netting, are presented for rainbow trout, Salmo gairdneri Richardson, coho salmon, Oncorhynchus kisutch (Walbaum), and Dolly Varden, Salvelinus malma (Walbaum), captured in managed area lakes. Pertinent historical data regarding stocking, size, time, densities and catch rates are examined for various stocked lakes.

Creel census activities on 64.4 kilometers (40 miles) of the Kenai River from June 1 through September 30 resulted in an estimated harvest of 69,333 fish in 147,398 man-days of effort. Harvest estimates for coho salmon, sockeye salmon, Oncorhynchus nerka (Walbaum), pink salmon, Oncorhynchus gorbuscha (Walbaum), rainbow trout and Dolly Varden are presented. Angler effort from June 1 through July 25 was directed primarily toward chinook salmon, Oncorhynchus tshawytscha (Walbaum), although other species are harvested incidentally. After July 25, effort was directed primarily toward coho salmon.

It was estimated that Anchor River anglers fished a total of 9,144 man-days during the period August 16 through October 31, 1982. The period covered in the census differed from previous years, but Statewide Harvest Survey data indicated that the harvest of most species was comparable to other recent years, although total effort was lower.

Comparatively small numbers of coho and chinook salmon smolts were trapped in 1982. It is suspected this is a result of severe flooding of Anchor River in 1979 and 1980.

A resource survey of marine waters of the outer Kenai Peninsula was conducted during the period August 14 through 23, 1982. In the area from

Aialik Bay to Nuka Bay, rockfish Sebastes sp., and ling cod, Ophiodon elongatus (Girard), were abundant.

#### KEY WORDS

Coho salmon, stocked lakes, creel census, steelhead trout, Kenai River, Anchor River, Kachemak Bay.

#### BACKGROUND

##### Stocked Lake Evaluation

Since statehood, an ongoing program to provide angling opportunities in easily accessible lake waters has utilized artificially reared or transplanted fish. Survey data have been analyzed with regard to: (1) need for additional angling opportunity; (2) potential of a given water to sustain desired species; (3) status, condition and composition of existing populations; and (4) requirements for rehabilitation or enhancement.

Historically, rainbow trout and coho salmon have been the predominant species used for stocking. Sockeye salmon and Arctic grayling have also been used when these species are available. In 1981, chinook salmon were planted in a landlocked lake to ascertain the potential of this species to the program.

During the past few years, the State has been trying to develop its own native brood stock of rainbow trout. The Swanson River on the Kenai Peninsula was selected as the donor stream. The program has been plagued with various problems until 1982 when sufficient numbers of young fish were available to meet the stocking requirement of this area. Between 1978 and 1981, only five lakes were stocked with rainbow trout. In 1982, an additional six lakes were stocked with Swanson River fish.

Stocked populations are sampled each fall and the data obtained are used to determine relative survival, growth rate and future stocking densities. In addition, data gathered are forwarded to researchers in the Matanuska Valley where work evaluating native Alaskan rainbow trout brood stock is being conducted.

##### Kenai River Creel Census

The creel census on the Kenai River was initiated in 1974. Initially, the target species was chinook salmon; however, information gathered the first year demonstrated that anglers shifted their emphasis from chinook salmon to coho salmon after the chinook salmon season closed (July 31).

The fishing techniques also change from those primarily of a drift fishery to those of a stationary bait or casting fishery. Although most anglers still use boats, they usually run to a favorite spot, anchor and fish with either roe or lures. In 1981 there were significant numbers of anglers who used a trolling technique termed "tadpollying" which consists of trolling a deep diving lure by holding the boat stationary in the current. Fishing

continues through September unless poor weather or high water levels prevail.

The coho salmon run into the Kenai River is comprised of two segments, early and late. The early run enters the stream in late July, peaks in early August and is present until late August. The late run usually enters in late August and is present until freeze-up, with peak fishing occurring in mid-September.

Prior to 1978, both runs were harvested commercially, primarily by the set net fishery occurring on the eastern shores of Cook Inlet (statistical areas 244-20, 30, 40). A decision by the Board of Fisheries in 1978 set the commercial closing date in this part of Cook Inlet at August 15.

In 1978, legislation was passed giving subsistence priority use of fishery resources. Prior to 1978, a small subsistence fishery had taken place along the east side of Cook Inlet. The fishery grew to nearly 600 household permits in 1980. In the spring of 1981, the Board of Fisheries closed the subsistence fishery. However, a court decision overruled the Board and the Department was ordered to conduct a fishery in the fall of 1981. No gill net fishery was conducted in 1982.

#### Anchor River Creel Census

Anchor River has long been recognized as one of the most popular sport fishing streams on the Kenai Peninsula. The river supports good populations of Dolly Varden, chinook and coho salmon. It also has the largest steelhead trout population of the five Kenai Peninsula streams which produce this species.

Observations indicated a great increase in angler effort and harvest on the river and, during the period 1978-82, a creel census of the summer-fall sport fishery was conducted to obtain data on harvest and population levels of Dolly Varden, coho salmon and steelhead trout.

#### Anchor River Life History Studies

During the course of an ongoing life history study of steelhead trout in Anchor River, juvenile salmonids were captured in various locations in the watershed. Fish of all species were captured, thereby providing an opportunity to obtain basic life history data for other species in addition to steelhead. These data will provide a better understanding of the fish stocks and ultimately lead to better management techniques.

#### Kenai Peninsula Marine Survey

The major sport fishing effort in marine waters of the southern Kenai Peninsula is directed toward salmon and halibut. There is a substantial sport fishery for rockfish and bottomfish by boats based in Seward, but very little effort out of Homer. Public inquiries and interest about rockfish and bottomfish resources are increasing, and we need at least general information about occurrence and general abundance of these fishes throughout the area.

A list of common and scientific names is presented in Table 1 and a map of the study area is depicted in Figure 1.

#### RECOMMENDATIONS

1. Adult Arctic grayling should be transported from Bench Lake to Seldovia Lake in an attempt to establish a self-sustaining population.
2. Added emphasis should be placed upon collection of life history data for coho and chinook salmon and Dolly Varden, and defining population characteristics of Dolly Varden in the Anchor River.
3. The Kenai Peninsula marine survey should be continued to supplement the existing data base on species other than salmon and halibut.

#### OBJECTIVES

1. To determine the environmental characteristics of the existing recreational fishery waters of the job area and to obtain estimates of existing and/or potential angler use and sport fish harvest.
2. To evaluate application of fishery restoration measures and availability of sport fish egg sources.
3. To assist as required in the investigation of public access status to the area's fishing waters and to make specific recommendations for segregation of public fishing access sites.
4. To investigate, evaluate and develop plans for the enhancement of anadromous and resident fish stocks.
5. To provide recommendations for the management of sport fish resources in these waters and direct the course of future studies.

#### TECHNIQUES USED

##### Stocked Lake Evaluation and Lake Survey

The techniques for evaluating the stocked lakes were the same as those described by the Lake and Stream Manual, ADF&G (1971), Engel (1973) and Hammarstrom (1974).

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

Common Name	Scientific Name and Author	Abbreviation
Pink salmon	<u>Oncorhynchus gorbuscha</u> (Walbaum)	PS
Chinook salmon	<u>Oncorhynchus tshawytscha</u> (Walbaum)	KS
Chum salmon	<u>Oncorhynchus keta</u> (Walbaum)	CS
Coho salmon	<u>Oncorhynchus kisutch</u> (Walbaum)	SS
Sockeye salmon	<u>Oncorhynchus nerka</u> (Walbaum)	RS
Dolly Varden	<u>Salvelinus malma</u> (Walbaum)	DV
Lake trout	<u>Salvelinus namaycush</u> (Walbaum)	LT
Rainbow trout	<u>Salmo gairdneri</u> Richardson	RT
Steelhead trout	<u>Salmo gairdneri</u> Richardson	SH
Arctic grayling	<u>Thymallus arcticus</u> (Pallas)	GR
Round whitefish	<u>Prosopium cylindraceum</u> (Pallas)	RW
Threespine stickleback	<u>Gasterosteus aculeatus</u> Linnaeus	TS
Black rockfish	<u>Sebastes melanops</u> (Girard)	BR
Dusky rockfish	<u>Sebasodes ciliatus</u> (Tilesius)	DR
China rockfish	<u>Sebastes nebulosus</u> (Ayres)	CHR
Copper rockfish	<u>Sebastes caurinus</u> (Richardson)	COR
Quillback rockfish	<u>Sebastes maliger</u> (Jordan and Gilbert)	QR
Ling cod	<u>Ophiodon elongatus</u> (Girard)	LC

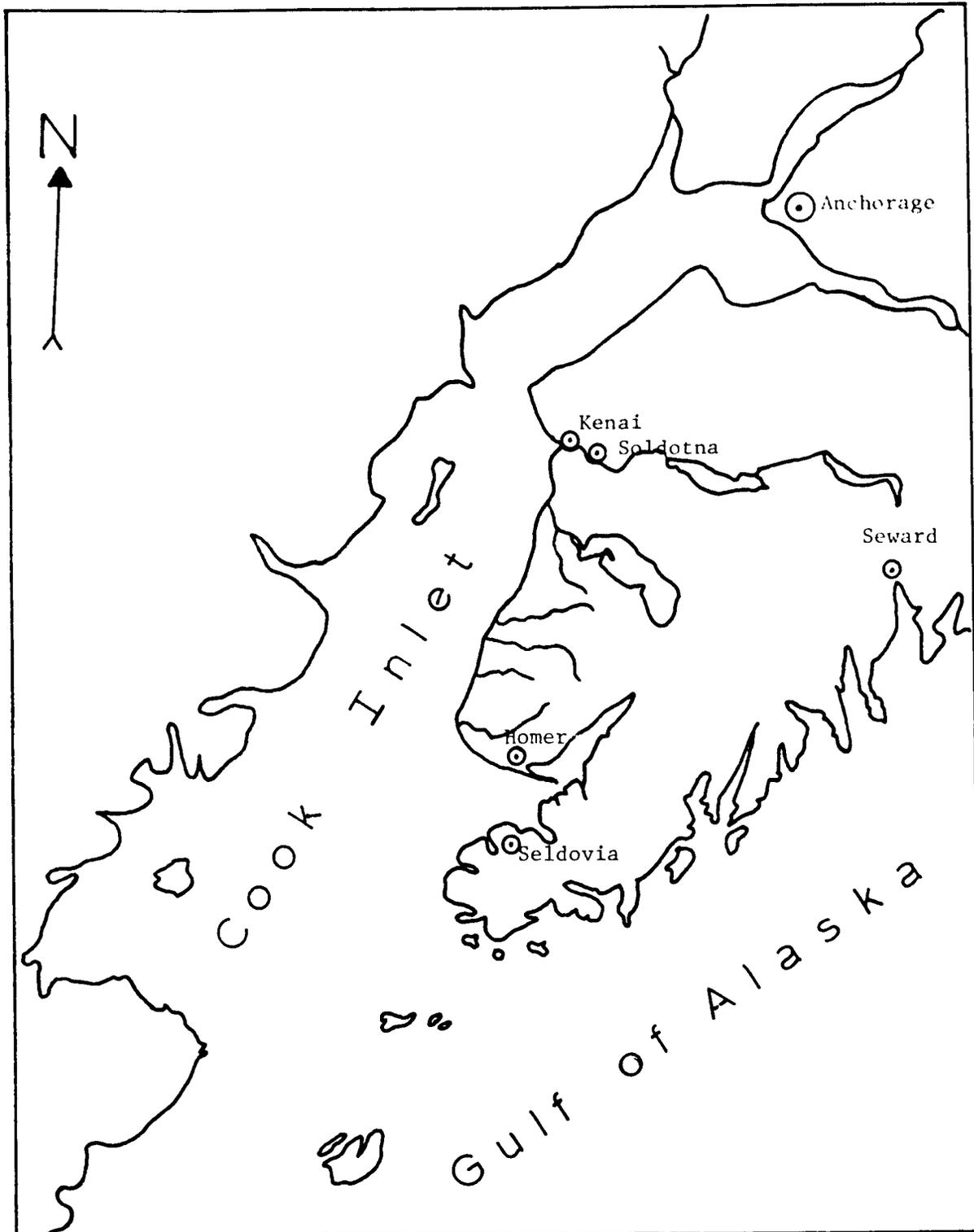


Figure 1. Vicinity map showing location of the study area.

### Kenai River Creel Census

The creel census employed on the Kenai River was based on the techniques described by Neuhold and Lu (1975) and described in detail by Hammarstrom (1977).

Effort estimates were based on two randomly selected instantaneous angler counts per day. Every weekend/holiday and 3 of 5 weekdays were sampled. Because of changing daylight hours, the fishing day ranges from 20 hours to 12 hours as follows: June and July, 20 hours; August, 16 hours; September, 12 hours. During two interview periods, the following information was collected: hours fished; catch by number and species; whether guided or unguided; and specific biological data from chinook salmon, coho salmon and large rainbow trout.

The Kenai River coho salmon run is comprised of two distinct segments, termed early run and late run. Certain Alaska Board of Fisheries' policies pertain to these run segments; therefore, effort and harvest were calculated separately for early run and late run fish in upstream and downstream sections of the river. Previous unpublished data have shown the uncensused section of the river accounts for 9.1% as much as the two census areas. In 1981 and 1982, the use increased to 12.6% and thus the estimates for the two census areas were combined and increased by 12.6% to achieve total estimates for the river. The separation date between early and late run was determined by analyzing catch rates and size of fish captured, then adjusted to the closest weekly period.

### Anchor River Creel Census

The Anchor River creel census was conducted during the period of August 16 through October 31, 1982. Methods employed were described in detail by Wallis and Hammarstrom (1979).

Biological data (fork length, sex and scales) were collected from samples of adult coho salmon. Scales were mounted on gummed cards and pressed on acetate sheets, then were read on a microfiche viewer.

### Anchor River Life History Studies

Juvenile chinook and coho salmon and Dolly Varden were captured in an "inclined-plane" downstream migrant trap, a fyke net and several minnow traps. Fish were measured, weighed and scales removed. Scales were mounted on glass slides for later analysis.

## FINDINGS

### Stocked Lake Evaluation

Currently there are 20 lakes being managed for recreational fishing using artificially produced salmon and trout. Eleven have been stocked with rainbow trout, eight with coho salmon and one with chinook salmon.

During 1982, nine lakes were sampled with gill nets during the fall. Eight additional lakes were considered too small to be effectively sampled. Two of the lakes are remote, and one lake, Rogue, was stocked with only 1,500 fish and the number of fish killed in nets would have adversely affected the winter angler catch rate.

Jerome Lake, located in a mountainous pass at approximately 800 feet elevation, was rehabilitated with emulsified rotenone in 1980 and stocked with rainbow trout in 1981. The rehabilitation was designed to eliminate Dolly Varden that were planted illegally after a previous rehabilitation. When the lake was sampled in 1982, Dolly Varden were again present in size ranges that suggested the kill was incomplete or again an illegal plant. The rainbow trout also captured suggests this lake should support a successful fishery during the winter of 1982-83.

One lake, Scout Lake, was stocked in 1981 with chinook salmon as an experiment to see if that species would support a winter fishery. This lake was part of an overall program to evaluate the potential of chinook salmon to support fisheries in landlocked lakes throughout southcentral Alaska. Initial indications were encouraging.

These small chinook salmon entered the fishery after one growing season at about 180 mm (7 inches). Anglers reported excellent catches throughout the winter. The results of gill-netting in the fall of 1982 and the subsequent 1982-1983 winter fishery were less encouraging. Although the fish had grown to an average length of 310 mm (12 inches) and average weight of 0.42 kg (0.92 lbs), catch rates did not indicate many had survived. It is suspected that most fish were caught during the first winter and the summer of 1982.

Pertinent historical data regarding stocking of area lakes are presented in Table 2. The summarized results of gill net sampling in 1982 is presented in Table 3.

#### Kenai River Creel Census

The creel census on the Kenai River commenced June 1 and was continuous through September 30. Through July 25 (the stream was closed to chinook salmon fishing by emergency order 6 days early), the principal species harvested was chinook salmon. Dolly Varden, rainbow trout, sockeye, coho and pink salmon, were taken incidental to chinook salmon. Data regarding chinook salmon and the associated fishery are presented in the G-II-L Report of Progress, Hammarstrom (1983).

When the chinook salmon season normally closes July 31, emphasis shifts to coho salmon. Anglers that had drift fished the day before would set anchor in a quiet area along the bank and either fish with bait, usually salmon roe, or cast for coho or pink salmon. Because pink salmon are of an "even" year cycle in the Kenai River, they were plentiful in 1982.

The coho salmon return to the Kenai River is comprised of two segments termed early and late run. Early run fish are available from late July through late August. In 1982, the first coho salmon was reported July 20 and a few reported each day until July 26 when catch rates began rising

Table 2. Summary of Recent Stockings of Kenai Peninsula Lakes (1979-1982).

Lake	Date Stocked	Species	Origin	Fish/kg (lb)	Fish/Hectare (acre)	Total Stocked
Arc	5/21/81	SS	Seward, AK	684 (310)	473 (191)	3,000
Barr	9/8/82	RB	Swanson R., AK	713 (323)	412 (167)	7,000
Cabin	7/24/79	SS	Seward, AK	267 (121)	650 (263)	15,000
Carter	7/30/80	RB	Talarik Cr., AK	864 (376)	494 (200)	9,600
Centennial	5/21/81	SS	Seward, AK	684 (310)	600 (240)	6,000
Douglas	9/8/82	RB	Swanson R., AK	713 (313)	412 (167)	15,000
Engineer	5/21/81	SS	Seward, AK	684 (310)	486 (197)	45,000
Island	9/8/82	RB	Swanson R., AK	713 (323)	258 (104)	28,000
Jerome	9/24/81	RB	Swanson R., AK	567 (257)	454 (184)	3,000
Johnson	6/3/82	SS	Seward, AK	627 (284)	580 (235)	20,000
Longmere	9/8/82	RB	Swanson R., AK	713 (323)	359 (145)	25,000
Portage	6/3/82	SS	Seward, AK	627 (284)	449 (182)	5,000
Rainbow	9/24/81	RB	Swanson R., AK	567 (257)	495 (200)	3,000
Rogue	5/21/81	SS	Seward, AK	684 (310)	740 (300)	1,500
Scout	5/27/81	KS	Ship Cr., AK	72 (33)	312 (126)	12,000
Sport	9/24/81	RB	Swanson R., AK	567 (257)	240 (98)	7,000
Stormy	9/8/82	RB	Swanson R., AK	713 (323)	317 (128)	50,000
Trout	9/8/82	RB	Swanson R., AK	713 (323)	317 (128)	25,000
Upper Jean	6/8/79	SS	Seward, AK	785 (357)	486 (197)	9,060
Vagt	7/30/80	RB	Talarik Cr., AK	864 (376)	495 (200)	8,600

Table 3. Summary of Gill Net Results From Kenai Peninsula Lakes Sampled in 1982.

Lake	Species	Number Caught	Year Planted	Fork Length (mm)		Weight (lbs) Mean	Catch/Hour
				Range	Mean		
Centennial	SS	65	1981	158-255	194.5	.18	2.55
Engineer	SS	3	1979	303-370	326.0	.95	0.06
	SS	24	1981	215-260	236.8	.30	0.50
Upper Jean	SS	3	1979	300-415	358.3	.97	0.07
	SS	36	1981	172-230	199.3	.19	0.78
Jerome	DV	25	...	154-390	251.5	.43	1.00
	RB	21	1981	160-303	192.7	.19	0.84
Johnson	SS	43	1979	280-445	332.2	.95	0.86
	SS	90	1982	105-158	118.0	.04	1.80
Portage	SS	4	1979	250-350	295.3	.69	0.16
	SS	29	1982	98-117	110.1	.04	1.16
Rainbow	RB	76	1981	115-278	205.7	.25	2.98
Scout	KS	13	1981	230-476	310.4	.92	.31
Sport	RB	2	1979	476	476.0	3.45	.08
	RB	12	1981	170-249	199.8	.19	.48

steadily in the downstream section (Beaver Creek to Soldotna Bridge). The early run peaked in this section about August 5 and was considered present until August 27 (Figure 1). The upstream section displayed similar timing; the early run began to show increased harvest rates the first week of August, peaked about August 15 and was considered present until September 3 (Figure 2).

The dates between runs are somewhat arbitrary to conform with Board of Fisheries policies dealing with the individual runs. There is considerable overlap between the early and late runs, especially during years of strong returns.

The early run was exceptionally strong. The commercial harvest from the three set net beaches (statistical area 244-20, 30, 40) which intercept Kenai River fish reported the largest coho salmon catch ever at slightly more than 109,000. The 1966-1981 mean was approximately 29,000.

The recreational catch in the Kenai River was also the largest ever for early run coho salmon at 24,827, which was 2.4 times the 1976-1981 mean of 10,305 (Table 4). Effort in 1982 at 41,838 man-days was 2.2 times the historical mean of 18,801.

Historically, harvest rates for early run fish are similar between the upstream section (Naptown Rapids to Skilak Lake) and downstream section (Soldotna Bridge to Beaver Creek) with the downstream area being slightly higher. In 1982, the downstream catch per hour was 0.174 (5.7 man-hours per fish) while the upstream catch rate was 0.083 (12.0 man-hours per fish) (Table 5). It is speculated that this discrepancy can be explained by increased efficiency due to ideal stream conditions and increased effort in the downstream section.

The late run was also considered strong. The pleasant weather and relatively clear water contributed to an excellent fishery. The estimate harvest of 13,351 late run coho salmon is the largest since 1976. Effort was estimated at 16,070 man-days which is the second largest. However, effort measured in man-hours, 61,082, was 3,769 hours greater than the previous high in 1978 (57,313 man-hours) which indicates anglers were willing to fish longer on a given day. The catch per hour in 1982 of 0.172 (4.6 man-hours per fish) was less than the 1980 harvest rate of 0.253 (3.9 man-hours per fish).

Excellent fishing continued into October according to reports from anglers who fished the upstream section. Further reports were received from anglers who were taking coho salmon at the outlet of Kenai Lake in February 1983.

In the past, the late run had been subjected to various forms of gill net fisheries, either commercial, subsistence or personal use. No fishery was held in 1982 and it is speculated that this absence was reflected by the excellent catch rates in the river.

Pertinent historical data concerning both early and late run coho salmon fisheries on the Kenai River are presented in Tables 4 and 5.

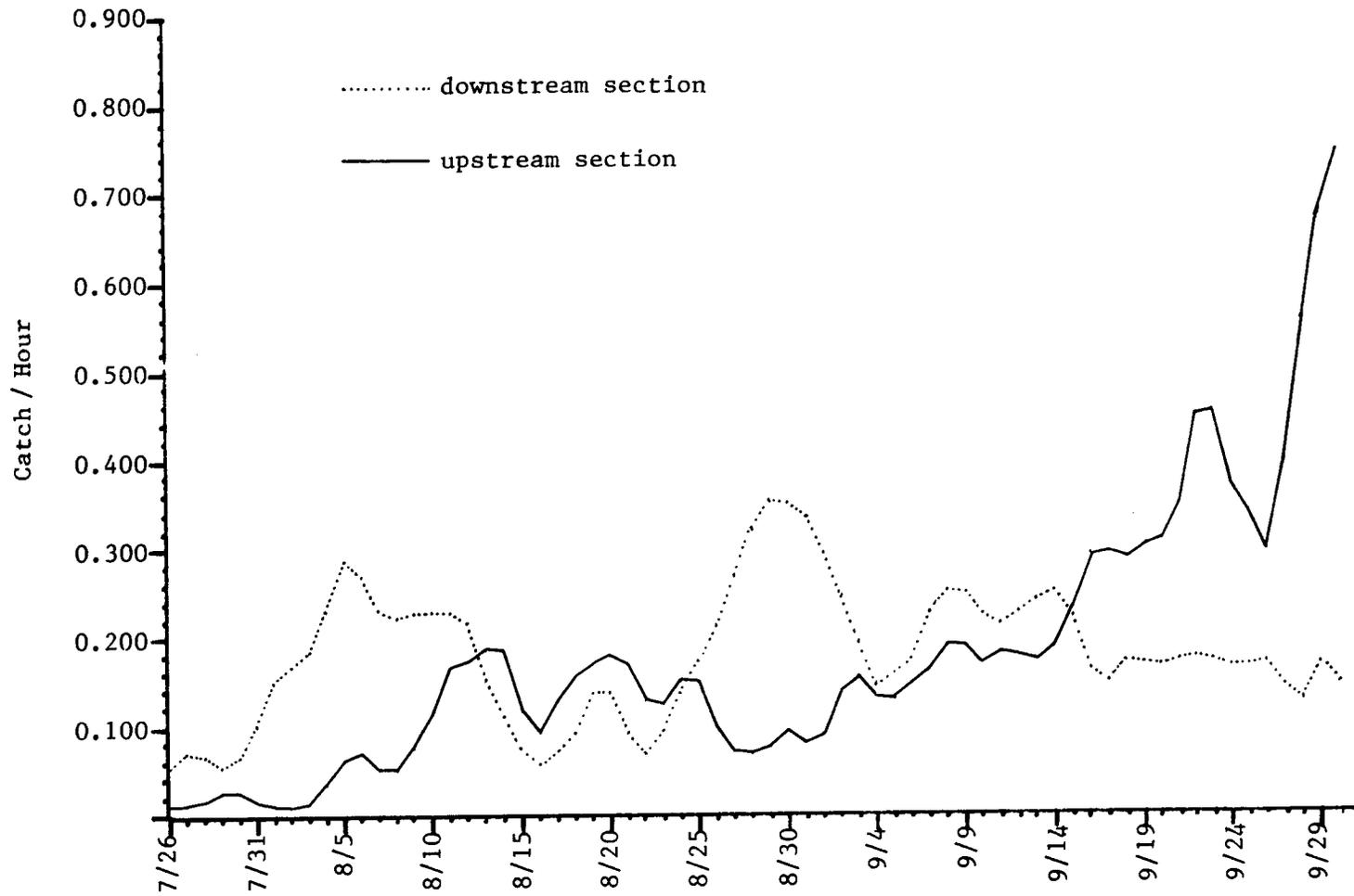


Figure 2. Catch per hour by date for coho salmon taken in the Kenai River recreational fishery, 1982.

Table 4. Summary of Kenai River Coho Salmon Recreational Harvest and Effort, 1976-1982.

Year	Early Run			Late Run			Total	
	Harvest	Effort (man-days)	Catch per Hour	Harvest	Effort (man-days)	Catch per Hour	Harvest	Effort
1976	7,711	21,178	0.072	5,513	11,672	0.129	13,224	32,850
1977	7,415	13,576	0.115	2,371	5,317	0.093	9,786	18,893
1978	5,236	17,487	0.051	6,644	16,376	0.107	11,880	34,223
1979	11,122	12,439	0.112	3,510	7,721	0.118	14,632	20,160
1980	15,668	22,095	0.184	9,545	10,699	0.253	25,213	32,794
1981	14,680	25,670	0.129	6,664	13,198	0.121	21,344	38,868
Mean	10,305	18,801	0.121	5,708	10,831	0.133	16,013	29,632
1982	24,827	41,838	0.132	13,351	16,070	0.172	38,178	57,908

Table 5. Historical Data from Kenai River Coho Salmon Fishery, 1976-1982.

Year	Harvest*	<u>EARLY RUN</u>			Harvest	<u>LATE RUN</u>		
		Effort Man-hours	Effort Man-days	Catch Per Hour		Effort Man-hours	Effort Man-days	Catch Per Hour
<u>UPSTREAM</u>								
1976	1,625	22,042	5,511	0.063	1,445	10,742	3,069	0.127
1977	3,349	24,046	5,465	0.135	898	6,020	1,281	0.147
1978	800	22,193	4,932	0.029	1,788	12,869	3,677	0.118
1979	1,831	23,562	4,284	0.064	2,003	16,427	4,323	0.119
1980	4,670	30,582	8,751	0.143	4,665	16,586	4,739	0.276
1981	4,719	36,392	8,768	0.122	2,900	20,628	5,157	0.130
Mean	2,832	26,470	6,285	0.103	2,283	13,879	3,708	0.152
1982	3,081	37,120	9,797	0.083	3,286	12,307	3,419	0.267
<u>MIDSTREAM</u>								
1976	1,165	12,803	3,201	0.081	828	6,133	1,752	0.129
1977	617	4,976	1,131	0.118	198	2,087	444	0.095
1978	386	6,528	1,865	0.059	554	4,776	1,365	0.116
1979	918	5,646	1,027	0.133	290	2,423	638	0.118
1980	1,319	6,376	1,824	0.202	788	3,092	883	0.255
1981	1,804	13,087	3,153	0.134	817	6,472	1,618	0.126
Mean	1,035	8,236	2,034	0.118	579	4,164	1,117	0.139
1982	2,778	21,703	4,682	0.128	1,494	6,553	1,820	0.228

Table 5 (cont.). Historical Data from Kenai River Coho Salmon Fishery, 1976-1982.

Year	Harvest*	<u>EARLY RUN</u>			<u>LATE RUN</u>			
		Effort Man-hours	Effort Man-days	Catch Per Hour	Harvest	Effort Man-hours	Effort Man-days	Catch Per Hour
<u>DOWNSTREAM</u>								
1976	4,921	49,862	12,466	0.082	3,240	23,977	6,851	0.130
1977	3,449	30,711	6,980	0.106	1,275	16,883	3,592	0.074
1978	4,050	49,725	11,050	0.067	4,302	39,668	11,334	0.103
1979	8,373	39,205	7,128	0.172	1,217	10,489	2,760	0.115
1980	9,679	40,262	11,520	0.240	4,092	17,769	5,077	0.228
1981	8,157	57,064	13,749	0.137	2,947	25,690	6,423	0.112
Mean	6,438	44,471	10,482	0.133	2,846	22,413	6,006	0.119
1982	18,968	109,011	27,359	0.174	8,571	42,222	11,728	0.203
<u>TOTAL</u>								
1976	7,711	84,707	21,178	0.072	5,513	40,852	11,672	0.129
1977	7,415	59,733	13,576	0.115	2,371	24,990	5,317	0.093
1978	5,236	78,446	17,847	0.051	6,644	57,313	16,376	0.107
1979	11,122	68,413	12,439	0.112	3,510	29,339	7,721	0.118
1980	15,668	77,220	22,095	0.184	9,545	37,447	10,699	0.253
1981	14,680	106,543	25,670	0.129	6,664	52,790	13,198	0.121
Mean	10,305	79,177	18,801	0.121	5,708	40,455	10,831	0.133
1982	24,827	167,834	41,838	0.132	13,351	61,082	16,070	0.172

\* Harvest includes those coho salmon taken prior to 1 August during the chinook salmon fishery.

Most of the species in the Kenai River are harvested incidentally while fishing for coho or chinook salmon. Data regarding other species are presented in Table 6 and a historical summary of harvest is presented in Table 7. Both the rainbow trout and Dolly Varden harvest declined from 1981. Total harvest of all species was the highest recorded since 1976, as was the total effort during the creel census period.

#### Anchor River Creel Census

A creel census of the fall fishery on Anchor River was conducted during the period August 16 through October 31. Estimates of effort and harvest during this period are listed in Table 8.

Data are not comparable to estimates in previous years because the entire period of the coho salmon and Dolly Varden fisheries was not covered. Statewide Harvest Survey (Mills, 1978-1982) data (Table 9) show that harvest of Dolly Varden and coho salmon were of the same general magnitude as other recent years, although total effort was reduced.

One hundred seventy Dolly Varden were tagged with serially-numbered Floy anchor tags during the period June 29 to September 8. Only four tags were recovered from anglers.

Scales from 71 adult coho salmon caught by anglers were used for age determination. The length frequency of the sample is listed in Table 10 by age class and sex. In the sample, 11% were Age 1.1, 80% were age 2.1 and 9% were Age 3.1.

#### Life History Studies

Juvenile salmonids were captured in various trapping devices during the period May 6 through September 28, 1982 as part of a steelhead trout life history study (Wallis and Balland, 1983). Coho salmon, chinook salmon and Dolly Varden juveniles were also captured in the traps and provide some information on time of migration and size at migration. Numbers of juveniles captured at the different locations are listed in Table 11 and location of the trap sites is shown in Figure 3.

Very few coho or chinook salmon smolts were captured at any station. Coho and chinook captured in the inclined plane trap are listed in Tables 12 and 13 by weekly period and length interval.

The inclined plane trap was not operated the first week in June, and the peak catch of coho smolts occurred the second week in June. Smolts were those fish in the size range of 90 to 129 mm.

Peak catch of chinook salmon smolts occurred during the week ending July 11. Smolts were those fish 80 mm and larger.

During most of the period, Dolly Varden were not measured. Too few Dolly Varden were captured to provide meaningful information on the time of migration.

Table 6. Harvest and Effort as Determined by Creel Census by Month, by Species, for the Kenai River, 1982.

Month	Effort Man-Days	Chinook Salmon	Sockeye Salmon	Pink Salmon	Coho Salmon	Rainbow Trout	Dolly Varden	Total Harvest	Total Catch/Hour
<u>Downstream Section</u>									
June & <sup>2</sup> July <sup>1</sup>	66,137	8,281	450	0	180	147	214	9,272	0.035
August <sup>2</sup>	27,359	...	401	7,375	18,788	424	1,201	28,189	0.179
September	11,869	...	...	0	8,571	0	0	8,571	0.147
Total	105,365	8,281	851	7,375	27,539	571	1,415	46,032	0.095
<u>Midstream Section</u>									
June & <sup>2</sup> July <sup>1</sup>	11,867	989	155	0	26	175	124	1,469	0.031
August <sup>2</sup>	4,682	...	251	1,019	2,752	114	464	4,600	0.126
September	1,843	...	0	11	1,494	1	4	1,510	0.187
Total	18,392	989	406	1,030	4,272	290	592	7,579	0.082
<u>Upstream Section</u>									
June & <sup>2</sup> July <sup>1</sup>	11,085	612	948	0	30	1,243	772	3,605	0.076
August <sup>2</sup>	9,797	...	1,592	713	3,051	478	2,482	8,316	0.070
September	2,759	...	0	84	3,286	7	30	3,407	0.330
Total	23,641	612	2,540	797	6,367	1,728	3,284	15,328	0.087
<u>Total</u>									
June & <sup>2</sup> July <sup>1</sup>	89,089	10,276 <sup>3</sup>	1,553	0	236	1,565	1,110	14,740 <sup>3</sup>	0.040
August <sup>2</sup>	41,838	...	2,244	9,107	24,591	1,016	4,147	41,105	0.132
September	16,471	...	0	95	13,351	8	34	13,488	0.175
Total	147,398	10,276	3,797	9,202	38,178	2,589	5,291	69,333	0.092

<sup>1</sup> June 1 - July 25 (due to chinook salmon emergency closure)

<sup>2</sup> August figures include last six days of July.

<sup>3</sup> Includes 394 chinook salmon caught by shore anglers in all sections.

Table 7. Kenai River Historical Sport Harvest and Effort Data, 1976-1982.

Year	Effort Man-Days	Sockeye* Salmon	Coho Salmon	Pink** Salmon	Rainbow Trout	Dolly Varden	Chinook Salmon	Total Harvest
1976	80,506	719	13,808	21,443	1,797	4,957	6,031	48,755
1977	102,203	1,436	10,056	100	2,474	8,058	7,321	29,445
1978	118,307	2,180	11,585	17,011	3,118	11,695	7,120	52,709
1979	126,585	1,907	14,479	...	3,100	11,764	7,295	38,545
1980	103,460	1,862	25,255	7,415	1,541	5,965	5,554	47,592
1981	97,010	3,181	21,052	...	3,338	11,635	9,810	49,016
1982	147,398	3,797	38,178	9,202	2,589	5,291	10,276	69,333
Mean	110,781	2,155	19,202	Not Applicable	2,565	8,481	7,630	47,914

\* Sockeye salmon estimates reflect only the legal boat harvest and do not estimate the shore harvest that occurs outside the creel census area.

\*\* Pink salmon estimates are only valid for the creel census area. A significant harvest occurs downstream from the creel census area.

Table 8. Estimated Sport Fishing Effort and Harvest from Anchor River by Species and Weekly Intervals, August 16-October 31, 1982.

Week Ending	Effort Man-hours	Estimated Harvest			
		DV	PS	SS	SH
8/22	7,797	97	82	805	7
8/29	4,602	38	29	454	11
9/5	3,552	79	0	302	35
9/12	2,435	81	4	103	68
9/19	670	32	0	4	23
9/26	3,029	258	0	12	92
10/3	1,306	190	0	0	32
10/10	3,120	895	0	4	67
10/17	726	321	0	0	21
10/24	1,403	360	0	4	14
10/31	439	105	0	0	5
Total	29,079 <sup>1</sup>	2,456	115	1,688	375

<sup>1</sup>Completed anglers fished an average of 3.18 hours per day; total effort equals 9,144 man-days.

Table 9. Summary of Creel Census Data from Anchor River for Harvest of Dolly Varden, Coho and Steelhead Trout.

Year	Period Covered In Census	Effort Man-Days	Dolly Varden		Coho		Steelhead	
			Harvest	Total Run	Harvest	Total Run	Harvest	Total Run
1954	5/29-10/23	3,000	4,000	11,500	395	1,700	247	511
1957	5/1-10/15	5,800	573	7,000	90	801	50	600
1960	5/7-10/2	5,300*	3,300	...	1,000	...	400	...
1968	7/6-10/19	3,045	4,352	...	1,149	...	102	...
1977	Entire Year**	31,515	9,222	...	1,339	...	1,072	...
1978	Entire Year**	42,671	17,357	...	1,559	...	1,754	4,132
1979	Entire Year**	44,220	21,364	...	2,870	5,306	782	...
1980	Entire Year**	33,272	10,948	...	2,649	...	841	2,388
1981	Entire Year**	34,257	15,271	...	2,949	...	777	...
1982	Entire Year**	24,709	10,375	...	2,379	...	551	...

\* Effort incomplete - covers period 5/7-7/14 only.

\*\* Effort and harvest data from statewide harvest survey.

Table 10. Length Frequency of Coho Salmon from Anchor River, by Sex and Age Classification, 1982.

Age Classification	<u>Males</u>			<u>Females</u>		
	1.1	2.1	3.1	1.1	2.1	3.1
Length Interval (mm)						
500-524				1		
525-549					1	
550-574						
575-599						
600-624				1		
625-649		6		2	1	
650-674	1	11		1	6	1
675-699		10	1		4	2
700-724	1	2			9	1
725-749					5	
750-774				1	1	1
775-799					1	
Number	2	29	1	6	28	5
Mean	688	665	695	635	696	702
S.D.*	24.7	28.8	0	85.0	46.7	38.5

\* Standard Deviation

Table 11. Summary of Numbers of Juvenile Salmonids Captured at Trapping Stations in Anchor River, 1982.

Station Number	Type of Trap	SH	DV	KS	SS
1	Inclined Plane	36	11	234	610
2	Minnow Traps	171	88	99	158
3	Minnow Traps	115	235	265	421
4	Minnow Traps	98	192	167	248
5	Minnow Traps	198	180	117	359
	TOTAL	618	706	882	1,796

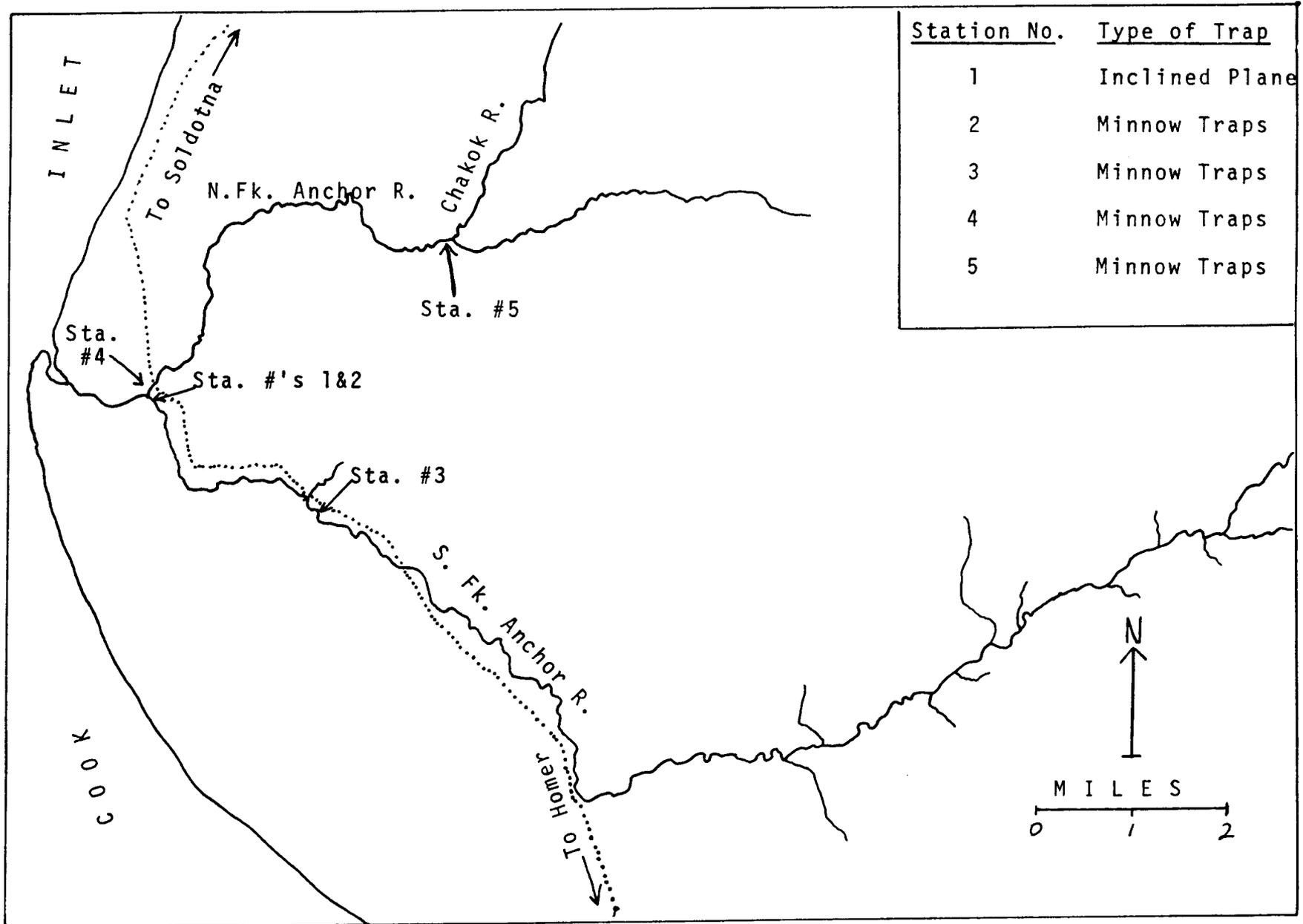


Figure 3. Map of Anchor River Showing Location of Juvenile Trapping Stations, 1982.

Table 12. Numbers of Juvenile Chinook Salmon Trapped at Station 1 in Anchor River, by Weekly Period and Length Interval, 1982.

Length Interval (mm)	Weekly Period													
	6/13	6/20	6/27	7/4	7/11	7/18	7/25	8/1	8/8	8/15	8/22	8/29	9/5	9/12
45-49			1			1								1
50-54						1	2	1						1
55-59					1	3	2	1	2	1	1			
60-64						1	1	1	1	2				
65-69		1				1			3	2	1			
70-74		2							6	6	2	1	1	
75-79		2							5	9	1	1	1	
80-84		4	1		8	7	2		5	4	4	1		
85-89		1			26	18	3			1				
90-94			1		25	21	5				1			
95-99					7	9	4	1						
100-104						4	1							
105-109														
110-114														
115-119			1											
Total	0	10	4	0	67	66	20	4	22	24	10	3	4	0

Table 13. Numbers of Juvenile Coho Salmon Trapped at Station 1 in Anchor River, by Weekly Period and Length Interval, 1982.

Length Interval (mm)	Weekly Period														
	5/16	6/13	6/20	6/27	7/4	7/11	7/18	7/25	8/1	8/8	8/15	8/22	8/29	9/5	9/12
35-39			1				2	2		2	10	3	1	3	2
40-44		29	1	1	1	1		2		3	39	11	2	9	1
45-49		1				6		1		5	31	19	13	41	2
50-54						3	1	5	2	7	32	18	16	51	2
55-59		4				4	3	5		3	11	5	13	31	2
60-64			3	2		1	5	4	3	2		2	6	6	
65-69		1	1				2	3	5	2	2	3		2	2
70-74			1				4	2		3			2	1	1
75-79		3	1				4	1	1		1		1		
80-84	1					1			1				1	1	
85-89		1	1	1				1				5			2
90-94	1	1	6	1				1						1	
95-99		7	2												1
100-104		3	5	1	1										
105-109		2	3												
110-114		1	2				1								
115-119	1	1	1												
120-124															
125-129			1												
Total	3	54	29	6	3	26	19	26	10	25	126	67	53	146	13

Severe flooding occurred in both 1979 and 1980 on the Anchor River. In 1979, the river flooded in early November with a peak flow of 1,980 cfs; the maximum flow of record was 2,240 cfs. This flood was accompanied by severe shifting of stream gravels. In 1980, the river flooded in late October with a new record flow of 2,760 cfs. Extreme shifting of gravels and rechanneling of the streambed occurred.

In both 1979 and 1980, chinook and coho embryos were in the gravel during the period of flooding. Coho smolts consist of Age I and Age II fish, and the smolts in 1982 were progeny of 1979 and 1980 spawners. Chinook smolts are Age I, which would be offspring from the 1980 spawn. The floods in both 1979 and 1980 were severe enough to impact survival of embryos in both years, and may have been a factor in the reduced numbers of smolts captured in 1982. If this is the case, it may be reflected in reduced adult runs of coho in 1983 and 1984, and chinook in 1983, 1984 and 1985.

Scales were taken from both coho and chinook salmon juveniles. Analysis of scales is still incomplete, but will be completed and incorporated with length and weight data in a more comprehensive study of juvenile growth in a later report.

#### Kachemak Bay Feeder Chinook Salmon

We have been collecting data from tagged feeder chinook salmon caught in the Kachemak Bay sport fishery since 1977. Two marked feeder chinooks were reported in 1982. One fish, caught near Anchor Point on July 1, originated at the South Santiam River Hatchery in Oregon (Table 14). The second fish was caught off the Homer Spit on August 15; it originated at the Deer Mountain Hatchery in Ketchikan.

#### Kenai Peninsula Marine Survey

A resource survey of the marine waters in the Outer District of the Kenai Peninsula was conducted during the period August 14-23. The trip was made aboard the SS PANDALUS, and the survey was conducted in cooperation with the Commercial Fisheries Division's bottomfish biologist. A map of the area covered in the survey is presented in Figure 4. Approximate sites of sampling are noted in the figure.

Fish were captured by jigging with rod and reel. Fish were anesthetized in an MS-222 solution, measured, weighed and tagged with serially-numbered Floy tags before release.

Numbers and sizes of captured fish species are listed in Table 15.

Rockfish were found on virtually all rocky points we fished, with greatest apparent populations on points exposed toward the Gulf of Alaska. All fishing was done close to the shoreline in comparatively shallow water. Black rockfish were by far the most abundant species. In areas where we altered techniques to fish for ling cod, we caught them readily.

Table 14. List of Tagged Chinook Salmon Caught in Kachemak Bay Sport Fishery 1977-1982.

Date Captured	Length/ Weight	Tag Code	Brood Year	Origin
1977	Lgth.-Weight unknown	2-3-2	1973	Puntledge River Hatchery, British Columbia; hatchery evaluation.
9/26/78	680 mm/5.9 kg	9-5-7	1975	South Santiam River, Oregon; hatchery experimental
9/26/78	575 mm/3.6 kg	2-4-11	1975	Nitinat River, British Columbia; wild stock contribution
9/26/78	570 mm/3.6 kg	2-1-10	1975	Atnarko River, British Columbia; wild stock contribution
9/30/78	825 mm/6.8 kg	9-5-8	1975	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/19/78	Lgth. Unknown 2.3 kg	63-16-6	1976	Skagit River, Washington; wild stock contribution
3/5/79 <sup>1</sup>	505 mm	4-16-16	1976	Crystal Lake Hatchery, Petersburg, Alaska.
5/6/79	Lgth. Unknown 1.6 kg	9-16-30	1976	South Santiam River, Oregon; planted in Willamette River at Oregon City.
9/9/79	Lgth. Unknown 6.8 kg	9-16-30	1976	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/6/79	760 mm/10 kg	9-5-8	1975	South Santiam River, Oregon; planted in Willamette River at Oregon City.
10/23/79	Lgth.-Weight Unknown	2-16-30	1976	Robertson Creek Hatchery, British Columbia.

Table 14 (cont.). List of Tagged Chinook Salmon Caught in Kachemak Bay Sport Fishery 1977-1982.

Date Captured	Length/ Weight	Tag Code	Brood Year	Origin
5/23/80	Lgth. Unknown 12.2 kg	2-16-30	1976	Robertson Creek Hatchery, British Columbia
6/7/80	Lgth.-Weight Unknown	63-16-62	1976	Priest Rapids, Columbia River, Washington.
9/-/80	Lgth.-Weight Unknown	7-12-32	1977	Marion Forks Hatchery, North Santiam River, Oregon.
5/13/81	Lgth. Unknown 6.4 kg	3-16-21	1977	Little Port Walter Hatchery, Alaska; NMFS experimental, Unuk River stock.
5/13/81	Lgth. Unknown 11.3 kg	2-16-28	1976	Nitinat Lake, British Columbia; wild stock contribution.
5/27/81	Lgth.-Weight Unknown	2-16-15	1978	Robertson Creek Hatchery, British Columbia.
9/27/81	Lgth. Unknown 5.4 kg	2-16-15	1978	Robertson Creek Hatchery, British Columbia.
10/3/81	Lgth.-Weight Unknown	2-17-32	1978	Atnarko Hatchery, British Columbia.
7/1/82	Lgth. Unknown 5.4 kg	7-30-22	1978	South Santiam River Hatchery, Oregon.
8/15/82	Lgth. Unknown 5.9 kg	4-19-38	1978	Deer Mountain Hatchery, Ketchikan, Alaska.

<sup>1</sup> This individual was caught in an experimental shrimp trawl.

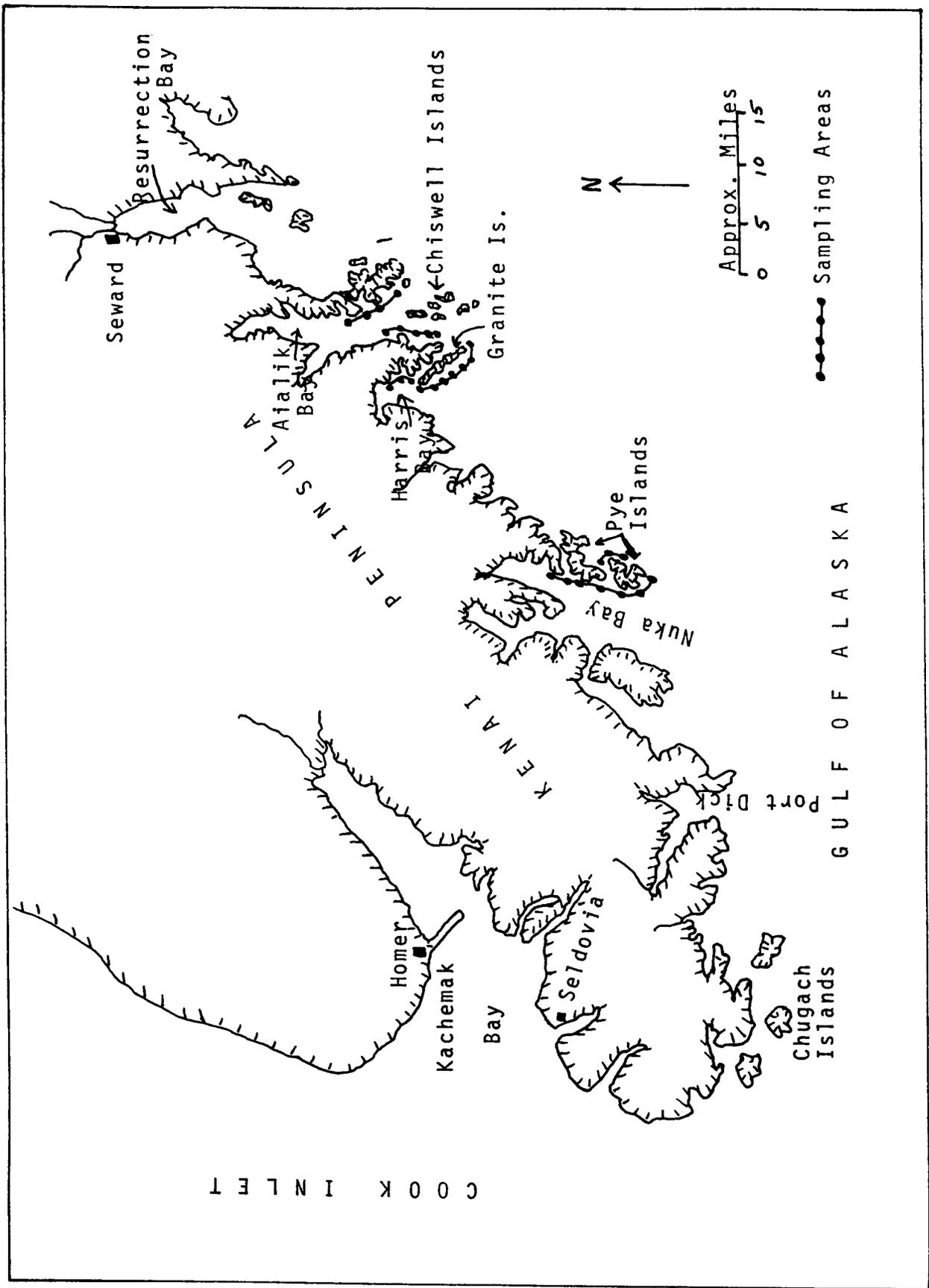


Figure 4. Map of Lower Kenai Peninsula Showing Location of Rockfish Sampling Survey, 1982.

Table 15. Numbers and Size of Fish Captured During Survey of Outer Kenai Peninsula, August 15-23, 1982.

Species	Number	Length(mm)	Weight(g)
Black rockfish	730	mean 377 range 220-505	1,137 325-2,500
Dusky rockfish	71	mean 321 range 190-410	750 250-1,375
Copper rockfish	10	mean 316 range 265-390	662 350-1,250
China rockfish	3	mean 313 range 290-340	883 575-1,050
Quillback rockfish	2	mean 250 range 245-255	362 325-400
Ling cod	27	mean 819 range 345-1,285	7,196 400-17,750

## LITERATURE CITED

- Alaska Dept. of Fish and Game. 1971. Lake and stream survey manual. Sport Fish Division. 30 pp.
- Engel, L.J. 1973. Inventory and cataloging of Kenai Peninsula, Cook Inlet and Prince William Sound drainages and fish stocks. Alaska Dept. of Fish and Game, Federal Aid in Fish Restoration, Annual Report of Progress 1972-1973, Project F-9-5, 14(G-I-C): 1-25.
- Hammarstrom, S.L. 1974. Inventory and cataloging of Kenai Peninsula, Cook Inlet and fish stocks. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1973-1974, Project F-9-6, 15(G-I-C): 23-65.
- \_\_\_\_\_. 1975. Inventory and cataloging of Kenai Peninsula, Cook Inlet and fish stocks. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1974-1975, Project F-9-7, 16(G-I-C): 27-67.
- \_\_\_\_\_. 1977. Inventory and cataloging of Kenai Peninsula and Cook Inlet drainages and fish stocks. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1976-1977, Project F-9-9, 18(G-I-C): 29-46.
- Mills, M.J. 1979. Alaska statewide harvest studies. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1978-1979, Project F-9-11, 20(SW-I-A). 112 pp.
- \_\_\_\_\_. 1980. Alaska statewide harvest studies. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1979-1980, Project F-9-12, 21(SW-I-A). 65 pp.
- \_\_\_\_\_. 1981a. Alaska statewide harvest studies. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1980-1981, Project F-9-13, 22(SW-I-A). 78 pp.
- \_\_\_\_\_. 1981b. Alaska statewide harvest studies. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1980-1981, Project F-9-13, 22(SW-I-A). 107 pp.
- \_\_\_\_\_. 1982. Alaska statewide harvest studies. Alaska Dept. of Fish and Game. Federal Aid in Fish Restoration, Annual Report of Progress, 1981-1982, Project F-9-14, 23(SW-I-A). 115 pp.
- Neuhold, J. M. and K.H. Lu. 1957. Creel census methods. Publication No. 8, Utah Dept. of Fish and Game. 36 pp.
- Wallis, J. and D.T. Balland. 1982. Anchor River steelhead study. Alaska Dept. of Fish and Game. Anadromous Fish Studies, Annual Report of Progress, 1981-1982. Project F-9-14, 23(AFS-48).

\_\_\_\_\_. 1983. Anchor River steelhead study. Alaska Dept. of Fish and Game. Anadromous Fish Studies, Annual Report of Progress, 1982-1983. Project F-9-15, 24(AFS-48).

Wallis, J. and S. Hammarstrom. 1979. Inventory and cataloging of Kenai Peninsula and Cook Inlet drainages and fish stocks. Alaska Dept. of Fish and Game, Federal Aid in Fish Restoration, Annual Report of Progress, 1978-1979, Project F-9-11, 20(G-I-C): 49-96.

\_\_\_\_\_. 1980. Inventory and cataloging of Kenai Peninsula and Cook Inlet drainages and fish stocks. Alaska Dept. of Fish and Game, Federal Aid in Fish Restoration, Annual Report of Progress, 1979-1980, Project F-9-12, 21(G-I-C): 59-90.

Prepared by:

Approved by:

Stephen Hammarstrom  
Fishery Biologist

E. Richard Logan, Ph.D.  
Director, Division of Sport Fish

Joe Wallis  
Fishery Biologist

Mark C. Warner, Ph.D.  
Research Chief, Division of Sport Fish