

Informational Leaflet 57

FISHERY AND BIOLOGICAL CHARACTERISTICS OF SALMON CAUGHT BY SPORT GEAR IN SOUTHEASTERN ALASKA

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May 10, 1965

STATE OF ALASKA
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DEPARTMENT OF
FISH AND GAME
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SUBPORT BUILDING, JUNEAU



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INTRODUCTION

The king salmon (Oncorhynchus tshawytscha) stocks in Alaska, similar to other coastal areas, have been declining since 1935 when 17 million pounds were landed in the Alaska troll fishery. In 1962 the Alaska troll catch was only 2.6 million pounds and was the lowest on record.

Because of the long range migratory behavior of the king salmon, usually northward, with stocks of fish from Washington, Oregon and British Columbia entering into the fishery, the problem has been one of coastal concern (Parker and Kirkness, 1956). The states of California, Oregon, Washington and the province of British Columbia have for several years recorded the sport catch of kings to augment the commercial fisheries statistics. In 1959 the Alaska Department of Fish and Game initiated a program to evaluate the sport harvest of Southeastern Alaska-caught king salmon to complete the overall coastal enumeration and to provide information for the proper management of this species.

PROCEDURE

A sampling program was designed to check the Southeastern Alaska sport catch of king salmon for the following information: number caught, area caught, number of fishermen, size and type of boat, time fished, type of fishing tackle and bait, tide and weather conditions and landing location.

This investigation was conducted with Federal Aid in Fish Restoration Funds under Project F-5-R-1 (1959-1960); F-5-R-2 (1960-1961) and F-5-R-3 (1961-1962).

Information on the following biological factors was also obtained: size of fish (length and weight), scale samples for age determination, sex ratios and flesh color (red or white kings).

The sampling was conducted in Ketchikan and Juneau, the two main sport fishing areas in Southeastern Alaska. The fishermen were contacted at the boat landings for the above information. Two or three men were stationed in each town to conduct fishermen interviews and to record data on standard field forms. All the data were coded and entered on punch cards for analysis.

As a supplement to the regular season's coverage of the sport fishery, the major salmon derbies were also sampled. The same information mentioned above was collected during these derbies, but due to the special aspect of this fishery these data were treated separately and are discussed in another report (Finger and Armstrong, 1965).

Nearly all the boats in the Juneau and Ketchikan areas were docked at a small-boat landing throughout the fishing season and almost all of these boats were removed and stored in the early fall when the weather became inclement. Each town had two principal boat harbors that catered to the sport fishing boats and, in addition, the city boat harbors (chiefly fishing boats and large pleasure boats) were a secondary place of moorage for some of the small fishing boats. Nearly all the information was obtained as the fishermen returned to their place of moorage. In the Juneau area these places of landing were Tee Harbor and Auke Bay and in the Ketchikan area these were the Mountain Point and Clover Pass boat harbors.

The sampling was conducted every day except for days of bad weather when nearly all of the boats stayed at their moorages. The fishing boats were also counted at various times on the fishing grounds and these counts were compared to the regular moorage interviews in order to determine the degree of boat coverage. In addition, boat counts and estimates of the number of boats leaving the harbors were also compared to the returning interview coverage for the determination of the degree of sampling coverage.

Fisherman cooperation was excellent in both areas and the small return of boats at any one time permitted adequate coverage on nearly all of the desired items of information concerning king salmon. Information on coho (O. kisutch) and other species of salmon was also obtained when possible.

The chief sampling difficulty was with the separation of the sport fishermen and the commercial fishermen who utilized sport gear and methods (hereafter referred to as sport-commercial fishermen). Sport-commercial fishermen were defined as those fishermen who used pleasure type boats, sport tackle, and sport fishing methods, but who

possessed a commercial fishing license and sold their fish. The possession of a commercial license allowed the fisherman to use up to four fishing rods while the sport fisherman was restricted to the use of only one fishing pole. The sport-commercial fisherman was also exempt from the limit regulations of king salmon while the sport fisherman was limited in his catch of this species. However, the liberal daily limit at the time of the study (fifty pounds and one fish or three king salmon, whichever was less restrictive) did not usually result in any great advantage to the average sport-commercial fisherman in numbers of king salmon caught. There were no limit restrictions on the other species of salmon.

FINDINGS

Seasonal Catch Success

Combined Areas

Excluding 1,325 salmon derby fish, a total of 6,467 Pacific salmon (Onchorhynchus) was sampled during two years of investigation of the Southeastern Alaska seasonal sport fishery from 4,559 boat trips in the Juneau and Ketchikan areas. This coverage resulted in an overall seasonal catch per unit effort (C.P.U.E.) for total salmon of 1.71 fish per boat trip in 1960 and 1.12 fish per boat trip in 1961 for the combined sport and sport-commercial fishermen (Table 1).

The 3,143 king salmon sampled in both areas resulted in a seasonal C.P.U.E. of 0.88 fish per boat trip in 1960 and declined to 0.50 fish per boat trip in 1961. Coho salmon were the second most numerous species of salmon to enter the fishery and the sample of 2,989 coho in both areas also showed a reduction in the C.P.U.E., from 0.75 in 1960 to 0.56 in 1961. The other three species of Pacific salmon were not important in the fishery and did not contribute substantially to the total catch. The order of abundance was as follows: pink salmon (O. gorbuscha), chum salmon (O. keta), and red salmon (O. nerka).

Area Comparison

Although the C.P.U.E. for total salmon was approximately the same, the Juneau district sampling showed approximately four times the effort and catch as the Ketchikan district in 1960. In 1961

Table 1. The Numbers of Fish, Boats, and Catch per Boat for the Combined Sport and Sport-Commercial Catch in 1960 and 1961.

Area	Species of Salmon	No. of Fish		No. of Boats		C.P.U.E.*	
		1960	1961	1960	1961	1960	1961
KETCHIKAN	King	392	277	470	726	0.83	0.38
	Coho	296	147			0.63	0.20
	Pink	70	51			0.15	0.07
	Chum	1	0			0.00	0.00
	Red	0	1			0.00	0.00
	Total	759	476			1.62	0.66
JUNEAU	King	1637	837	1840	1523	0.89	0.55
	Coho	1442	1104			0.78	0.72
	Pink	97	78			0.05	0.05
	Chum	16	18			0.01	0.01
	Red	0	0			0.00	0.00
	Total	3192	2037			1.73	1.34
TOTAL	King	2029	1114	2310	2249	0.88	0.50
	Coho	1738	1251			0.75	0.56
	Pink	167	132			0.07	0.06
	Chum	17	18			0.01	0.01
	Red	0	1			0.00	0.00
	Total	3951	2516			1.71	1.12

*Catch per unit effort = no. of fish per boat trip unless otherwise stated.

the above differences in the number of fish landed in the two areas remained at the same level, but the effort (number of boats sampled) in the Ketchikan area almost doubled. This resulted in a correspondingly greater decrease in the C.P.U.E. for that area. The C.P.U.E. in the Juneau area also declined in 1961, but less sharply than in the Ketchikan area. Slightly higher C.P.U.E. values for the Juneau area were recorded for king salmon and much larger values were recorded for coho salmon than in the Ketchikan district during both study years. The Ketchikan area displayed better pink salmon success in both years of the study.

Coho Availability

Coho salmon, unlike king salmon which were available in varying abundance to the sport fishermen during the entire fishing season (April to September), did not enter the fishery until the latter part of June. The C.P.U.E. for coho salmon was therefore lower when considered on an entire seasonal basis than when calculated only for the period during which they were available. A C.P.U.E. of 1.21 per boat trip for 1960 and 1.08 per boat trip for 1961 was obtained for coho when considered only on the basis of availability (Table 2). Coho salmon, therefore, contributed to the angler success to a greater degree than king salmon (0.88 and 0.50) for the period that they entered the fishery. This was especially true of the Juneau area in 1961 where greater fishing success for coho was obtained when compared to the Ketchikan fishery.

Fishermen Success and Numbers

A total of 9,407 sport and sport-commercial fishermen was sampled from 4,455 boat trips which resulted in a consistent average value of 2.1 men per boat for both 1960 and 1961 (Table 3). The Juneau area had slightly higher average-fishermen-per-boat values (2.1 and 2.2) than the Ketchikan area (2.0) for the two years of the study. The average number of fishermen for each sport fishing boat trip was higher than the combined sport and sport-commercial average with the Juneau area registering slightly higher values than the Ketchikan area. The two-year Juneau average was 2.6 sport fishermen per boat trip and the Ketchikan two-year average was 2.5 sport fishermen per boat trip. The sport-commercial fishermen averaged one person per boat trip in both areas.

The C.P.U.E. for the combined classes of fishermen was similar in the Ketchikan and Juneau areas in 1960 with 0.79 and 0.75 fish per fishermen. The C.P.U.E. for fishermen declined in 1961 for

Table 2. The Catch Per Boat for Coho Salmon for Period of Availability and Seasonal Fishery.

Seasonal Coho Success					Period of Coho Availability Success				
Date	Area	No. Boats	No. Coho	C.P.U.E	Date	Area	No. Boats	No. Coho	C.P.U.E
April to September 1960	Juneau	1840	1442	0.78	June 20 to September 1960	Juneau	1201	1441	1.20
	Ketchikan	470	296	0.63		Ketchikan	238	296	1.24
	Total	2310	1738	0.75		Total	1439	1739	1.21
April to September 1961	Juneau	1523	1104	0.72	June 19 to September 1961	Juneau	890	1103	1.24
	Ketchikan	726	147	0.20		Ketchikan	266	147	0.55
	Total	2249	1251	0.56		Total	1156	1250	1.08

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9
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Table 3. The Average Fisherman Per Boat and the C.P.U.E. for the Sport and Sport-Commercial Fisherman.

		1960			1961		
		Ketch- ikan	Juneau	Total	Ketch- ikan	Juneau	Total
SPORT	No. Fish	316	433	749	201	589	790
	No. Boats	358	1247	1605	477	1037	1514
	No. Men	813	3215	4028	1204	2839	4043
	Ave. Men per Boat	2.3	2.6	2.5	2.5	2.7	2.6
	C.P.U.E. (Men)	0.39	0.14	0.19	0.17	0.21	0.20
SPORT - COMMERCIAL	No. Fish	405	2378	2783	258	1435	1693
	No. Boats	101	517	618	243	475	718
	No. Men	101	517	618	243	475	718
	Ave. Men per Boat	1.00	1.00	1.00	1.00	1.00	1.00
	C.P.U.E. (Men)	4.01	4.60	4.50	1.06	3.02	2.36
TOTAL	No. Fish	721	2811	3532	459	2024	2483
	No. Boats	459	1764	2223	720	1512	2232
	No. Men	914	3732	4646	1447	3314	4761
	Ave. Men per Boat	2.0	2.1	2.1	2.0	2.2	2.1
	C.P.U.E. (Men)	0.79	0.75	0.76	0.32	0.61	0.52

the combined areas (0.52) with the Ketchikan area registering only half as high a C.P.U.E. as the Juneau area (0.32 to 0.61 respectively).

Only 104 additional boat trips with 449 fish were recorded where the number of fishermen was unknown. When the number of fishermen was calculated for these boats by using the average number of fishermen per boat stated above, a corrected figure of 9,622 fishermen was obtained for the 4,559 total boat trips sampled in both areas.

Class of Fishermen

A comparison of the sport and sport-commercial fishermen who caught fish (successful fishermen only ¹) in 1960 showed that the sport-commercial fishermen caught more fish with nearly three times as great a total C.P.U.E. (Table 4). In 1961 a better separation of the two groups of fishermen was obtained which did not restrict the comparison to only the successful fishermen. Again, the sport-commercial group displayed a marked advantage over the strictly sport fishermen in catching salmon. The better catches for the sport-commercial group were more pronounced for coho salmon than for king salmon and for the Juneau district over the Ketchikan area.

The total sampling effort in Southeastern Alaska showed that approximately 70 percent of the boats contacted were sport fishermen and 30 percent were sport-commercial fishermen (Table 5). However, the latter class of fishermen caught approximately 70 percent of the fish. The larger Juneau sample was chiefly responsible for the predominantly commercial catch figures with 75 percent and 70 percent of the total fish landed in 1960 and 1961. The Ketchikan sport-commercial fishermen did not show such an advantage over the sport fishermen with only 53 percent and 55 percent of the catch, but this group was probably not sampled in the same magnitude as the sport fishermen.

Many factors were responsible for the greater catch success of the sport-commercial fishermen. They fished longer hours, could use more than one rod, and were generally the more experienced fishermen. This groups greater catch of coho salmon reflected

¹As the sport-commercial fishermen in 1960 were chiefly recorded only if they sold their fish, only the successful sport fishermen (those who caught fish) were used for comparison. However, very few sport-commercial fishermen failed to catch at least one fish.

Table 4. The Seasonal Sport and Sport-Commercial C.P.U.E. for 1960 and 1961.

AREA	SPECIES OF SALMON	1960*		1961**	
		Sport	Sport-Commercial	Sport	Sport-Commercial
JUNEAU	King	1.17	2.10	0.34	1.01
	Coho	0.36	2.54	0.21	1.86
	Pink	0.05	0.14	0.02	0.12
	Chum	0.01	0.02	0.01	0.03
	Total	1.59	4.80	0.58	3.02
KETCHIKAN	King	1.00	1.91	0.26	0.62
	Coho	0.52	1.93	0.13	0.34
	Pink	0.21	0.29	0.06	0.10
	Chum	0.00	0.01	0.00	0.00
	Total	1.73	4.13	0.45	1.06
TOTAL	King	1.12	2.07	0.32	0.88
	Coho	0.41	2.44	0.19	1.35
	Pink	0.09	0.17	0.03	0.12
	Chum	0.01	0.02	0.00	0.02
	Total	1.63	4.69	0.54	2.36

*C.P.U.E. based on only those boat trips that caught fish (successful fishermen).

**C.P.U.E. based on both successful and unsuccessful boat trips.

Table 5. The Number and Percentage of Salmon and Boats Sampled in the Juneau and Ketchikan Areas by Class of Fishermen.

		1960			1961		
		Ketchikan	Juneau	Total	Ketchikan	Juneau	Total
SPORT	No. Boats	369	1323	1692	476	1043	1519
	% Boats	79	72	73	66	69	68
	No. Fish	354	814	1168	212	601	813
	% Fish	47	25	30	45	30	32
SPORT-COMMERCIAL	No. Boats	101	517	618	243	475	718
	% Boats	21	28	27	34	31	32
	No. Fish	405	2378	2783	258	1435	1693
	% Fish	53	75	70	55	70	68
TOTAL	No. Boats	470	1840	2310	719	1518	2237
	% Boats	100	100	100	100	100	100
	No. Fish	759	3192	3951	470	2036	2506
	% Fish	100	100	100	100	100	100

the commercial aspect of this fishery because, with the generally good availability and no limit restrictions on this species, the sport fisherman could probably have caught far more fish than he did, but was limited by time considerations as well as by the number of fish that he could personally utilize.

Sampling Projections

Sampling Average

In the Juneau area, enumerations of the boats on the fishing grounds were compared to the counts obtained by the usual sampling procedures. These comparisons indicated that a 79 percent coverage was obtained in 1960 and a 56 percent coverage was obtained in 1961. Also, in 1961 a comparison was made between weekday versus weekend and holiday coverage and no large differences were indicated (Table 6). These percent-of-coverage values, obtained by the normal sampling procedures, were considered to be over-estimated for the following reasons: (1) The total boat count did not include one of the fishing areas (Point Bishop area) which was separated from the main concentration of boats. This area was primarily important in the early Taku River run of king salmon in May and in the late coho fishery in late August and early September; (2) a few boats were moored at places not included in the sampling program; and (3) boat returns on days of inclement weather, early morning hours, and after dark were not usually sampled.

A ten percent reduction was applied to the coverage values of 79 and 56 percent in both years to compensate for the above unknown sources of discrepancies. The ten percent reduction was believed minimal and the percent-of-coverage factor used in projecting the sample values was thought to be overly large. This would result in an understatement of the projected total take of fish, fishermen and boat trips.

Similar boat count comparisons were not usable in the Ketchikan area because of the widely scattered fishing grounds. An effort was made to determine the extent of the sampling coverage by comparing the sampling crew's and harbor manager's estimated or direct counts of the boats leaving the boat harbors to the normal sampling procedures on the returning fishermen. These estimates, when adjusted to compensate for the unknown number of boats leaving other non-sampled areas and for days when incomplete or no sampling was conducted, resulted in an estimated value of 30 percent boat coverage in the Ketchikan area. This value was considered maximal and, again, probably underestimated the fish take. This is especially true of

Table 6. Fishing Ground Boat Counts Compared to the Number of Boats Sampled in the Juneau Area.

Year	Sample Evaluation		Month				Season Totals	
			May	June	July	Aug.		
1960	No. Boat Surveys		7	8	6	4	25	
	No. Boats Counted		184	284	302	150	920	
	No. Boats Checked		133	232	252	105	722	
	Percent Coverage		72	82	83	70	79	
1961	No. Boat Surveys		4	8	11	4	27	
	No. Boats Counted		92	254	415	216	977	
	No. Boats Checked		37	168	230	81	516	
	Percent Coverage		40	66	55	38	53	
	Weekend or Holiday		%	65	71	40	39	54
	Week Days			54	74	62	34	56

the sport-commercial fishermen, who were not sampled in the same magnitude as the sport-fishermen because of identification difficulties.

All projected sample values should be considered only as approximations in which the values for the sport-fisherman and the king salmon are thought to be the most correct. The sport-commercial sample projections were listed only to show the general magnitude of differences when compared to the sport-fisherman and the coho were not sampled as intensively as the king salmon.

Number of Salmon

The estimated total catch of salmon in the Juneau and Ketchikan areas (excluding salmon derby fish) for the combined sport and sport-commercial fishermen was 7,156 fish in 1960 and 6,302 salmon in 1961 (Table 7). The sport-commercial fishermen took the largest share of these fish with 4,796 in 1960 and 4,197 in 1961 as compared to the catch of 2,360 and 2,105 salmon for the sport fishermen. The Juneau sport-commercial fishermen contributed to this disparity between the two categories of fishermen to a greater degree than the Ketchikan sport-commercial fishermen.

More king salmon were caught in both study years in the Juneau district than in the Ketchikan area with an estimated 2,373 fish in 1960 and 1,944 fish in 1961 as compared to 1,306 fish in 1960 and 913 fish in 1961 for the Ketchikan district. Again, the Juneau sport-commercial fishermen took the bulk of these fish with an estimated take of 1,506 king salmon as compared to 867 for the sport fishermen in 1960 and with a 1,116 commercial fish take as opposed to a sport catch of 828 kings in 1961. The harvest of king salmon between the two classes of fishermen was almost equally divided for both years of the study in the Ketchikan area; but the sport-commercial take was probably under-sampled and, therefore, underestimated. The disparity in catch between the two classes of fishermen was greater in the harvest of the coho salmon.

Of the total Juneau estimated seasonal take of coho salmon (2,090 fish in 1960 and 2,568 fish in 1961), the sport-commercial fishermen harvested nearly seven times more fish in 1960 and four times more fish in 1961 than the sport fishermen. The difference in catch was not so large in the Ketchikan district, but here, also, the sport-commercial fishermen landed the greater share of coho salmon.

Table 7. The Calculated Salmon Catch and Number Sampled for the Juneau and Ketchikan Areas.*

Year	Area	Species of Fish	Sport		Sport-Commercial		Total	
			Fish Sampled	Fish Calculated	Fish Sampled	Fish Calculated	Fish Sampled	Fish Calculated
1960	Juneau	King	598	867	1039	1506	1637	2373
		Coho	186	270	1256	1820	1442	2090
		Other	30	43	83	120	113	163
		Total	814	1180	2378	3446	3192	4626
	Ketchikan	King	205	683	187	623	392	1306
		Coho	107	357	189	630	296	987
		Other	42	140	29	97	71	237
		Total	354	1180	405	1350	759	2530
	Total	King	803	1550	1226	2129	2029	3679
		Coho	293	627	1445	2450	1738	3077
		Other	72	183	112	217	184	400
		Total	1168	2360	2783	4796	3951	7156
1961	Juneau	King	356	828	480	116	836	1944
		Coho	220	512	884	2056	1104	2568
		Other	25	58	71	165	96	223
		Total	601	1398	1435	3337	2036	4735
	Ketchikan	King	123	410	151	503	274	913
		Coho	62	207	83	277	145	484
		Other	27	90	24	80	51	170
		Total	212	707	258	860	470	1567
	Total	King	479	1238	631	1619	1110	2857
		Coho	282	719	967	2333	1249	3052
		Other	52	148	95	245	147	393
		Total	813	2105	1693	4197	2506	6302

*Ketchikan samples were estimated as 30% of total fish. Juneau samples were estimated as: 1960 = 69% of total fish, 1961 = 43% of total fish.

Number of Boats and Fishermen

The estimated total sport boat trips for both seasons showed that the Juneau district (1,917 and 2,426 trips) had approximately 700 and 800 more sport fishing boat trips than the Ketchikan area with 1,230 and 1,587 boat trips (Table 8). The Juneau sport-commercial fishermen also registered a greater fishing effort with approximately 300 and 400 more boat trips than the Ketchikan district. The estimated number of sport fishing boat trips increased in both areas during 1961 with a combined estimated total for both areas of 4,013 boat trips in 1961 as compared to 3,147 boat trips in 1960. The sport-commercial boat trip effort also showed a similar increase.

The average fishermen per boat values (see Table 3) were used to calculate the estimated total seasonal fishermen. Estimated values of 4,984 and 6,550 fishermen were obtained for the Juneau sport fishermen for the two years of the study while the Ketchikan sport fishermen showed estimated values of 2,829 and 3,968. The total seasonal values for the combined areas was 7,307 sport fishermen in 1960 and 12,458 fishermen in 1961. The combined seasonal Ketchikan and Juneau sport and sport-commercial fishermen resulted in an estimated 8,899 fishermen in 1960 and 12,458 fishermen in 1961.

Combined Seasonal and Salmon Derby Estimates

The estimated seasonal sport fishing values for numbers of fish, fishermen, and boat trips, when combined with the Juneau and Ketchikan salmon derby data (Finger and Armstrong, 1965) showed that a grand total of 3,597 fish in 1960 and 2,988 fish in 1961 was caught by the sport fishermen (Table 9). The effort consisted of 5,001 boat trips in 1960 and 5,555 boat trips in 1961 with 12,288 and 14,234 fishermen, respectively.

A total of 2,112 kings and 1,283 coho in 1960 and 1,548 kings and 1,270 coho in 1961 was landed. The Juneau area contributed the largest share of the catch, especially for the coho salmon. The large Juneau catch occurred in both the seasonal and Salmon Derby fisheries.

The salmon derbies in the two areas contributed a major share of the seasonal take of salmon and fishing effort in both years of the study with a little less than a third in 1961 and a little more than a third in 1960 of the seasonal totals (Table 10). The Juneau Salmon Derbies, similar to the seasonal fishery, displayed the larger percentage of catch and effort.

Table 8. The Number Sampled and Estimated for Boat Trips and Fishermen for the Sport and Sport-Commercial Fishermen.

AREA	Year and Type of Number	Sport		Sport-Commercial		Total	
		No. Boats*	No. Men**	No. Boats	No. Men	No. Boats	No. Men
JUNEAU	1960 Sample	1323	3215	517	517	1840	3732
	1960 Estimate	1917	4984	749	749	2666	5733
	1961 Sample	1043	2839	475	475	1523 ⁺	3314
	1961 Estimate	2426	6550	1105	1105	3536 ⁺	7666
KETCHIKAN	1960 Sample	369	813	101	101	470	914
	1960 Estimate	1230	2829	337	337	1567	3166
	1961 Sample	476	1204	243	243	726 ⁺⁺	1447
	1961 Estimate	1587	3968	810	810	2404 ⁺⁺	4792
TOTAL	1960 Sample	1692	4028	618	618	2310	4646
	1960 Estimate	3147	7307	1086	1086	4233	8899
	1961 Sample	1519	4043	718	718	2249	4761
	1961 Estimate	4013	10518	1915	1915	5940	12458

* Estimates were calculated using the following values for sample coverage: Ketchikan 1960 and 1961 = 30 %- Juneau
 1960=69%
 1961=43%

** Estimates were calculated using the following values for average Sportfishermen/Boat: Ketchikan 1960=2.3 1961=2.5
 Juneau 1960=2.6 1961=2.7

+ Includes 5 additional boats

++ Includes 7 additional boats

Table 9. The Estimated Total Fish, Fishermen and Boat Trips for the Seasonal and Derby Sport Fisheries.

YEAR	AREA	SPECIES	DERBIES			SEASONAL			TOTAL		
			Fish	Boats	Men	Fish	Boats	Men	Fish	Boats	Men
1960	KETCHIKAN	King	201	657	1442	683	1230	2829	884	1887	4271
		Coho	6			357			363		
		Other	-			140			140		
		Total	207			1180			1387		
	JUNEAU	King	361	1197	3479	867	1917	4984	1228	3114	8463
		Coho	650			270			920		
		Other	19			43			62		
		Total	1030			1180			2210		
	TOTAL	King	562	1854	4921	1550	3147	7307	2112	5001	12228
		Coho	656			627			1283		
		Other	19			183			202		
		Total	1237			2360			3597		
1961	KETCHIKAN	King	89	440	898	410	1587	3968	499	2027	4866
		Coho	-			207			207		
		Other	-			90			90		
		Total	89			707			796		
	JUNEAU	King	221	1102	2818	828	2426	6550	1049	3528	9368
		Coho	551			512			1063		
		Other	22			58			80		
		Total	794			1398			2192		
	TOTAL	King	310	1542	3716	1238	4013	10,518	1548	5555	14,234
		Coho	551			719			1270		
		Other	22			148			170		
		Total	883			2105			2988		

Table 10. The Percentage of Total Fish, Fishermen and Boat Trips for the Seasonal and Derby Sport Fisheries.

YEAR	AREA	SPECIES	DERBY %			SEASONAL %			
			Fish	Boats	Men	Fish	Boats	Men	
1960	KETCHIKAN	King	23	35	34	77	65	66	
		Coho	2			98			
		Other	0			100			
		Total	15			85			
	JUNEAU	King	29	38	41	71	62	59	
		Coho	71			29			
		Other	31			69			
		Total	47			53			
	TOTAL	King	27	37	40	73	63	60	
		Coho	51			49			
		Other	9			91			
		Total	34			66			
	1961	KETCHIKAN	King	18	22	18	82	78	82
			Coho	-			100		
			Other	-			100		
			Total	11			89		
JUNEAU		King	21	31	30	79	69	70	
		Coho	52			48			
		Other	27			73			
		Total	36			64			
TOTAL		King	20	28	26	80	72	74	
		Coho	43			57			
		Other	13			87			
		Total	30			70			

The Southeastern Alaska sport fishery (seasonal and derbies combined) harvested approximately 0.5 percent of the total take of salmon by hook and line (Table 11). When the sport-commercial fishermen were combined with the sport fishermen on the basis of gear and fishing method, the percentage of harvest was approximately 1 percent of the total hook and line catch of salmon. The Southeastern Alaska sport catch of salmon, when compared to the commercial line harvest, was considerably lower than the sport harvest in other Pacific Coast areas. The British Columbia sport catch varies between 5.0 percent and 9.1 percent of the commercial harvest from 1953 to 1959 (Anonymous, 1959), while the Washington State sport catch has exceeded 20 percent of the total salmon harvest in some years.

Estimated Catch for Southeastern Alaska

Sitka was the only other large town in Southeastern Alaska that was not sampled during the two year sampling program. However, information on its salmon derby was obtained for the two years with an estimated 100 king and 50 coho salmon taken during the derbies. An additional 200 kings and 200 coho, taken during the regular season, were also credited to this area. Approximately 100 kings and 100 coho were assigned to the other smaller communities in Southeastern Alaska. The total estimated take for the Southeastern sport fishery was approximately 2,500 and 2,000 kings in 1960 and 1961, while 1,600 coho were harvested during both years.

Timing of Salmon

Combined Areas

The timing of the different species of salmon into the sport fishery was similar for the two years of the investigation for the combined Juneau and Ketchikan areas. King salmon was the only species that entered the fishery from its start in late April to the latter half of June, at which time coho salmon first entered the catch (Figures 1 and 2). These two species were followed in late June and early July by minor catches of pink and chum salmon. Usually, red salmon did not enter the sport catch. Fishing was generally finished sometime in September when the catch was chiefly restricted to coho salmon.

In 1960 the angler success for king salmon, as measured by the catch per boat trip, displayed a late April-early May peak, followed by a gradual decline and then a rise until the greatest

Table 11. The Percentage of Salmon Harvest by Sport and Commercial Line Fisheries.

TYPE OF FISHING		1960		1961	
		No. of Fish	%	No. of Fish	%
SPORT*	Seasonal Sport	2360	0.3	2105	0.3
	Salmon Derbies	1237	0.2	883	0.1
	Total	3597	0.5	2988	0.5
SPORT GEAR AND METHODS	Sport, and Sport-Commercial	7156	1.0	6302	1.0
	Sport and Sport Commercial & Salmon Derbies	8393	1.2	7185	1.1
COMMERCIAL	Sport - Commercial	4796	0.7	4197	0.7
	Troll	703,023	98.8	623,249	98.9
	Total	707,819	99.5	627,446	99.5

*If an estimated 200 seasonal and 100 derby kings and 200 seasonal and 50 derby coho are added for Sitka and other smaller Southeastern Alaska communities the total sport percentages are raised approximately 0.1 - 0.2 %

FIGURE 1. 1960 SEASONAL CATCH PER UNIT EFFORT BY WEEKS FOR THE COMBINED JUNEAU AND KETCHIKAN DISTRICTS.

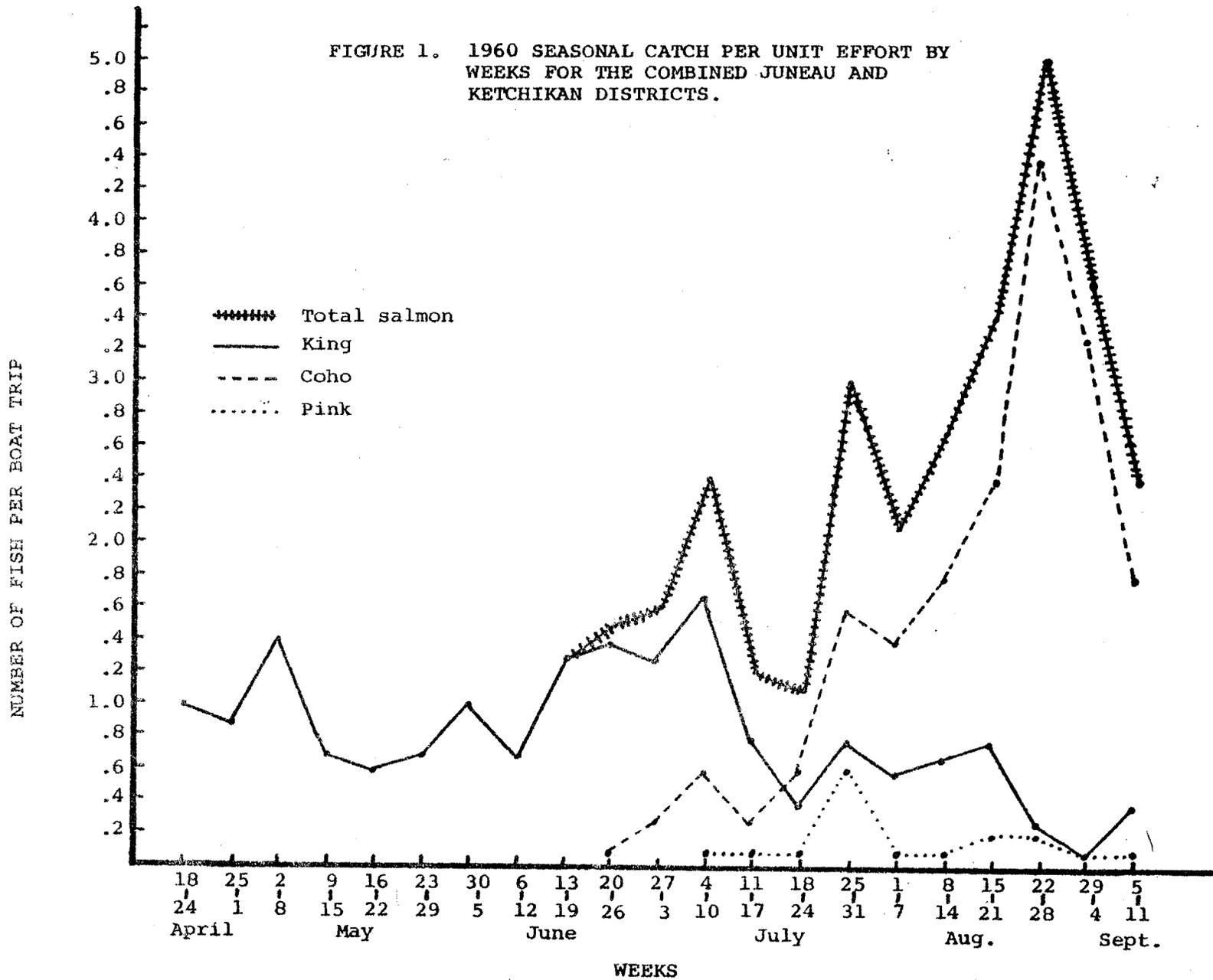
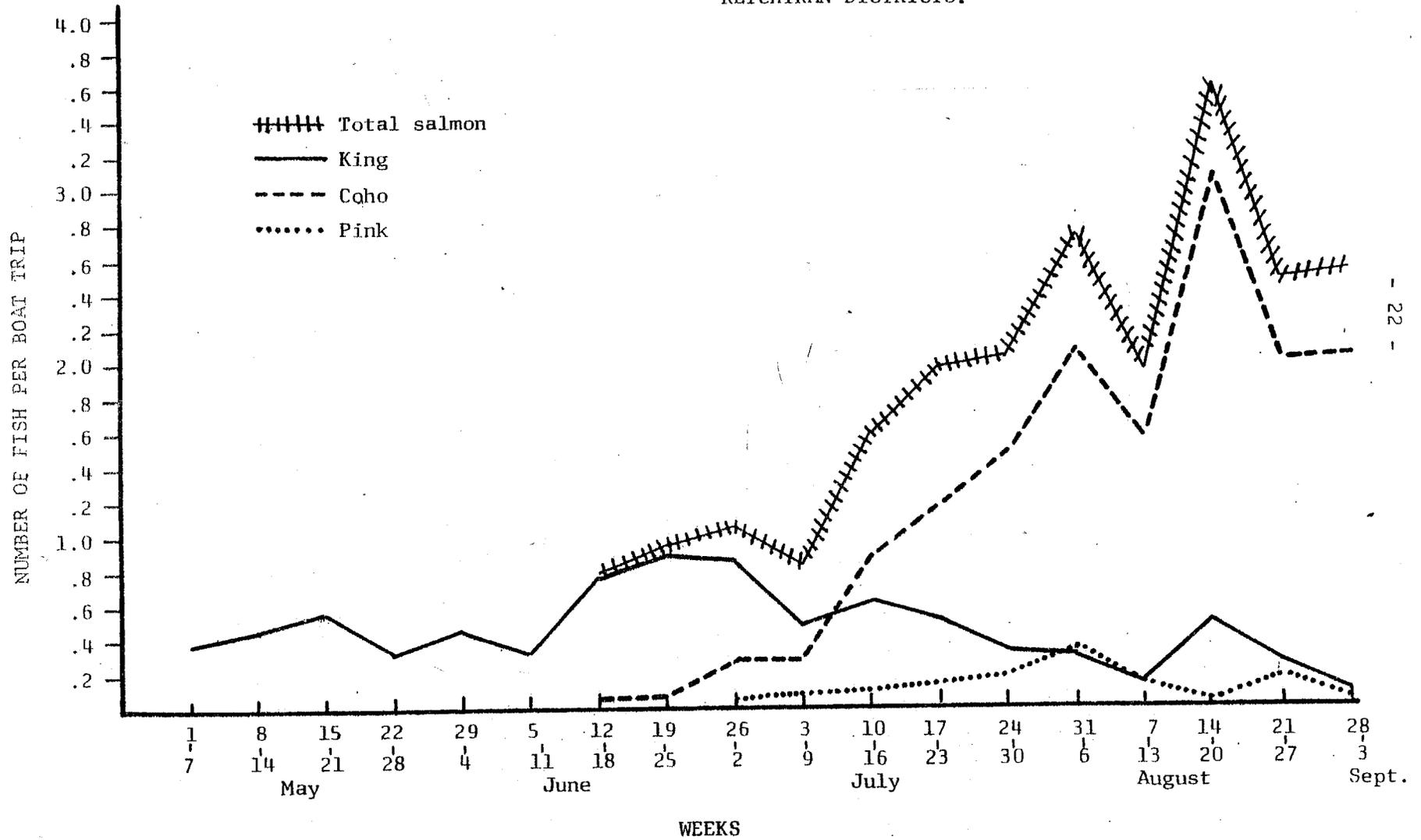


Figure 2. 1961 SEASONAL CATCH PER UNIT EFFORT BY WEEKS FOR THE COMBINED JUNEAU AND KETCHIKAN DISTRICTS.



success was reached late in June and early July. The catch dropped rapidly after the first week in July and reached the lowest level in the last of August. The fishing success was similar in 1961 except that the late April-early May peak did not occur and the peak of the king catch in July was reached a few days earlier.

The coho salmon in both 1960 and 1961 showed a sharp build-up from the time of their entry into the fishery in late June with the peak success occurring in late August.

Area Comparison

The king and coho salmon in the Juneau and Ketchikan districts, which represented the northern and southern regions of Southeastern Alaska, respectively, showed the same general availability in timing (Figures 3 and 4). The coho salmon peaked a little earlier in the Ketchikan district in both years, while in the Juneau area the peak success for king salmon was later in 1960 and earlier in 1961.

Success by Boat Type, Gear, and Method of Fishing

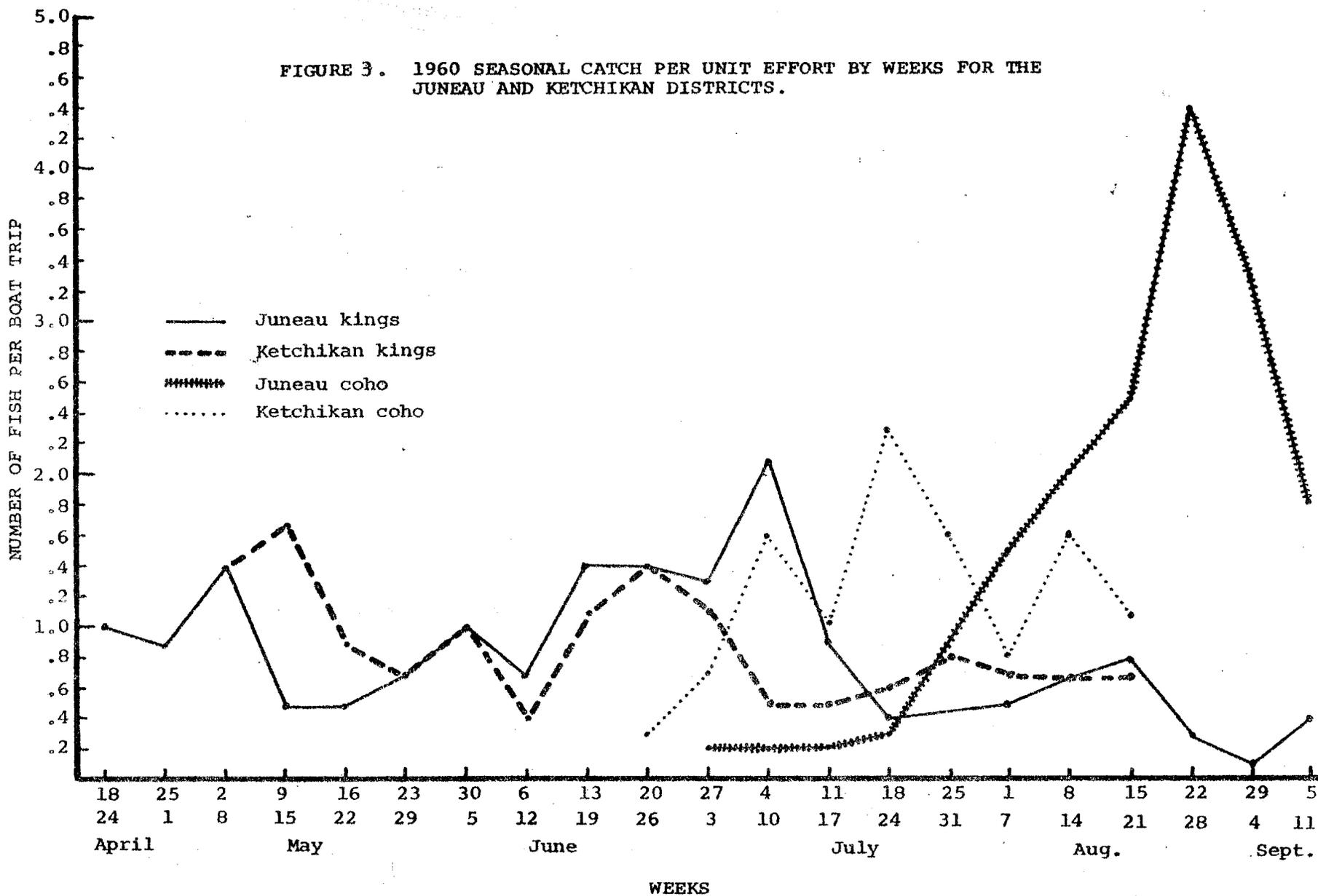
Boat Type

The cabin boats between 16-20 feet and equipped with outboards were by far the most popular boat used. The cabin boats in general, both inboard and outboard, displayed the greatest fishing success in both 1960 and 1961 (Figures 5 and 6).* The inboard cabin boats for both the Ketchikan and Juneau areas in 1960, though fewer in number, showed a greater fishing success than the outboard types. In 1961 the cabin boats with outboards were more successful in the Juneau area. This was probably a result of the trend for the use of increasingly larger horsepower outboards to replace inboard motors.

The better fishing success of the larger cabin boats was probably due to their greater size and range which enabled them to stay out longer and fish the more remote areas where the fishing pressure was lighter. There were no species difference in catch by boat type.

* The separate components of the individual bars in all-bar graphs in this report should be considered as extending to the base line. The component parts in each bar overlay each other according to the value rank order. Therefore, all component values can be directly read from the scale with no additional calculations or comparisons.

FIGURE 3. 1960 SEASONAL CATCH PER UNIT EFFORT BY WEEKS FOR THE JUNEAU AND KETCHIKAN DISTRICTS.



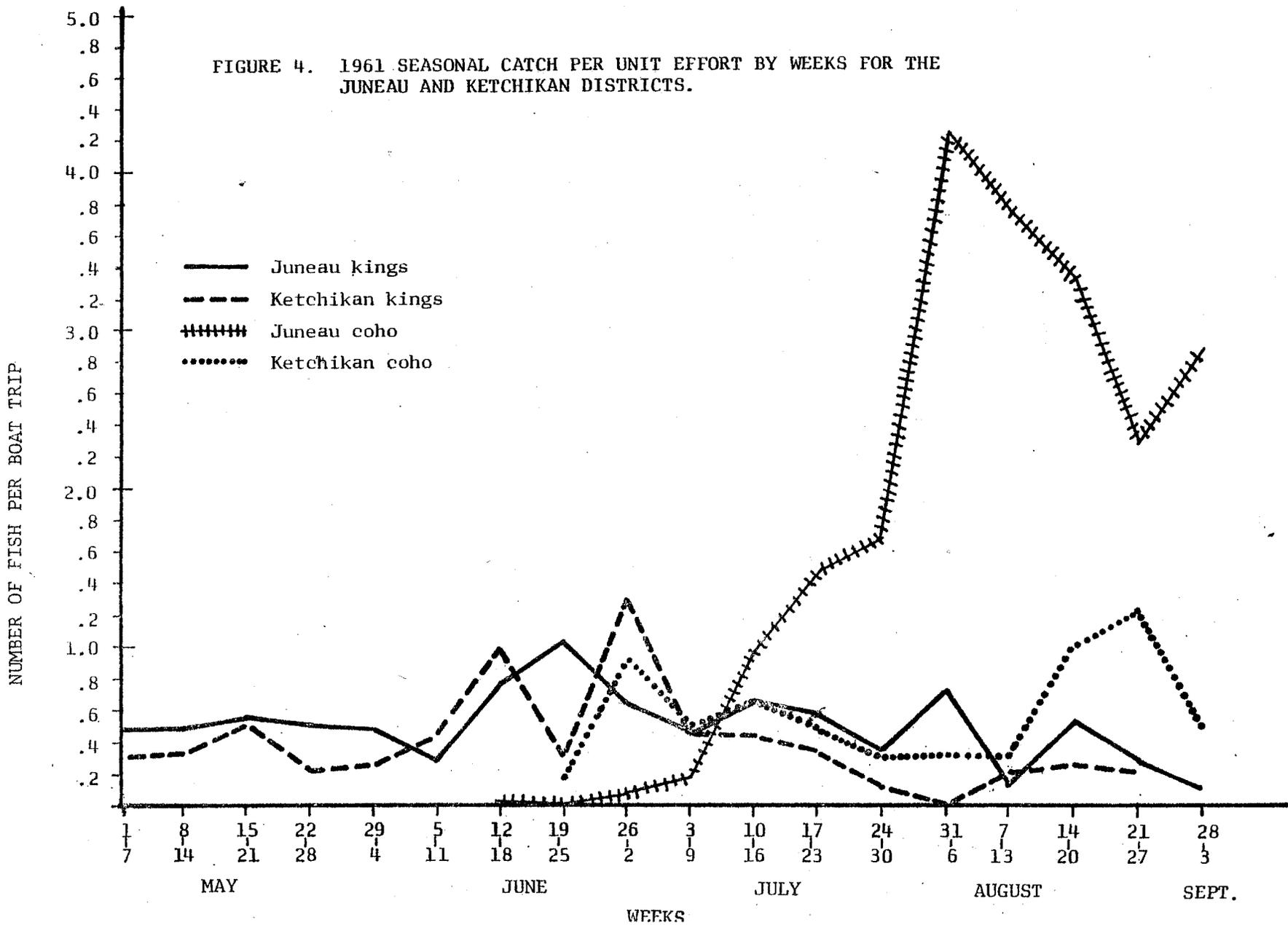
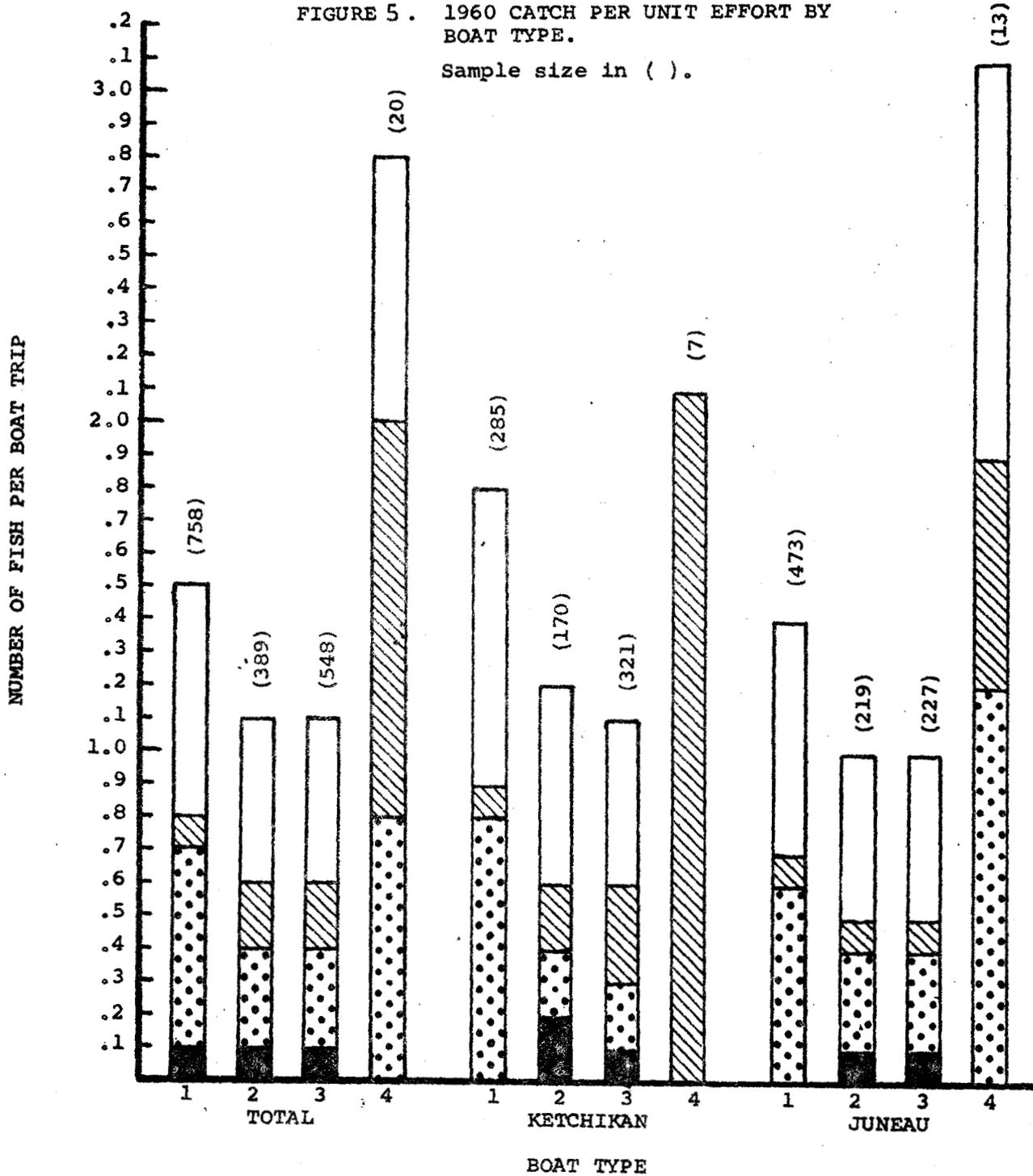


FIGURE 5. 1960 CATCH PER UNIT EFFORT BY BOAT TYPE.

Sample size in ().



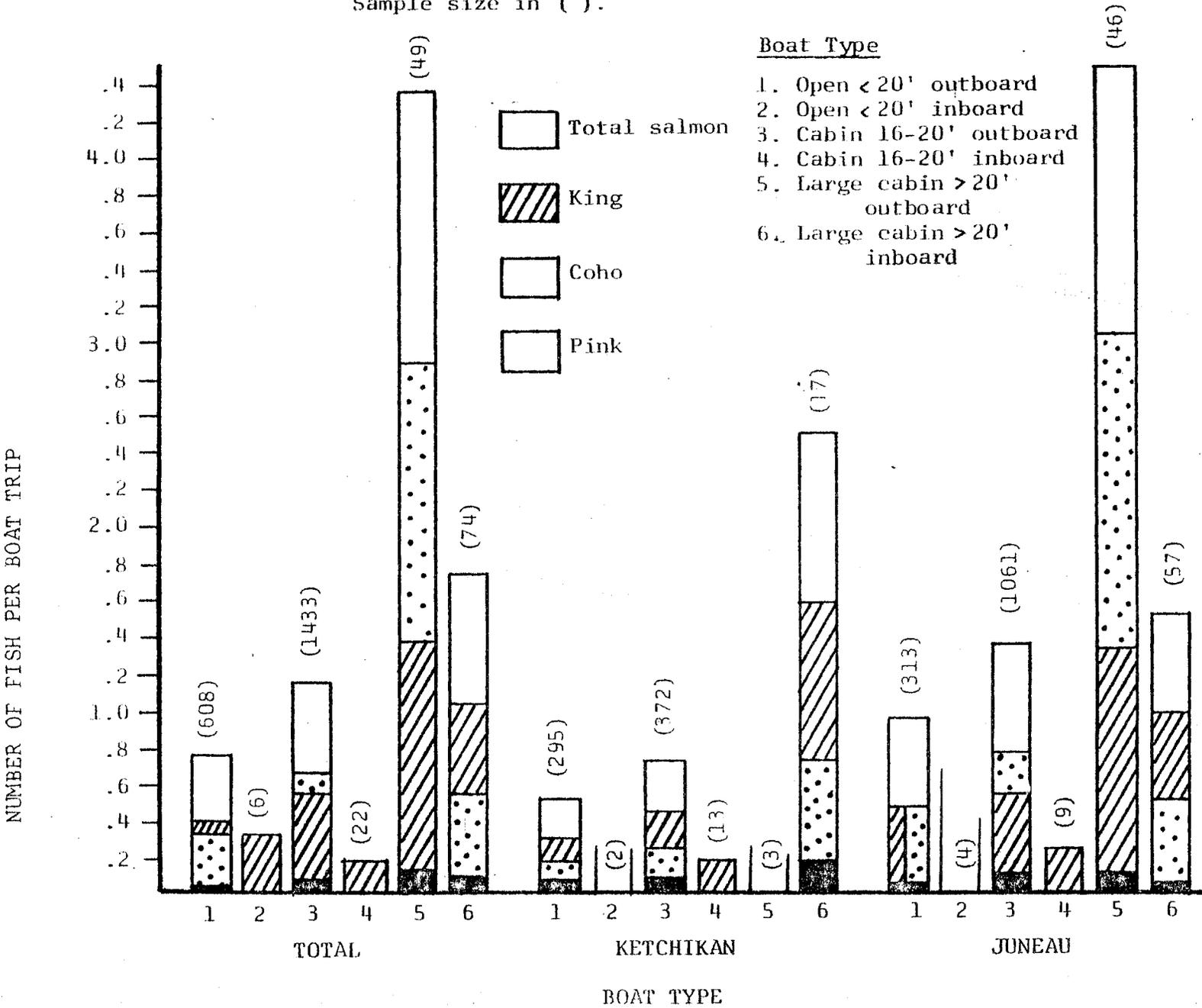
- 1. Cabin or closed
- 2. Open
- 3. Outboard
- 4. Inboard

- Total salmon
- King
- Coho
- Pink

*The separate components of the individual bars in all bar graphs in this report should be considered as extending to the base line. The component parts in each bar, overlay each other according to the value rank order. Therefore, all component values can be directly read from the scale with no additional calculations or comparisons.

FIGURE 6. 1961 CATCH PER UNIT EFFORT BY BOAT TYPE (6 or more boats).

Sample size in ().



Gear Type

In the Juneau area fresh herring was superior to the frozen herring as bait in both 1960 and 1961 (Figures 7 and 8). This was also true in the Ketchikan area in 1960, but as fresh herring were not easily obtained in 1961, valid comparisons could not be made for this year. The three methods of using herring for bait were ranked as to success in the following order in both 1960 and 1961: (1) strip, where a fillet or side strip was used, (2) plug cut, head removed by a bevel cut, and (3) whole herring. Whole herring was by far the most popular bait in usage.

Plugs, spoons and especially flashers, (large metal spoon ahead of bait), though not widely used, were also successful lures.

There were no large differences in the success of the various bait types when considered for the individual species of salmon. King salmon took frozen herring much more readily than coho in 1960, but this result was not repeated in 1961. Plugs, when used, were almost exclusively employed in angling for king salmon.

Fishing Methods

The least successful method of fishing in both years of the study, and by far the most popular, was trolling, (steady motor use, usually of constant speed to provide bait action) as shown in Figures 9 and 10. Drift spinning (where bait, usually a herring strip, was given action by hand, reel and tide) and mooching (slow troll combined with drifting) were the most successful fishing methods in 1960 and were combined in 1961 because of interview classification difficulties. Here again these two combined methods were more effective in taking fish than trolling. The use of a combination of fishing methods in 1961 resulted in a better catch than either trolling or mooching-drift-spinning alone.

The least successful method of fishing in the Juneau area in 1960 was anchored spinning. This finding was not substantiated, however, as this method was the most successful in 1961. This was probably due to the larger sampling coverage and catch of sport-commercial fishermen in 1961, as this method of fishing was used quite extensively by this group.

When considered for individual species of salmon, trolling appeared to be as effective as any other method in 1960 for catching coho salmon and in 1961, again, was a more effective

FIGURE 7. 1960 CATCH PER UNIT EFFORT BY GEAR TYPE (6 or more boats).

Sample size in ().

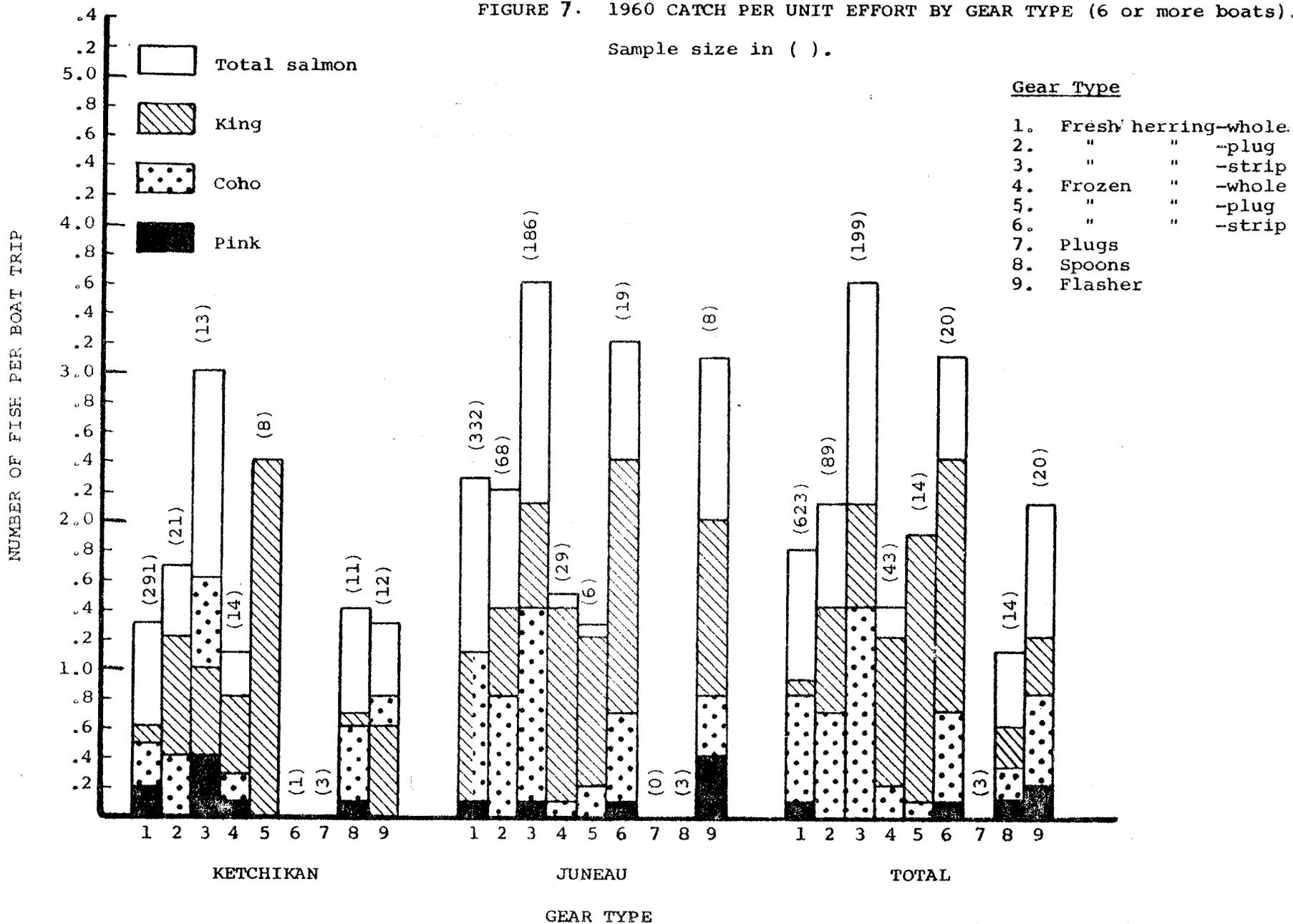


FIGURE 8. 1961 CATCH PER UNIT EFFORT BY GEAR TYPE (6 or more boats).

Sample size in ().

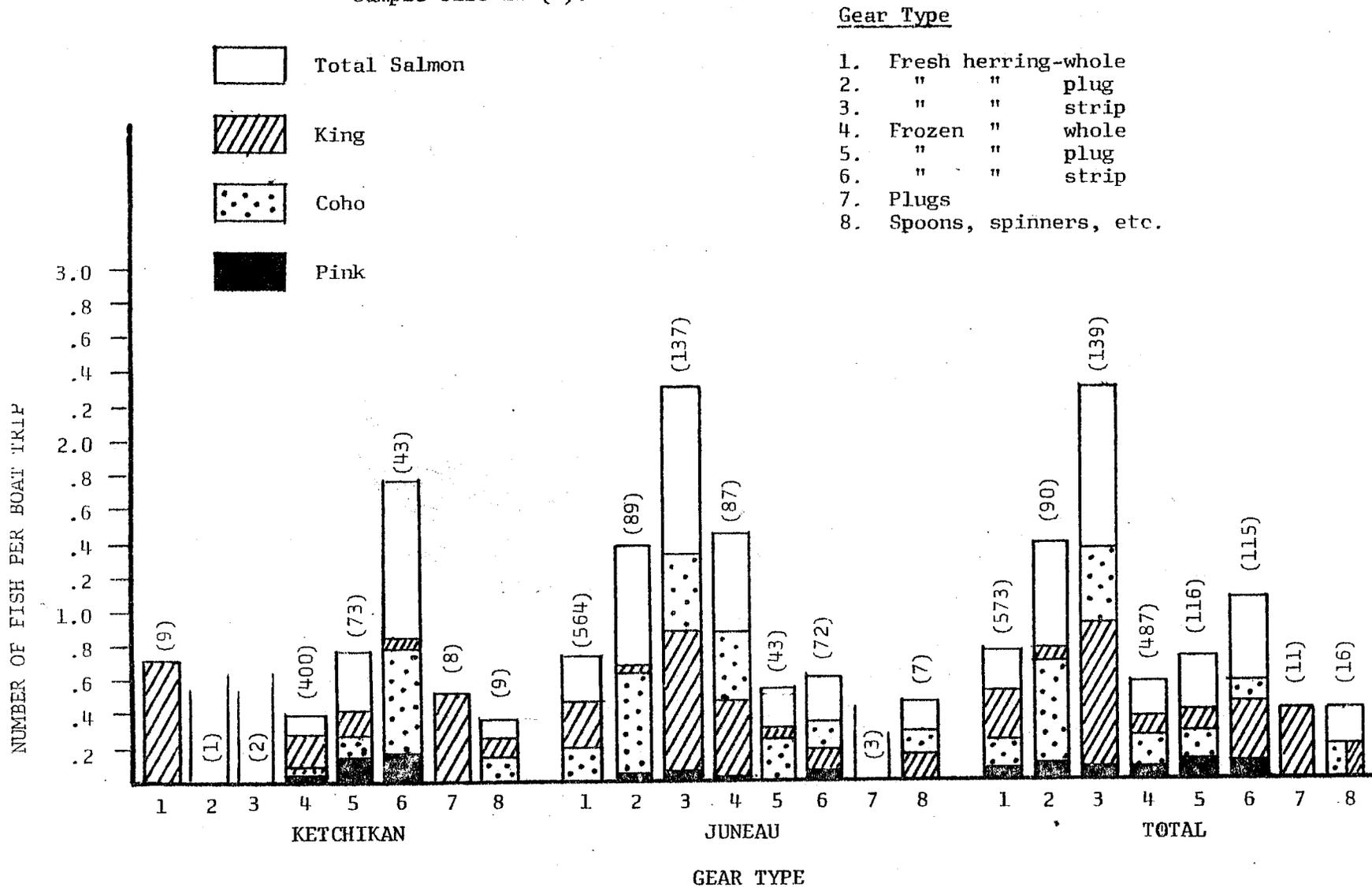


FIGURE 9. 1960 SEASONAL CATCH PER UNIT EFFORT BY METHOD OF FISHING. (6 or more boats)

Sample size in ().

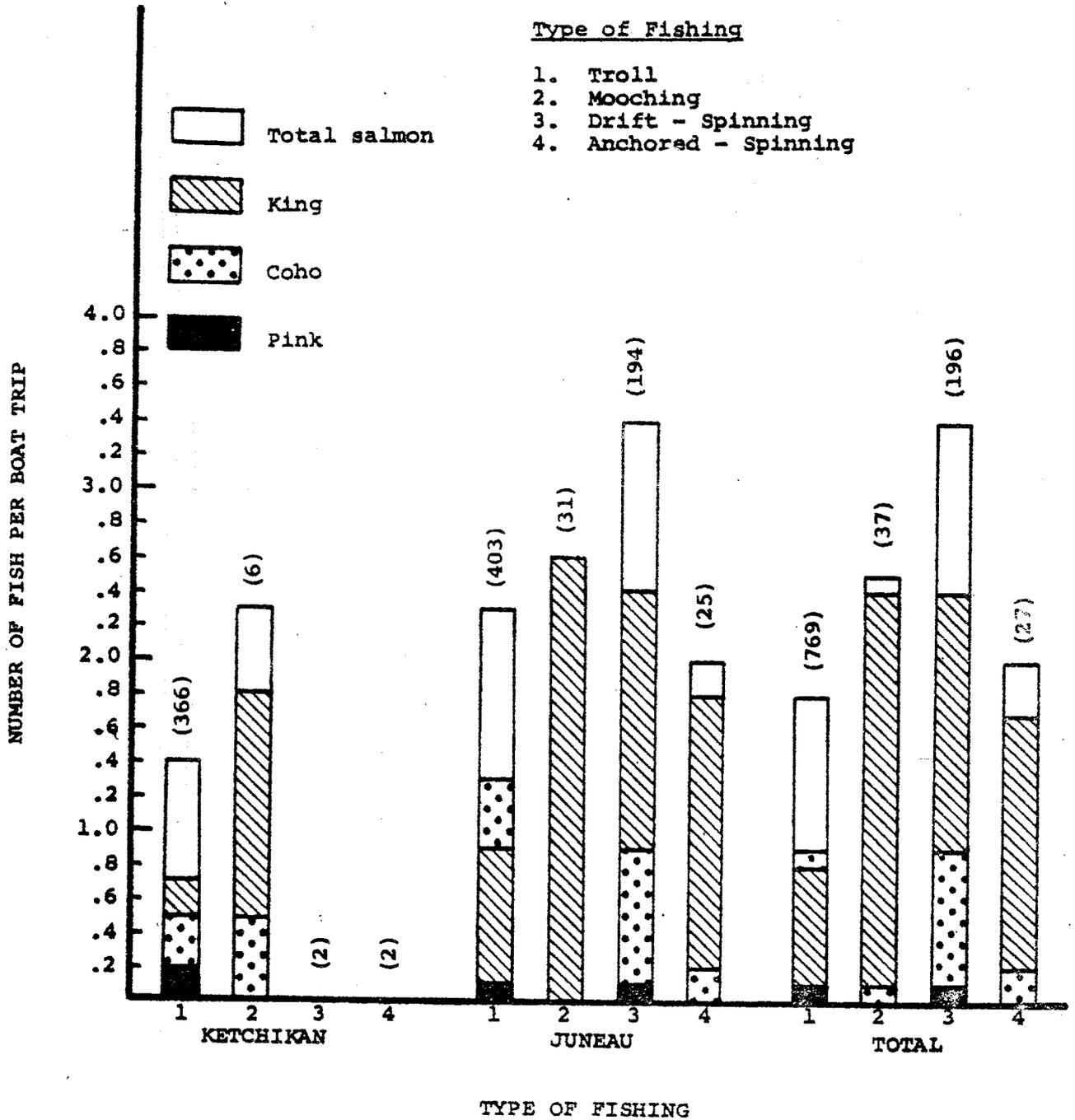
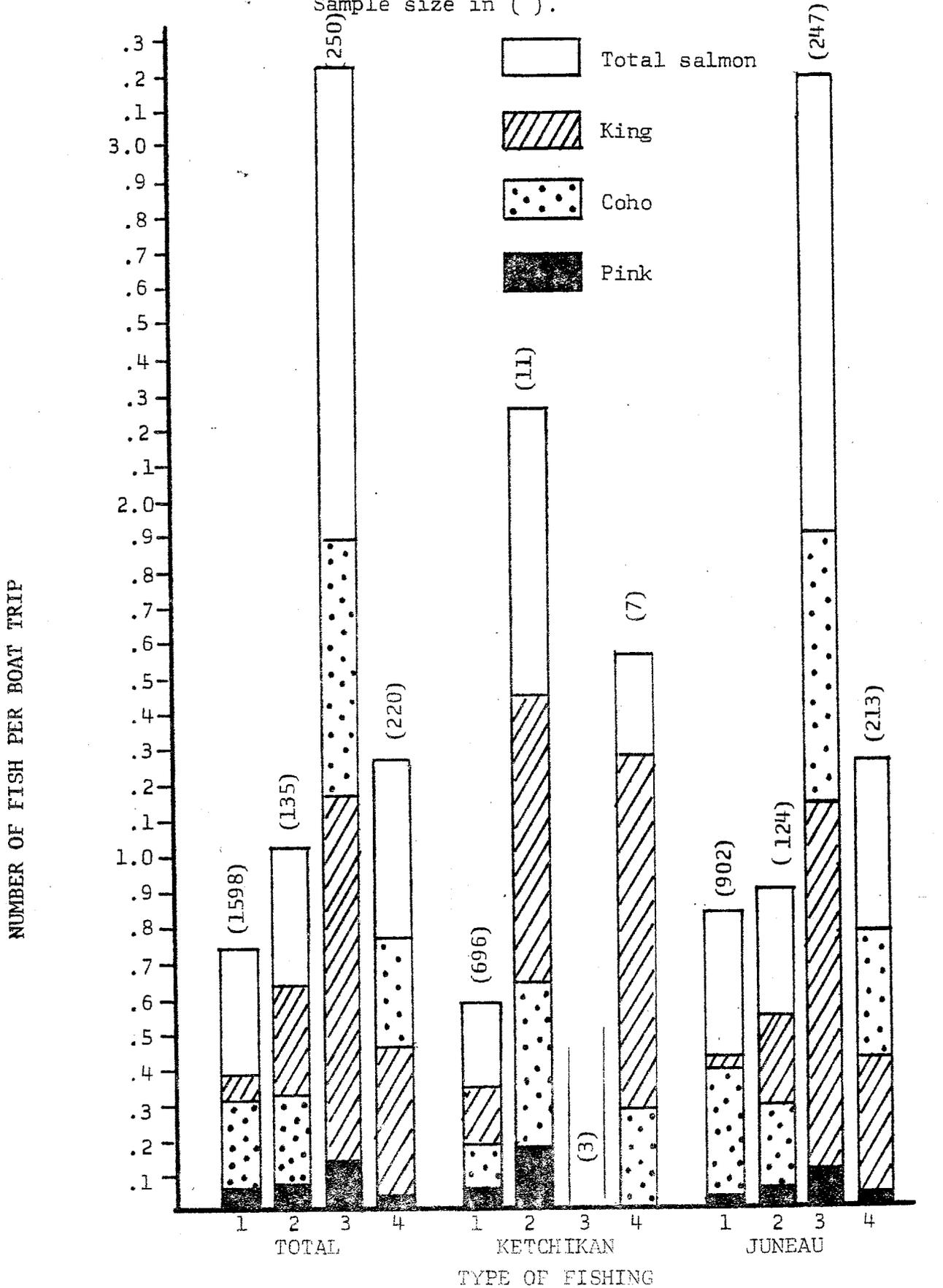


FIGURE 10. 1961 CATCH PER UNIT EFFORT BY TYPE FISHING
(7 or more boats)

Sample size in ().



- 1. Trolling
- 2. Mooching (drifting)
- 3. Strip fishing (anchored)
- 4. Combination of above

method for catching coho than king salmon. The best method of fishing for kings was anchored spinning and mooching-drift-spinning.

Success by Weather, Tide Conditions and Local Area

Weather and Tide Conditions

The least successful weather conditions for catching salmon for the two years of the study occurred on windy and rainy days when the water was rough (Figures 11 and 12).

The greatest fishing success for the combined Juneau and Ketchikan areas occurred on cloudy days in 1960 and on partly cloudy days in 1961. However, in the latter year, as can be seen from Figure 11, this conclusion was based only on the small sample from Juneau, and the Ketchikan area showed equal fishing success on sunny days. In comparing weather conditions (with a sample size over 100) sunny-calm days resulted in slightly better fishing than did cloudy-calm days. The influence of cloud cover during the two years of the study did not result in any decisive superiority of any one weather classification.

There was no advantage for any particular tide condition in angling for salmon in either 1960 or 1961 (Figure 13 and Table 12). This finding did not support the widespread belief of many fishermen that different stages of the tide resulted in varying success in catching fish.

Success by Local Area

In the Ketchikan district the fishing intensity was concentrated in two major areas, Mountain Point (area 25) and Clover Pass (area 8), during both years of the study. Both of these areas were located at the ends of the road leading north and south out of Ketchikan and had small boat harbors (Figures 14, 15 and 16). The C.P.U.E. for both of the above areas in Ketchikan was lower than the areas farther away from town, which were not utilized to any great degree. The greatest success for king and coho salmon occurred at Caamano Point (area 27) in 1961 and in Naha Bay (area 7) and Kasaan (area 14) in 1960.

The chief fishing areas in the Juneau district were spread over a greater distance and the majority of fishermen went farther to fish (Figures 15, 17 and 18). The greatest success for king and

FIGURE 11. 1960 CATCH PER UNIT EFFORT BY WEATHER CONDITION. Sample Size in ().

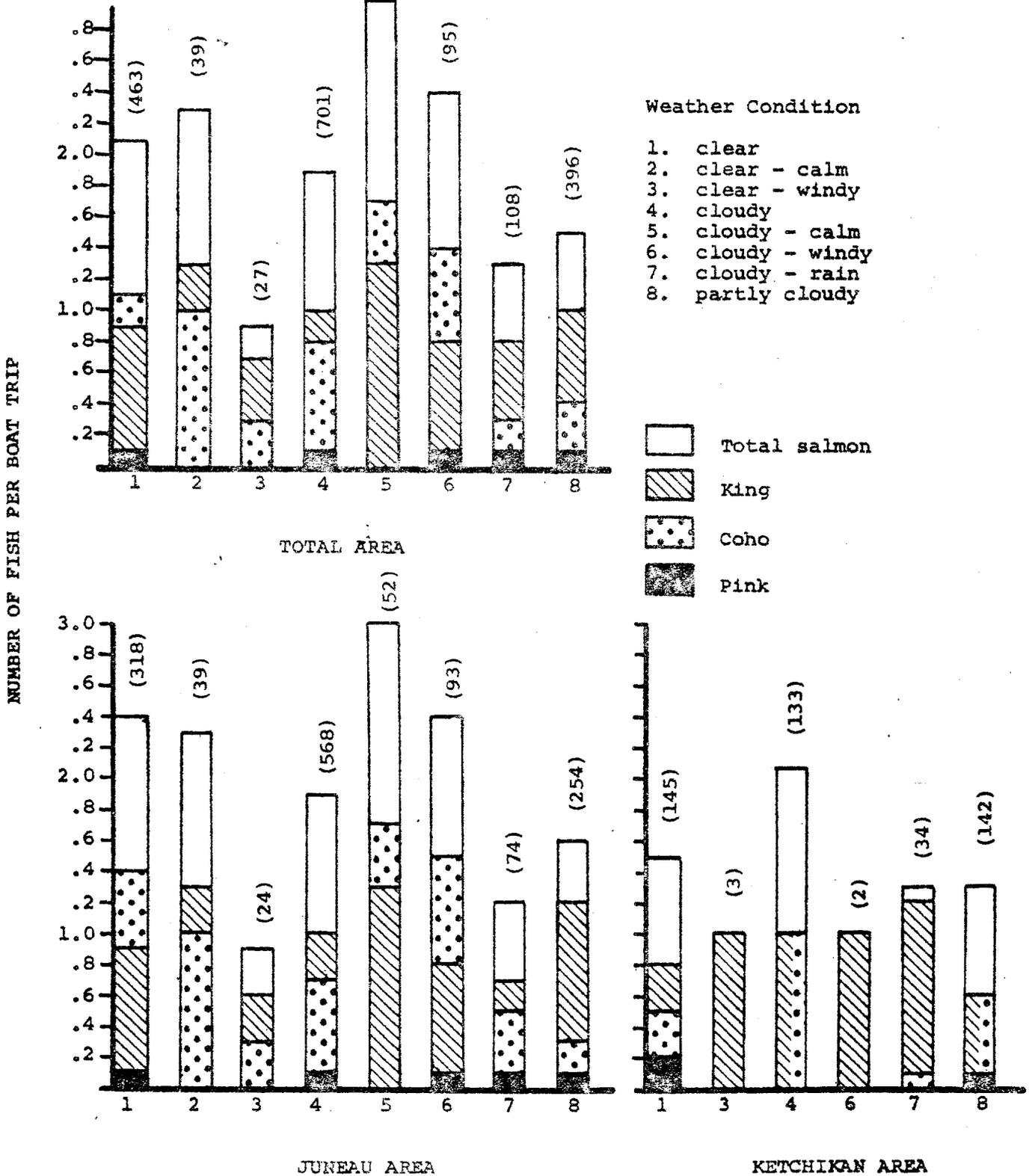
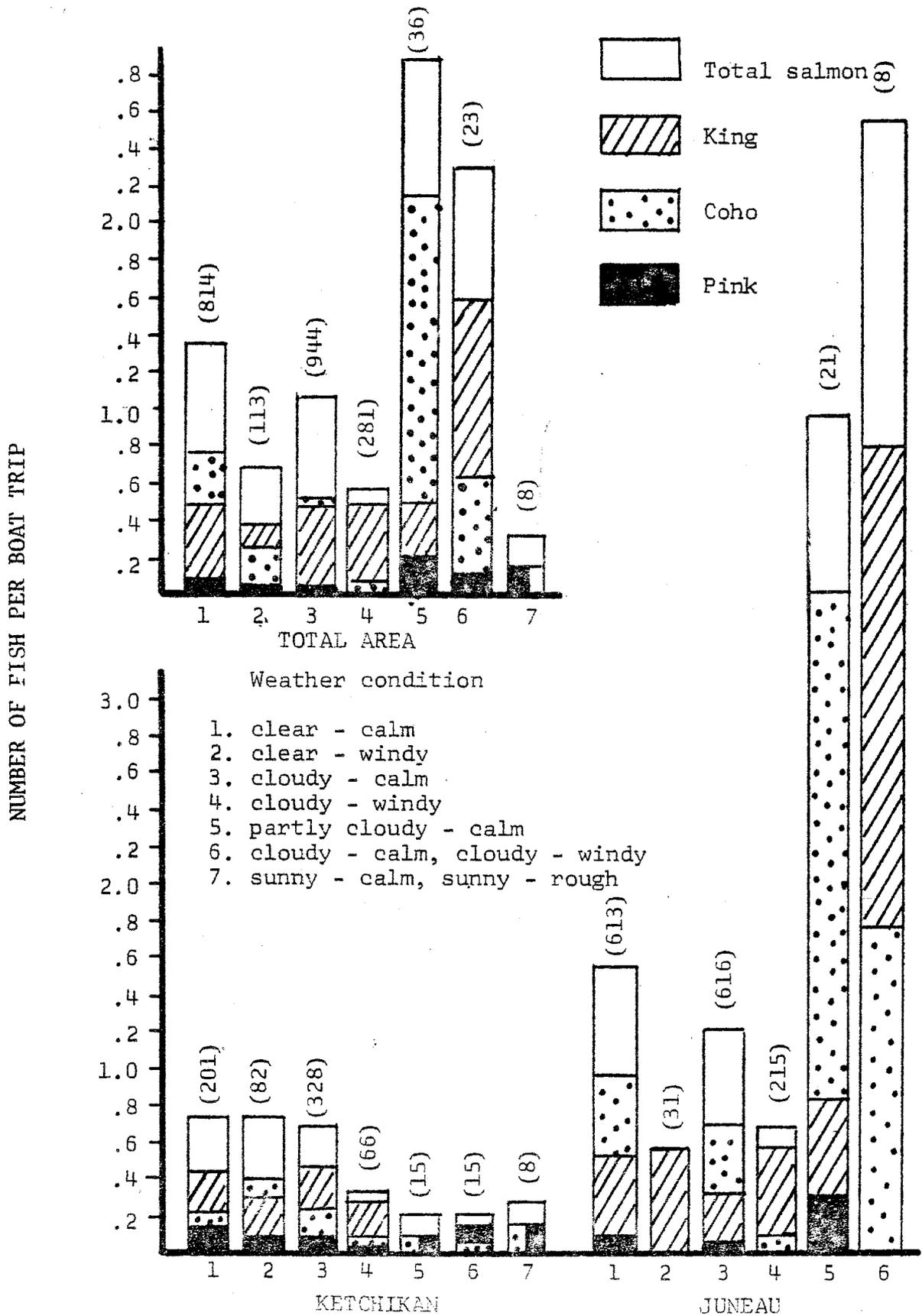


FIGURE 12. 1961 CATCH PER UNIT EFFORT BY WEATHER CONDITION.

Sample size in ().



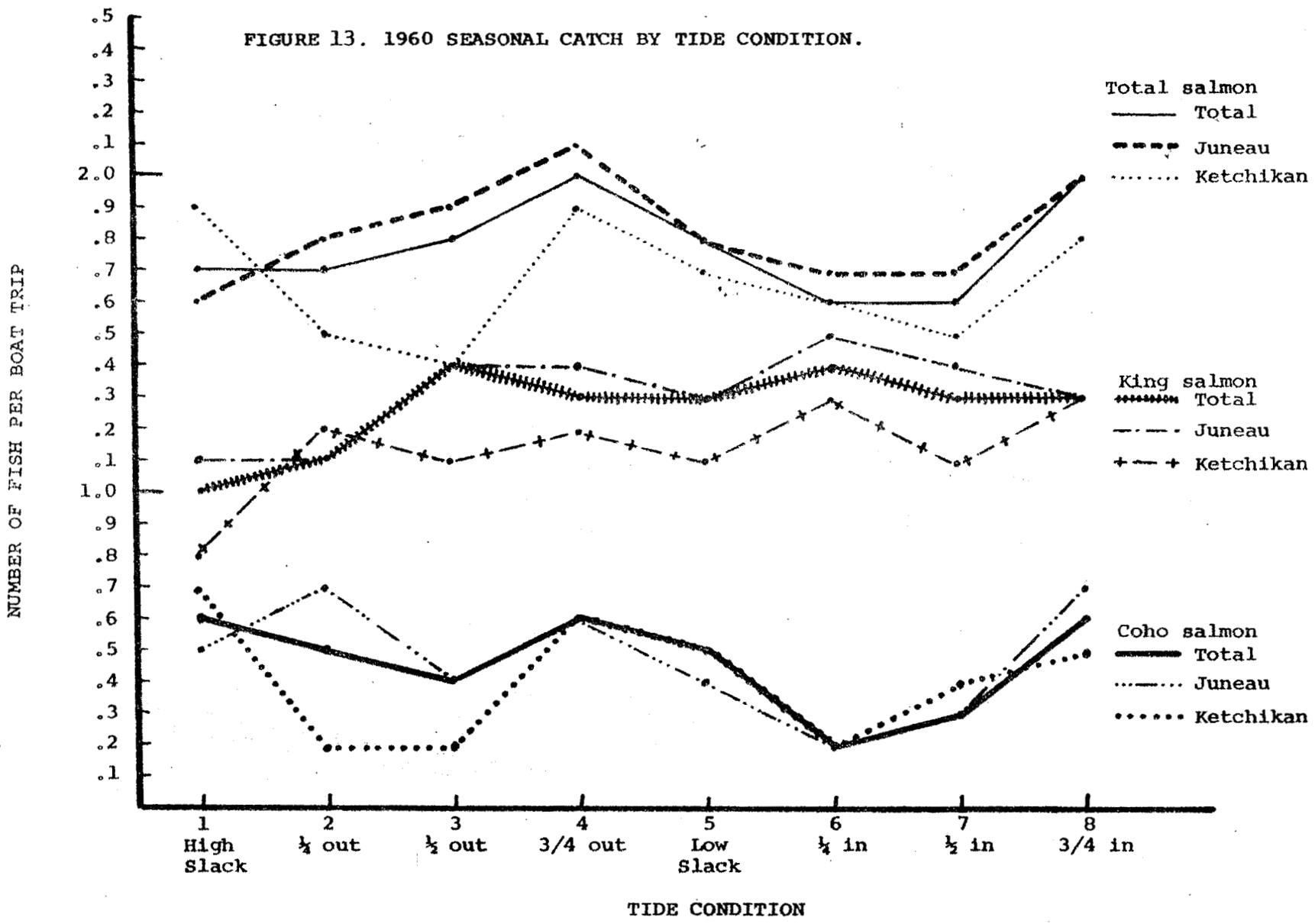


Table 12. The Number and Percentage of Successful and Unsuccessful Boat Trips by Tide Conditions (Juneau and Ketchikan Combined - 1961).

Tide Conditions	Successful Boat Trips		Unsuccessful Boat Trips	
	No. Boats	% Boats	No. Boats	% Boats
Low Tide	248	24	768	76
One-half in	234	25	705	75
High Tide	212	23	711	77
One-half out	204	23	690	77

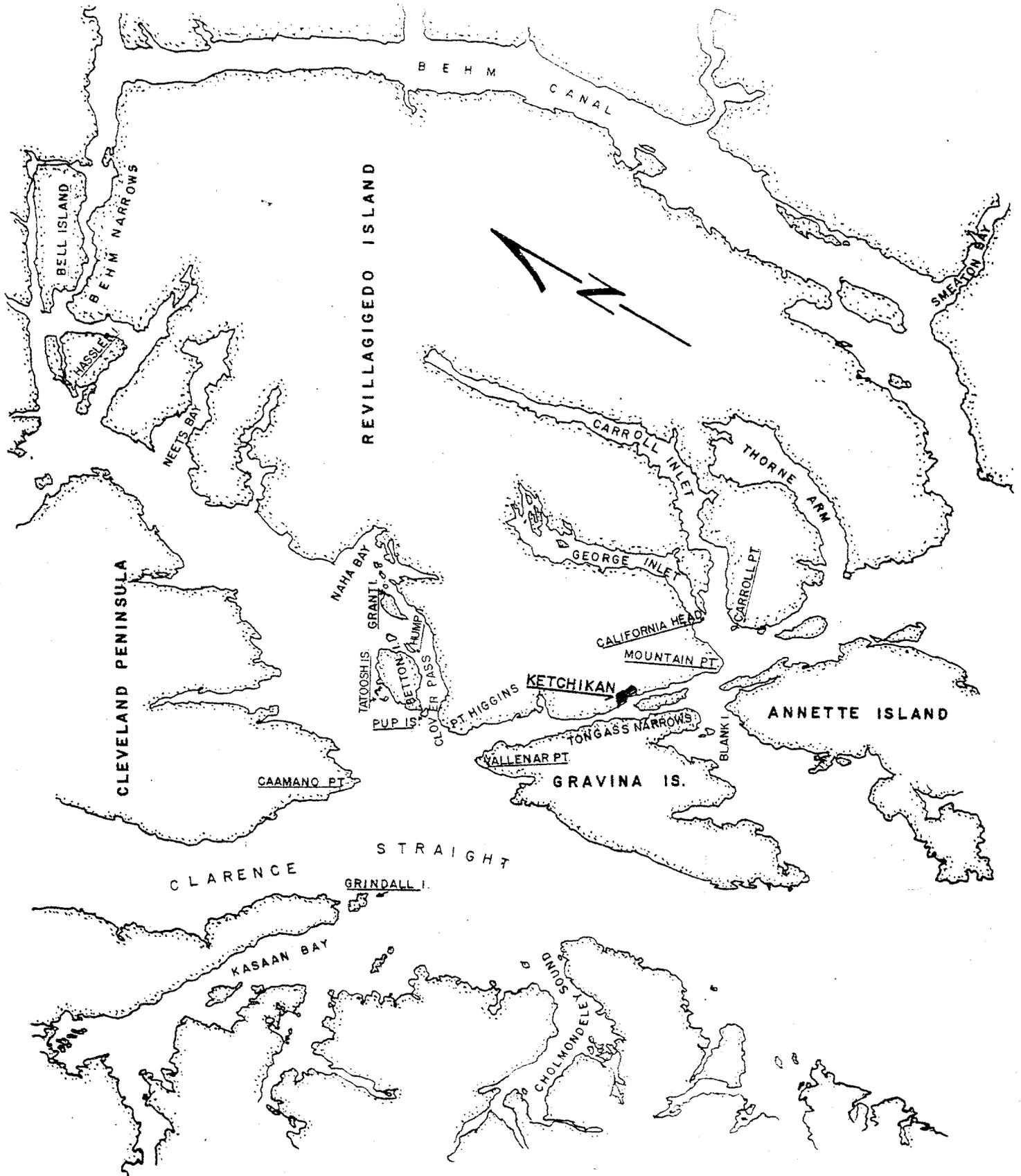


Figure 14. The Ketchikan sport fishing area showing the major fishing grounds.

FIGURE 15. 1960 SEASONAL CATCH PER UNIT EFFORT BY LOCAL AREAS.

(Five or more boats).

Sample size in ().

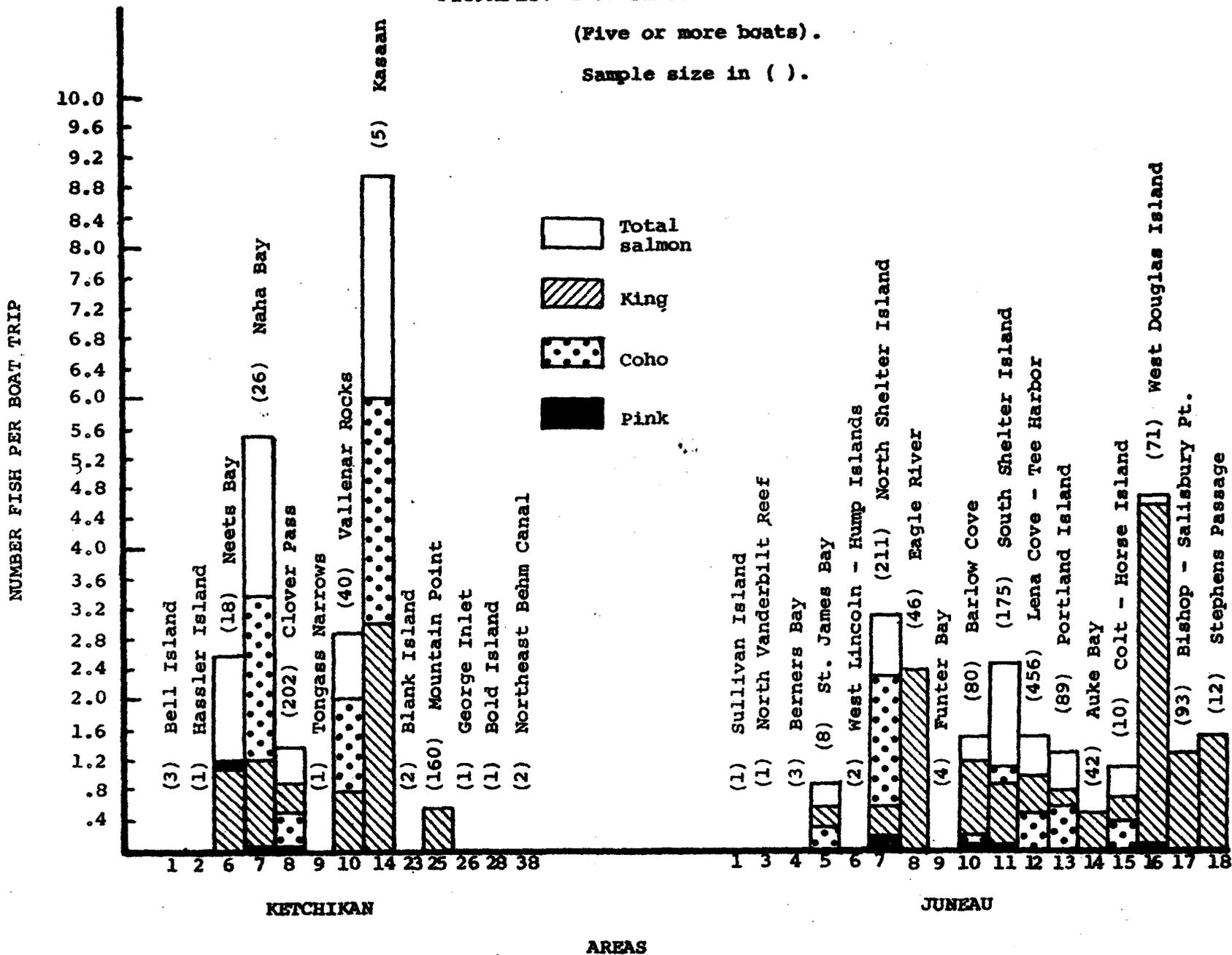


FIGURE 16. 1961 KETCHIKAN CATCH PER UNIT EFFORT BY LOCAL AREAS.

(Six or more boats)

Sample size in ().

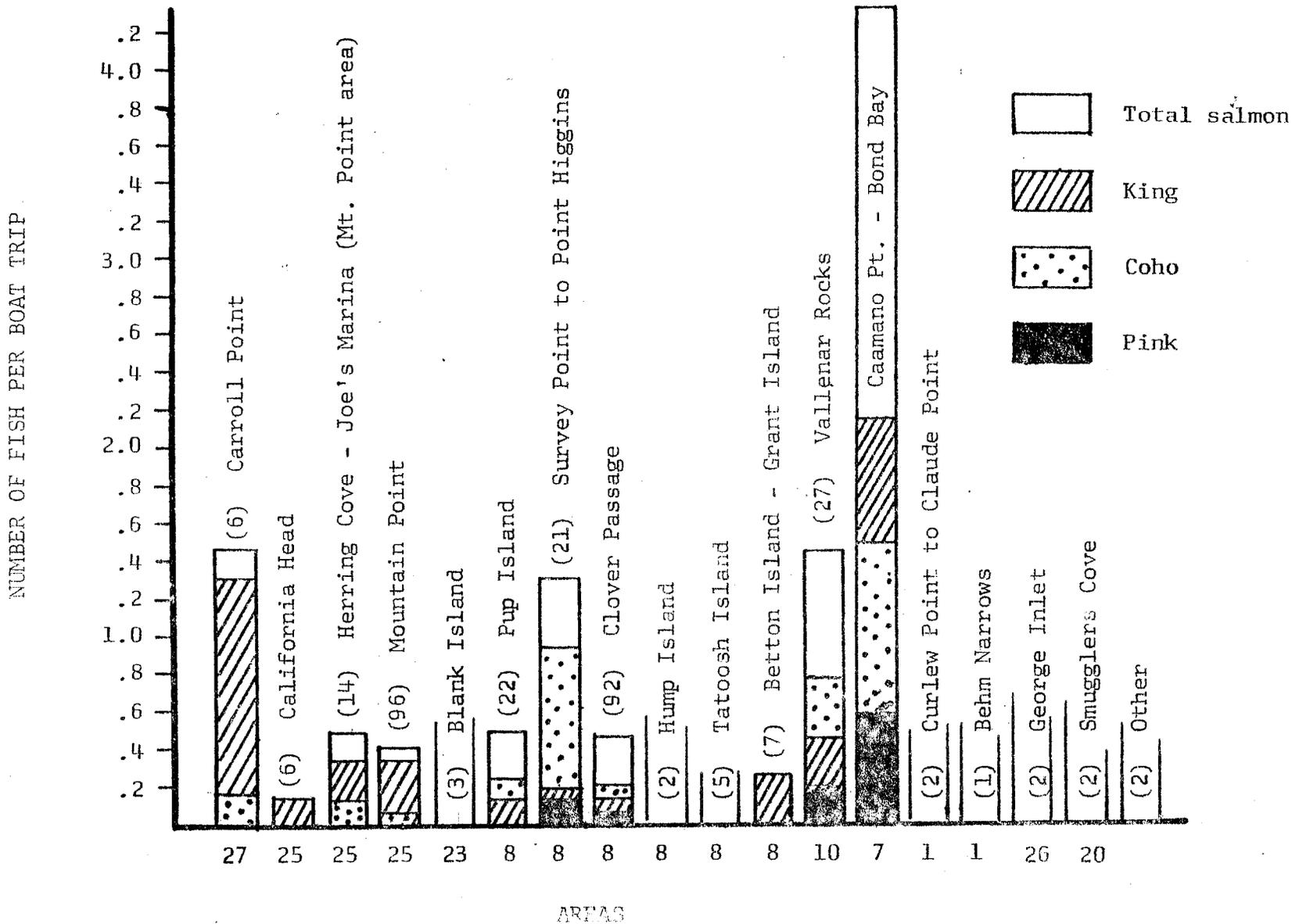


Figure 17. The Juneau sport fishing area showing the major fishing grounds

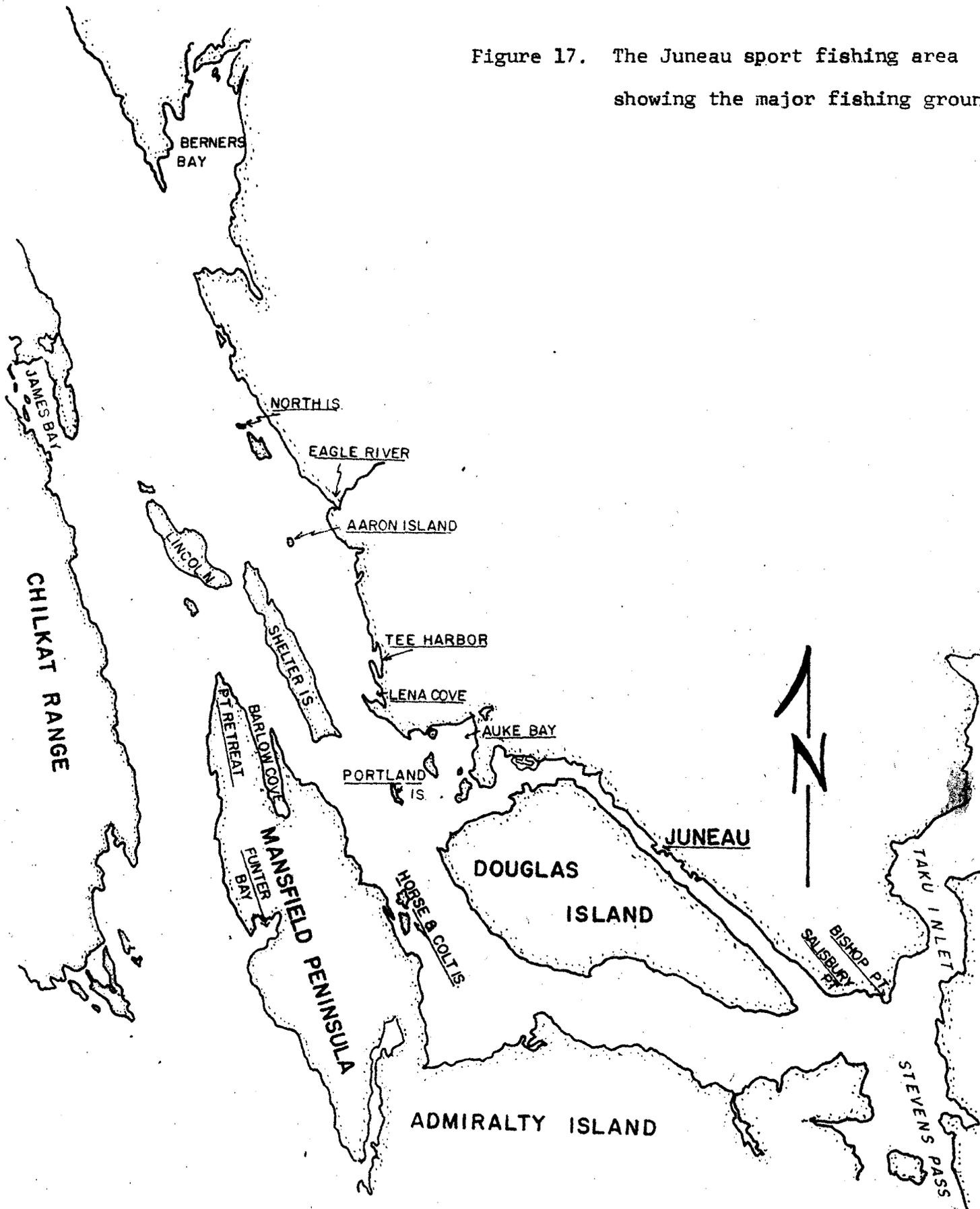
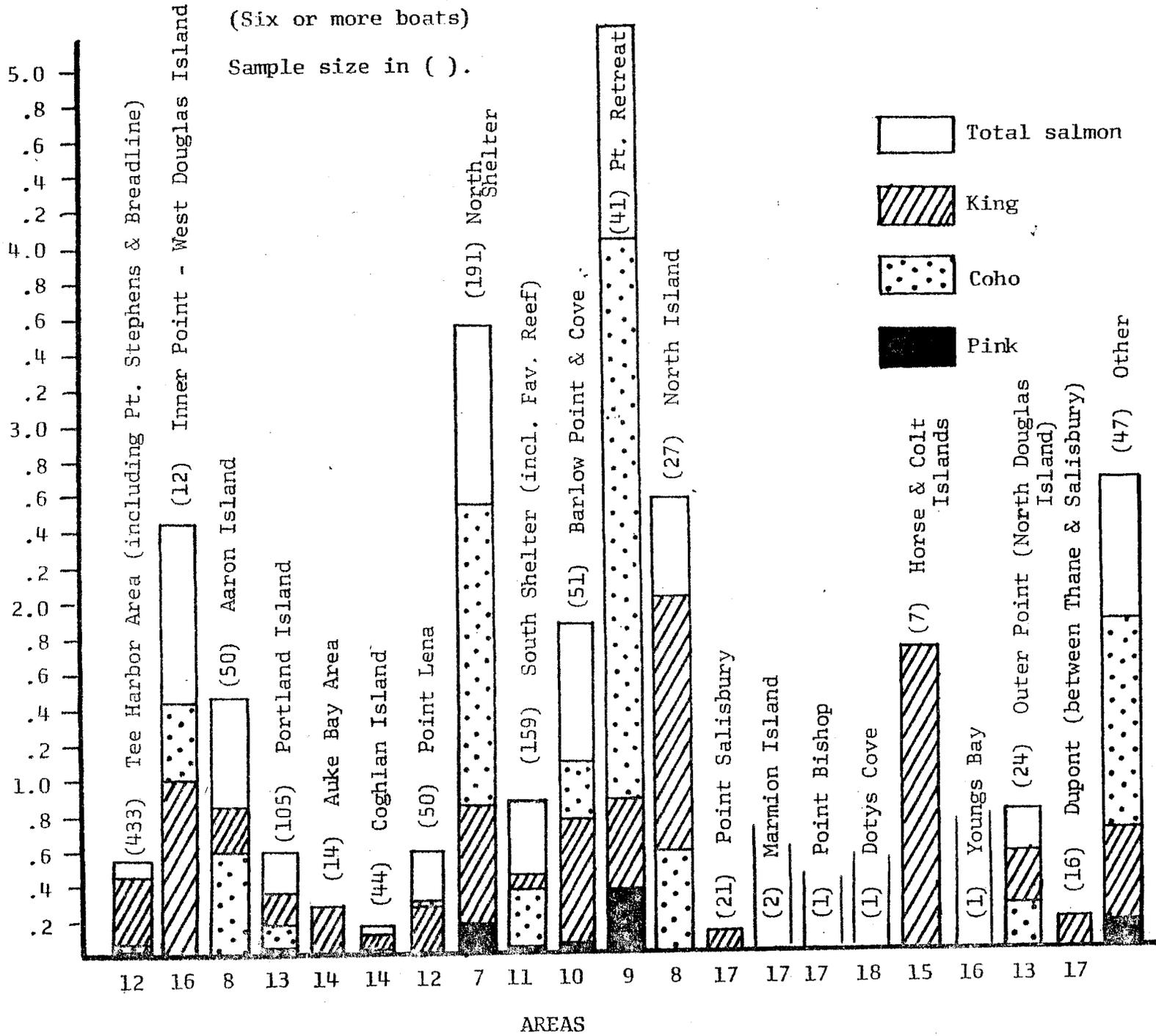


FIGURE 18. 1961 JUNEAU CATCH PER UNIT EFFORT BY LOCAL AREAS.

NUMBER OF FISH PER BOAT TRIP



coho salmon fishing in Juneau occurred in different areas. In 1961, North Island (area 8) and Horse and Colt Islands (area 15) produced the highest catch per boat for kings while Point Retreat (area 9) and North Shelter Island (the pass-area 7) registered the highest C.P.U.E. for coho salmon (Figure 18). In 1960, West Douglas Island (area 16) and the Aaron Island-Eagle River area (area 8) produced the highest king salmon C.P.U.E. The coho fishermen's most successful areas generally remained the same in 1960 with North Shelter Island (the pass) and south Shelter Island (area 11) registering the highest C.P.U.E.'s (Figure 15).

The greatest fishing effort in Juneau, unlike the Ketchikan effort, was not associated with the lowest C.P.U.E. Some of the more intensively fished areas in the Juneau district produced the better fishing.

Fish Size

Seasonal Fish Size

With the exception of a secondary increase of varying magnitudes in the size of the king salmon in July, the weight and lengths steadily decreased throughout the fishing season from a late spring peak in the Juneau and Ketchikan areas (Figures 19, 20, 21 and 22). The more northern Juneau area showed an earlier peak in the larger fish (late April to mid-May), while the larger mature Ketchikan kings peaked later in the spring (late May to the first of June) in both years of the study. The fishery harvested the mature spring-run spawners in late April-early June and after these fish had passed through the fishery the catch was largely dependent on feeding stocks of immature king salmon.

In both 1960 and 1961 the Ketchikan kings were larger than the Juneau king salmon. The 1961 fish were also larger than the 1960 kings in both areas. The seasonal average weights for the 1960 and 1961 Ketchikan kings were 18 pounds, 12 ounces and 21 pounds, 1 ounce, while the respective Juneau weights were 17 pounds, 8 ounces and 18 pounds, 1 ounce. The corresponding length measurements confirmed the above results (Table 13).

Dressed Weights

Dressed weight fish (heads on) were usually sampled from the sport-commercial fishermen, who cleaned their fish prior to selling.

FIGURE 19. 1950 SEASONAL AVERAGE WEIGHT OF KING SALMON IN JUNEAU AND KETCHIKAN (LBS. - OZS.)

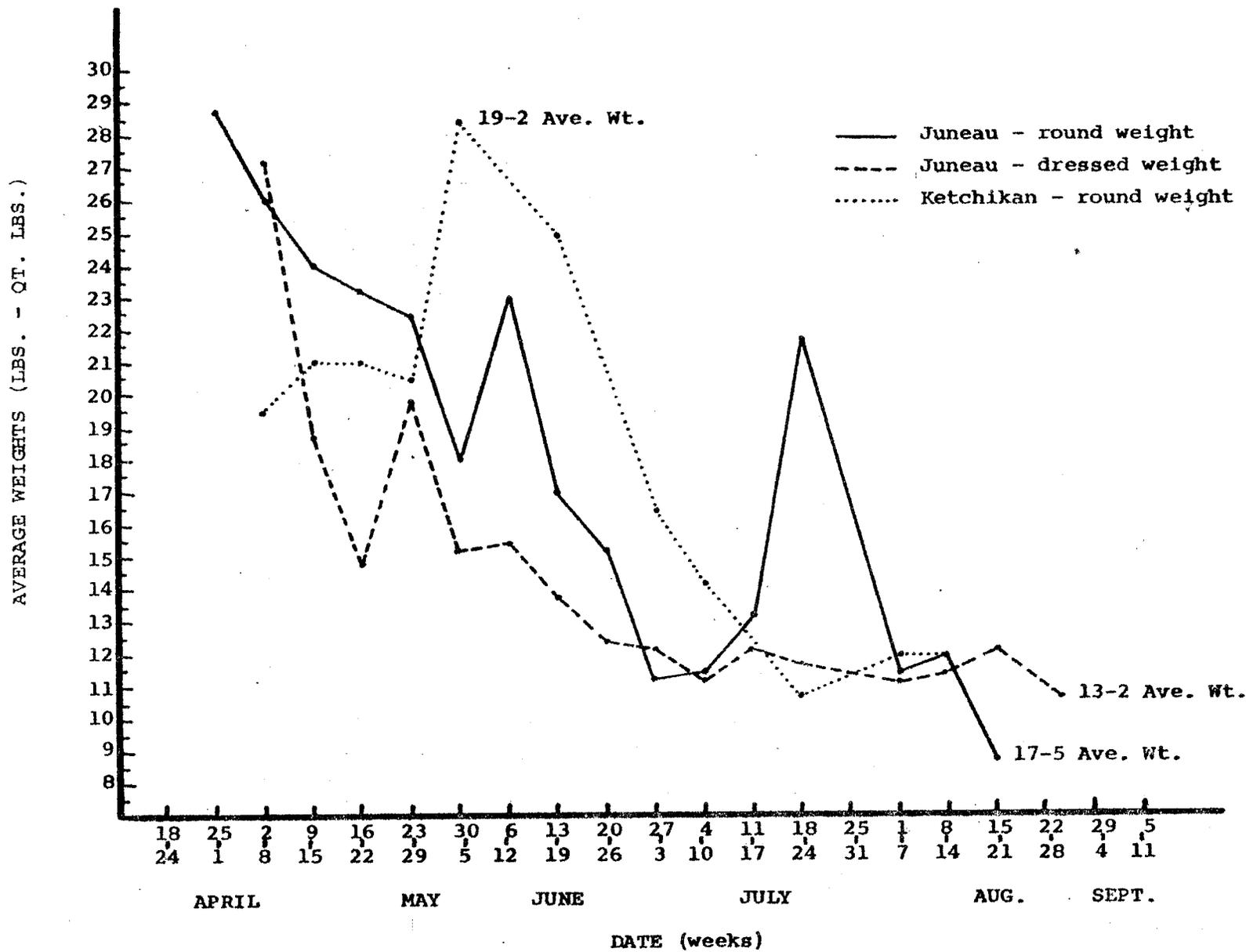


FIGURE 20. 1960 SEASONAL AVERAGE LENGTHS OF KING SALMON. (CMS.)

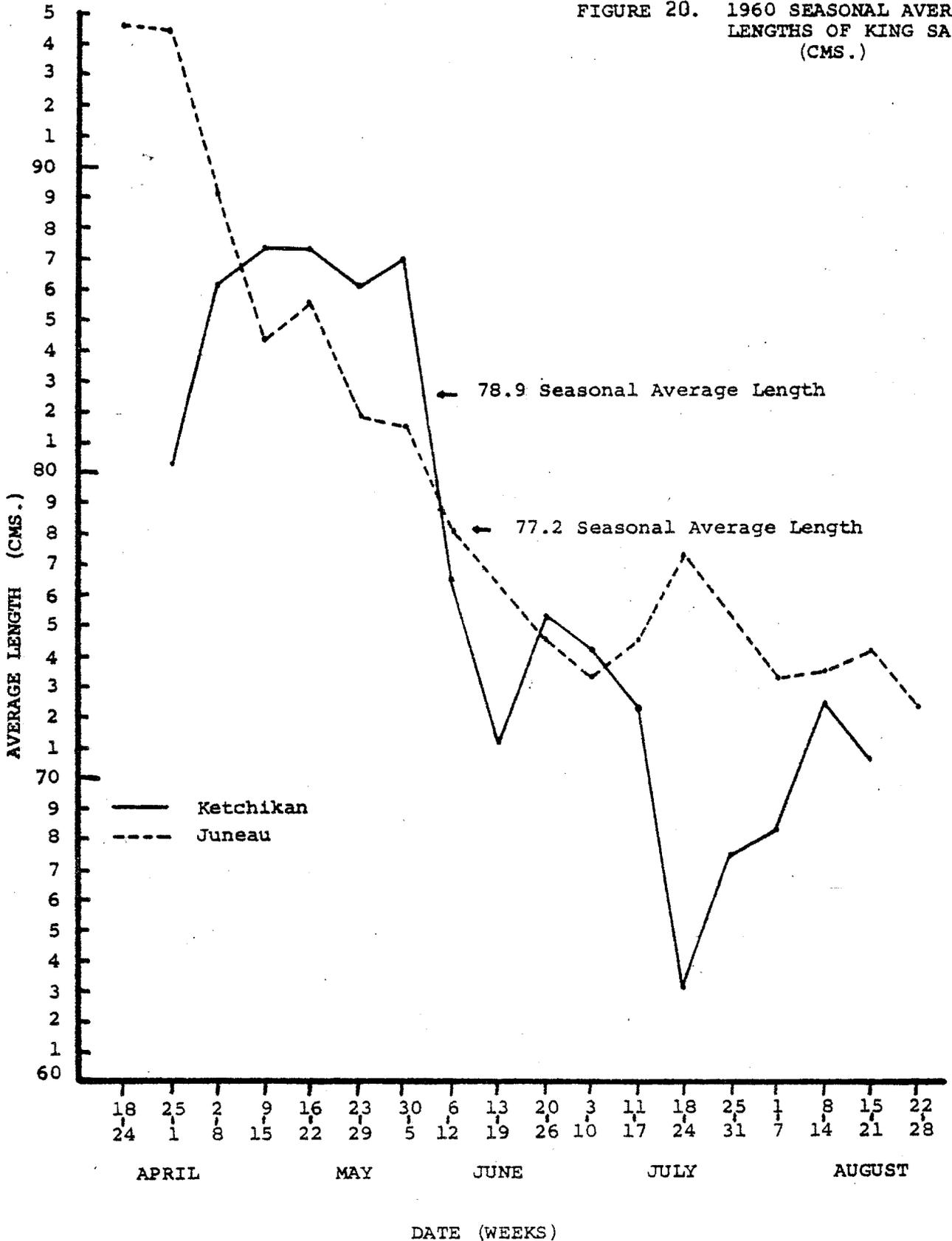


FIGURE 21. 1961 SEASONAL AVERAGE WEIGHT OF KING SALMON
IN JUNEAU AND KETCHIKAN

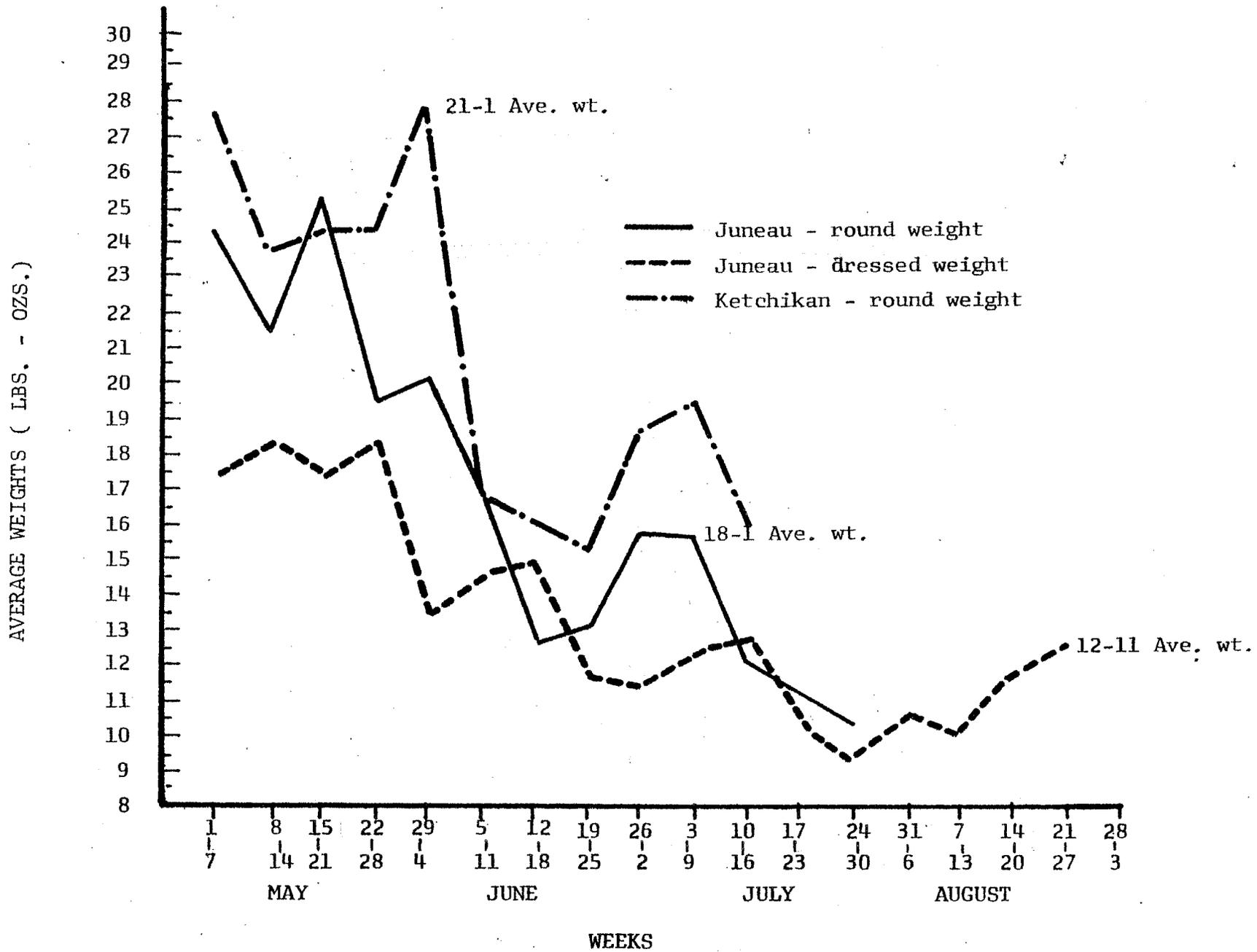


FIGURE 22. 1961 SEASONAL AVERAGE LENGTHS OF KING SALMON IN JUNEAU AND KETCHIKAN.

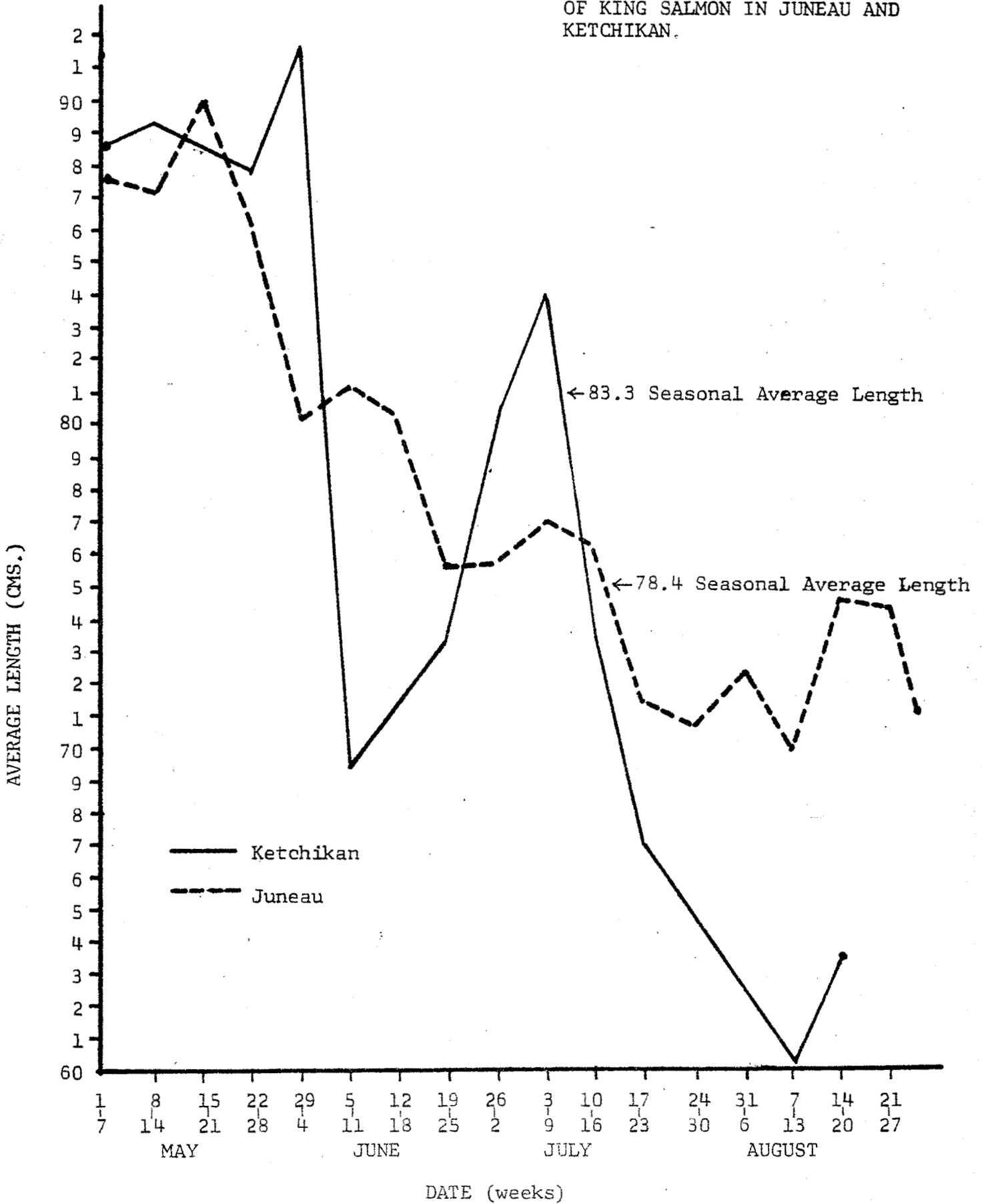


TABLE 13. THE SEASONAL AVERAGE WEIGHTS AND LENGTHS OF KING AND COHO SALMON

Species	Area	lbs.-ozs. and cms.	1960					1961				
			N	* Round	N	** Dressed	Corr.+ Dressed	N	* Round	N	** Dressed	Corr.+ Dressed
King Salmon	Juneau	weight	481	17-8	1029	12-13	15-7	204	18-1	585	12-11	15-5
		length	1423	77.2				780	78.4			
	Ketchikan	weight	245	18-12	--	--	--	184	21-1	56	14-2	17-0
		length	334	78.9				183	83.3			
	Total	weight	726	17-15	--	--	--	388	19-9	641	13-4	15-15
		length	1757	77.5				963	79.3			
Coho Salmon	Juneau	weight	170	9-0	998	7-15	9-9	105	8-13	490	7-8	9-1
		length	1129	67.6				456	66.8			
	Ketchikan	weight	57	7-3	--	--	--	84	8-6	--	--	--
		length	49	64.7				95	64.0			
	Total	weight	227	8-11	--	--	--	189	8-10	--	--	--
		length	1178	67.5				551	66.3			

* Round weight - entire fish weighed.

** Dressed weight - heads on; viscera removed.

+ Dressed weight converted to round weight using 17% of body weight for viscera and gills.

If the standard Southeastern Alaska conversion factor of 17 percent allowance for viscera and gills was used to convert dressed weight to round weight, the corrected average weight of the Juneau dressed weight king salmon was 15 pounds, 7 ounces in 1960 and 15 pounds, 5 ounces in 1961 (Table 13). In the Ketchikan area a corrected dressed weight of 17 pounds even was obtained in 1961.

In all cases the converted dressed weight to round-weight fish was approximately two to three and one-half pounds less in weight than the round-weight kings. The Juneau (the only area with an adequate sample) coho salmon dressed weights, when converted to round weights, were only in disagreement when compared to the round-weight fish by less than one-half pound.

If the conversion factor of 17 percent for dressed fish was approximately correct, then the large sample of sport-commercial caught kings weighed on the average, slightly less than the sport-caught king salmon. Another possibility existed, however, in that the conversion factor might have been too low and did not adjust the dressed weight fish correctly. The close approximation of the converted dressed weights for coho salmon did not support this latter possibility, however, if there were no species difference in the viscera weight to body weight-percentage-of the two species of salmon.

The sample size of the sport-commercial round weight fish was too small for comparison to the sport caught round weight fish in the Juneau area, but in the Ketchikan area in 1961 the sport-commercial fish were a little more than 1-1/2 pounds lighter than the average sport-caught fish (Table 14). A comparison could also be made between the Juneau sport and sport-commercial dressed weight fish which, again, showed that in 1961 the sport-commercial kings were approximately three-quarter pounds less in weight than the sport-caught king salmon. The reasons for the lower sport-commercial king salmon average weights, if valid, were not apparent.

Coho Salmon

The Juneau coho salmon were slightly larger (9 pounds) than the Ketchikan cohos (7 pounds, 3 ounces) in 1960, but the latter weight was based on a small sample (only 49 fish). More coho salmon were sampled in the Ketchikan district in 1961 and again, were slightly smaller (8 pounds, 6 ounces) than the Juneau fish (8 pounds, 13 ounces). The two-year average weight for Juneau coho was 8 pounds, 15 ounces and for Ketchikan coho was 7 pounds, 13 ounces.

TABLE 14. THE 1961 KING AND COHO SALMON DRESSED AND ROUND WEIGHTS FOR THE SPORT AND SPORT-COMMERCIAL FISHERMEN*

Weight	Species of Salmon	JUNEAU				KETCHIKAN			
		Sport		Sport - Commercial		Sport		Sport - Commercial	
		N	Wt. (lb-oz)	N	Wt. (lb-oz)	N	Wt. (lb-oz)	N	Wt. (lb-oz)
Round	King	172	17-5	32	22-0	96	21-9	86	19-15
	Coho	95	9-0	10	6-9	49	8-0	35	8-14
Dressed	King Dressed	168	13-2	416	12-8	9	14-15	47	14-0
	King** Corr. Dressed		15-13		15-1		18-0		16-14
	Coho	96	7-5	394	7-8	-	-	-	-

* Information was not available for 1960.

** Dressed weight converted to round weight using 17% of body weight for viscera and gills.

Sex Differences

Male king and coho salmon in both areas and for both years of the investigation averaged a little heavier than the female (Table 15). The difference in weight varied from approximately 2-1/2 to a 1/4 pound, with an approximate average difference of 1-3/4 pounds for king salmon. Coho salmon, being much smaller on the average than kings, also showed a smaller difference between the weights of males and females with approximately 3/4 pound difference in overall average.

The associated length measurements, in general, supported the above findings on sex differences in weights of king and coho salmon. The only exception was the 1960 Juneau king lengths in which the females averaged approximately two centimeters longer than the males.

Sex Ratio

King Salmon

An uneven sex ratio occurred in the king salmon sport fishery in both years of the study with 1.3 females in 1960 and 1.4 females in 1961 caught for each male king salmon landed (Table 16). A majority of females in the catch also occurred when analyzed separately for the Juneau and Ketchikan areas, although the disparity in sex was not as great in the Ketchikan area with a two year average of 1.15 females per each male as compared to a 1.50 female to male ratio in the Juneau area. These results in seasonal sex composition were in agreement with a three-year average of 1.50 females per each male in the Juneau salmon derbies and a two-year average of 1.35 females for each male king in the Ketchikan salmon derbies (Finger and Armstrong, 1965).

Coho Salmon

Coho salmon in the Juneau area showed the reverse of the female-dominated catch of king salmon. In both study years more male cohos were landed than females, with sex ratios of 1.6 and 1.3 males for each female landed. The Ketchikan coho sample was too small in both years for any valid conclusions to be made about the sex ratios, but were consistently opposite of the Juneau findings with 1.2 females for each male coho caught.

Table 15. The Average Weights and Lengths of Male and Female King and Coho Salmon.

Weights (Round)									
YEAR	AREA	KING				COHO			
		Male		Female		Male		Female	
		No.	Ave.	No.	Ave.	No.	Ave.	No.	Ave.
		Fish	Wt.	Fish	Wt.	Fish	Wt.	Fish	Wt.
1960	Ketchikan	104	20-2	107	17-5	14	8-7	15	7-4
	Juneau	87	21-0	129	20-9	42	9-14	35	8-6
	Total	231	20-9	236	19-1	56	9- 8	50	8-1
1961	Ketchikan	62	22-0	81	19-12	33	8-9	34	8-11
	Juneau	33	22-9	44	20-3	19	10-7	17	8- 7
	Total	95	22-5	125	20-0	52	9-8	51	8- 9
Length (cms.)									
1960	Ketchikan	106	83.16	122	80.57	15	65.33	14	64.50
	Juneau	222	79.74	312	82.32	412	69.25	253	66.53
	Total	328	80.85	434	81.83	427	69.11	267	66.42
1961	Ketchikan	71	83.55	79	83.18	33	64.93	39	64.34
	Juneau	135	81.89	206	80.44	86	68.33	60	66.23
	Total	206	82.72	285	81.81	119	66.63	99	65.29

Table 16. King and Coho Salmon Sex Composition for the Juneau and Ketchikan Areas.

		KING			COHO		
		Ktn.	Jun.	Total	Ktn.	Jun.	Total
1960	No. of Males	113	235	348	15	416	431
	No. of Females	126	328	454	18	262	280
	Total Fish	239	563	802	33	678	711
	% Males	47.3	41.7	43.4	45.5	61.4	60.6
	% Females	52.7	58.3	56.6	54.5	38.6	39.4
	Sex Ratio	1.1 Female for each male	1.4 Female for each male	1.3 Female for each male	1.2 Female for each male	1.6 Male for each female	1.5 Male for each female
1961	No. of Males	89	135	224	35	92	127
	No. of Females	105	212	317	41	69	110
	Total Fish	194	347	541	76	161	237
	% Male	45.9	38.9	41.4	46.1	57.1	53.6
	% Female	54.1	61.1	58.6	53.9	42.9	46.4
	Sex Ratio	1.2 Female for each male	1.6 Female for each male	1.4 Female for each male	1.2 Female for each male	1.3 Male for each female	1.2 Male for each female

Flesh Color

Combined Areas

The more aesthetically preferred of the two flesh color phases and economically more important red-fleshed king salmon were dominant in the catch in the Juneau and Ketchikan areas. The percentage of reds and whites in 1960 was 71.5 percent and 28.5 percent respectively (Table 17). The amount of difference between the two flesh types was reduced somewhat in 1961 but the reds still were dominant in the catch with 67.9 percent red and 32.1 percent white. The two-year average flesh composition was a little better than a two-to-one ratio with 70 percent red-fleshed and 30 percent white-fleshed king salmon.

Area Comparisons and Sex Differences

The Juneau area displayed a consistent red-to-white ratio for both years of the investigation with 67.6 percent red and 32.4 percent white-fleshed kings. The Ketchikan area showed a lower white flesh composition than the Juneau area during both years, but the number of whites in 1961 (30.1 percent) almost doubled the percentage of whites obtained in 1960 (15.9 percent).

Male kings in the combined Juneau and Ketchikan areas showed a slightly lower white composition for both of the years studied (26.2 percent and 32.7 percent) than did the females (32.5 percent and 35.9 percent). This finding however, when analyzed by area, showed that it was largely a result of one particular area in both years of the study and not a general Southeastern Alaska condition. Juneau males had a greater percentage of red-fleshed fish in 1960 while the Ketchikan males were composed of more reds in 1961.

Table 17. The Percentage and Sex Composition of Red and White Fleshed King Salmon.

	AREA	1960					1961				
		No. Red	No. White	Total Fish	% Red	% White	No. Red	No. White	Total Fish	% Red	% White
MALE	Ketchikan	23	7	30	76.7	23.3	67	22	89	75.3	24.7
	Juneau	87	32	119	73.1	26.9	83	51	134	61.9	38.1
	Total	110	39	149	73.8	26.2	150	73	223	67.3	32.7
FEMALE	Ketchikan	50	15	65	76.9	23.1	66	37	103	64.1	35.9
	Juneau	120	67	187	64.2	35.8	132	74	206	64.1	35.9
	Total	170	82	252	67.5	32.5	198	111	309	64.1	35.9
TOTAL KINGS*	Ketchikan	269	51	320	84.1	15.9	154	69	223	69.1	30.9
	Juneau	683	328	1011	67.6	32.4	479	230	709	67.6	32.4
	Total	952	379	1331	71.5	28.5	633	299	932	67.9	32.1

* Includes additional fish that were sampled for flesh color but not sexed.

SUMMARY

1. Excluding 1,325 salmon derby fish, 6,467 king and coho salmon were sampled for various fishery and biological factors during a two-year sport fish investigation from 4,559 boat trips in the Juneau and Ketchikan areas.

2. In both the Ketchikan and Juneau areas the catch per unit effort declined in the sport catch in the two years of the study. This was true for total salmon as well as for king salmon alone.

3. King salmon followed by coho salmon were the two most numerous species of salmon in the sport fishery. The other three species were not important in the catch and the order of abundance was pink, chum, and red salmon.

4. Coho salmon registered the highest C.P.U.E. values during the period that they were available to the fisherman.

5. The sport-commercial fisherman showed a marked advantage in catching salmon, especially coho, when compared to the sport fisherman.

6. In the combined Juneau and Ketchikan areas, an estimated take (including salmon derbies) of approximately 3,600 salmon in 1960 and 3,000 salmon in 1961 was caught by the sport fisherman. King salmon accounted for approximately 2,000 in 1960 and 1,500 in 1961 of the total fish caught.

7. The seasonal sport fishing and derby efforts in Juneau and Ketchikan consisted of approximately 5,000 boat trips in 1960 and 5,500 boat trips in 1961 with 12,200 fishermen and 14,200 fishermen, respectively.

8. The Juneau and Ketchikan salmon derbies contributed approximately a third of the total season's fishing effort and catch in both years of the study.

9. The Southeastern Alaska sport fishery only harvested approximately 0.5 percent of the total catch of salmon by hook and line.

10. The estimated total take of king salmon by the sport fishermen in Southeastern Alaska was 2,500 in 1960 and 2,000 in 1961. Approximately 1,600 coho were also harvested during both years.

11. The timing of the different species of salmon in the sport fishery was similar in the two years of the study with king salmon entering the fishery in late April, coho entering the fishery in late June, and with pink and chum salmon available in early July.

12. Outboard cabin boats between 16-20 feet were the most popular boats in the fishery, although the larger cabin boats showed a greater fishing success.

13. Herring was the most popular bait used in the fishery. Fresh herring was superior to frozen herring as bait and was used most often as whole herring (uncut). The most successful use of herring in catching salmon was as follows: (1) strip cut, (2) plug cut, and (3) whole herring.

14. Trolling, although the most popular, was the least successful fishing method and was more successful with coho than with king salmon. Drift and anchored spinning were the most successful fishing methods.

15. Windy and rainy days were the least successful weather conditions in fishing for salmon. There was no advantage for any particular tide condition.

16. The particular local areas of greatest fishing success were different for king and coho salmon and different for both years of the study.

17. The weights and lengths of king salmon decreased throughout the fishing season from a peak size in the spring with the males being slightly larger than the female salmon in both areas investigated. The king salmon in the Ketchikan area were larger than the Juneau kings for both years of the investigation.

18. An uneven sex ratio occurred in the king salmon sport fishery with 1.3 females in 1960 and 1.4 females in 1961 caught for each male king landed.

19. The more desirable red-fleshed king salmon were dominant in the catch in Southeastern Alaska with 71.5 percent in 1960 and 67.9 percent in 1961 having red flesh.

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