

Kotzebue District Salmon, 1985

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INTRODUCTION

The objectives of this report are to: (1) review and evaluate 1985 harvests and management strategies for Kotzebue District commercial salmon fishery, (2) provide results from the chum salmon escapement enumeration program, and (3) present management strategies for the 1985 salmon season.

A total of 521,406 chum salmon, 63 king salmon, and 454 Arctic char was captured by 189 fishermen and sold to four companies during the 1985 commercial fishing season (Table 1). The total cash value to fishermen was approximately \$2.1 million. This was the fourth largest commercial chum salmon harvest of second highest value since initiation of the recent fishery in 1962.

Chum salmon subsistence harvest levels during 1985 appear to be as high or higher than previous years which may be partially a reflection of survey effort and technique (Table 2). An estimated 245 fishing families within area communities (Noorvik, Kiana, Ambler, Shungnak, Kobuk, Kotzebue, and Deering) harvested an estimated 31,400 chum salmon.

Aerial surveys of chum salmon spawning ground index areas within the Noatak and Kobuk River drainages was the only escapement enumeration program conducted. Of the three primary lower Kobuk River tributaries, only one reached escapement goal. Surveys were not possible during the peak spawning period of chum salmon in the Noatak and upper Kobuk Rivers due to high turbid water conditions (Table 3).

COMMERCIAL FISHERY

District Boundaries

The Kotzebue District includes all waters from Cape Prince of Whales north to Point Hope. All commercial fishing effort occurs in marine waters near the village of Kotzebue (Figures 1 and 2). Commercial fishermen operate set gill nets of 150 fathoms in length primarily out of open skiffs powered by outboard motors.

Management Objectives and Strategies

The primary fishery management objectives were to provide adequate chum salmon escapement through the commercial fishery to ensure (1) required subsistence harvest levels, and (2) sustained runs in future years. Fishery management was dependent on comparing period and cumulative season catch rates to prior years. To a lesser extent management depended on inseason aerial survey counts of index area spawning grounds. This management technique resulted in a conservative management approach due to: (1) the absence of an inriver escapement index program as conducted in prior years, (2) the unknown effect on the commercial catch of the extended fishing boundary (statistical area 331-05), and (3) the increased fishing fleet efficiency in terms of new and improved equipment and greater fishing expertise. Run strength was assessed after each period by comparing catch data (total catch, catch per unit effort (CPUE), and cumulative CPUE) to average values for catches on approximately the same dates from the previous 6 years. The comparative data base was limited to the recent 6-year data to partially account for increased fleet efficiency and to encompass a range of weak and strong runs, thus providing a good comparative base.

The Kotzebue District fishery occurs on a twice weekly schedule. July fishing periods are usually only 24 hours in duration to protect the Kobuk River run from overharvest. The Kobuk run is strongest in July. These fish support the area's greatest subsistence harvest. During August when the more abundant Noatak River stock is dominant, fishing time is generally increased to at least two-36 hour periods per week. Further adjustments in fishing time are made based on trends of commercial catch rates over a series of periods. The Kotzebue commercial fishing fleet appears to be very effective at capturing the majority of the fish in the district during any given period.

Summary

Fifteen fishing periods occurred twice weekly from 11 July to 31 August for a total of 612 hours of fishing time. Weather conditions were mostly conducive to fair to good fishing through 24 August after which time strong winds and excessive grass in nets hindered catches and effort (Table 4). Fishing time per period was increased from the regulation directed length of 24-hour periods to 36-hour periods for the last period of July due to above average period and cumulative catch rates (Figures 2 and 3). The catch rate during the 36-hour period was also well above average justifying an extension of fishing time to twice weekly 48-hour periods. A single 72-hour period occurred 15 to 18 August as prior period catch rates remained high and aerial salmon escapement surveys showed fair numbers of fish on the spawning grounds. During the 72-hour period the catch dropped significantly, and the catch rate dropped to near average indicating the peak of the fishing season had passed. Fishing time then returned to 48-hour periods and remained so for the remainder of the season.

Catches within periods ranged from 2,435 to 85,788. Seven of the 15 periods had catches well above the prior 6-year average for

corresponding periods. Approximately 3,400 chum salmon age, sex, and size samples were obtained from the commercial catch. The age class composition was approximately <1% age 3, 84% age 4, 15% age 5 and <1% age 6. The total season's sex ratio was 1:1.

Fishing effort was above average for over 90% of the season which is consistent with other high catch seasons. The number of fishermen participating per period ranged from 37 to 177 with over 150 fishermen participating each period between 25 July and 18 August. About 50% (259,308) of the commercial chum salmon harvest occurred in statistical area 331-01 (Table 5). Over 90% of the fishermen participated in this area during at least one period of the fishery. Only 50% of the fishermen participated in statistical area 331-03 although each available site associated with the Noatak River mouth was utilized during the Noatak River segment of the run. Observation of this area between periods indicated great effort expended by fishermen toward site reservation. Only about 4% (18,600) of the commercial chum salmon harvest occurred in statistical area 331-05 by a total of 38 fishermen. Potential high sea conditions in this statistical area were such that only large boats fished this area on a regular basis.

The average price per pound for chum salmon, king salmon, and char was \$.47, \$1.25, and \$.25, respectively. The average weight for each was 8.7, 17.6, and 7.0 pounds, respectively. The chum salmon price of 42 cents per pound was maintained by three buyers through July. These buyers offered various bonuses which were redeemable at local stores. Tender service was provided from statistical area 331-02 by two of these buyers for the majority of the season. During the last period of July the fourth buyer entered the fishery and purchased chum salmon for 50 cents per pound. This prompted other buyers to raise prices to 45 cents per pound plus bonuses. One of these bonuses was redeemable in cash. Prices rose to as high as 57 cents per pound during the period 15-18

August. Only two buyers participated in the fishery during the last two periods. Many king salmon were captured during the fishery in excess of those sold as many fishermen prefer to consume rather than sell them. Arctic char were abundant in commercial catches from 24 August through the end of the fishery. It was estimated through fishermen interviews that about 2,500 arctic char were captured during the commercial fishery. Only about 18% (454) of the arctic char captured were sold since char are a preferred species for home consumption, and commercial markets were not always available.

Enforcement

The Alaska State Troopers were the primary agency responsible for regulation enforcement of the Kotzebue commercial fishery. Fish and Wildlife Protection officers stationed in Nome supported the troopers on a few occasions. The troopers made 150 to 200 contacts with fishermen (license checks or regulation conflicts) and issued about 15 warnings and a single citation. Verbal warnings were issued primarily in regard to regulations such as: (1) maintaining 300 ft between gear, (2) presence of cardholder onboard boat, and (3) fishing excess gear. The citation issued was in regard to fishing within closed waters. Regulation modifications suggested by the troopers which may provide for less conflict between fishermen include: (1) gear restriction to 100 fathoms in the fishing area associated with Noatak River mouth, and (2) allowing cardholders to maintain a distance of up to 300 ft from their boats while reserving a site between open fishing periods. The troopers participated in each fishing period making contact with fishermen or buyers by boat, aircraft, or vehicle. Few contacts were made with fishermen by boat after 10 August due to: (1) mechanical problems, (2) personnel on annual leave, and (3) other business involving serious felonies.

ESCAPEMENT SURVEYS

Aerial escapement surveys were conducted of established index areas of the Noatak and Kobuk Rivers and associated tributaries. River water levels were exceptionally low early in the season allowing fair to excellent surveys to be conducted from 26 July to 18 August. By late August water levels had risen such that survey conditions were unsatisfactory. River waters remained high and turbid until freeze-up.

Survey results of the lower Kobuk River systems indicate that only one of the three index streams achieved escapement goals. The peak escapement counts for the Squirrel, Salmon, and Tutuksuk Rivers were about 6,200, 2,800, and 5,100, respectively. The escapement goals for each of these systems are 11,500, 7,000, and 2,000, respectively. As escapement surveys were conducted prior to peak spawning, escapement was probably in excess of that documented. Pre-peak season aerial surveys documented 6,200 chum salmon (18 August) in the upper Kobuk River and 44,000 chum salmon (16 August) in the main stem Noatak River. Peak surveys are often obtained of these systems in September. Review of prior year survey information suggested these counts, given early survey timing, were well above average. However, the existing low water levels providing exceptional survey conditions were not typical for mid-August.

Ongrounds escapement surveys were conducted of the lower Kobuk River tributaries, the upper Kobuk River and the upper and lower Noatak River. Ground surveys were successful in collecting age, sex, and size samples from each area. However, due to high water conditions, only limited samples were obtained from the upper Kobuk River. It was noted by the project biologist that salmon were in greater abundance and more easily obtained from the Squirrel and Salmon Rivers than during the prior 2 years. Results of escapement survey age, sex, and size information will be made available on completion of data summation.

SUBSISTENCE SURVEYS

Household interviews were conducted to determine the number of chum salmon taken for subsistence utilization within the Kotzebue Sound watershed. The survey technique included: (1) obtaining a list of village residents from city or village offices to assist in directing interview coverage and to generate a percentage of households interviewed, (2) door-to-door interviews, (3) telephone interviews, and (4) enumerating fish on racks. These survey results are minimal estimates since all households were not contacted.

The total chum salmon subsistence harvest from villages along the Kobuk River was 17,300. Harvests from Noorvik and Kiana, lower river communities, were 7,000 and 3,500, respectively. Harvests for Ambler, Shungnak, and Kobuk, upper river communities, were 3,400, 3,100, and 300, respectively. The Kotzebue area (city and near city fish camps) estimated harvest was 13,500 chum salmon. The community of Deering was surveyed during mid-September with an estimated harvest of 570 chum salmon. Residents of the community indicated they would fish for coho salmon until freeze-up. Chum salmon subsistence harvest levels during 1985 appear to be as high or higher than previous years which may be partially a reflection of survey effort and technique.

OUTLOOK AND MANAGEMENT STRATEGY FOR 1986

The management strategy for 1986 will be similar to that of 1985. This strategy will provide for weekly fishing periods with further adjustments on fishing time made based on trends of commercial catch rates over a series of periods.

The 1986 chum salmon run will be returning from the 1981 - 1983 brood years, with returns from the 1982 year class dominant. During 1982, the escapement was above average as noted by commercial catch rates, side scan sonar enumeration study (Noatak River only) and aerial surveys (primarily upper Kobuk River). However, during 1985 returns of age 3 chum salmon were relatively low (less than 1% of the commercial catch) suggesting the 1982 brood year may have experienced poor survival. Environmental conditions, such as high water during peak spawning, as documented in the Noatak during 1982 may have strong influence on egg and fry survival. Therefore, in consideration of above average escapements during 1981 - 1983 and possible poor survival of the 1982 brood year, the 1986 run is expected to be about average when compared to the prior 10 years. The 10-year average commercial chum salmon harvest is 309,000. Management actions will be implemented during 1986 to provide escapement through the commercial fishery to ensure required subsistence harvest levels and to sustain future year runs.

Table 1. Comparative commercial chum salmon catch statistics, Kotzebue District, 1979 - 1985.

	Average 1962-1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Total catch	177,959	159,800	159,900	111,500	141,545	367,284	677,239	417,790	175,762	320,206	521,406
Total days 1/	31	16	21	23	21	27	27	23.5	12.5	19.5	25.5
Total boat days 2/	1,460	2,236	2,353	2,738	2,462	2,569	3,336	3,115	1,557	2,432	3,382
Average catch/ boat day	105	71	83	41	57	143	203	134	113	132	154
No. of fishermen	93	220	224	208	181	176	187	199	189	181	189
Average catch per fisherman	1,913	726	714	536	782	2,087	3,622	2,099	930	1,769	2,759
Estimated value 3/ (\$ x 1,000)	360	580	1,034	575	990	1,447	3,247	1,962	421	1,149	2,137
Round weight (pounds)	8.8	8.9	9.6	9.1	8.8	8.6	9.1	9.3	9.4	8.2	8.7
Average price per pound \$	0.15	0.41	0.56	0.57	0.80	0.46	0.53	0.51	0.25	0.44	0.47

1/ Day = 24 hours of open fishing time.

2/ Boat days standardized in 1983 for all prior years. Boat days = number of boats fishing x period length in hours divided by 24. Total boat days = total season boat hours divided by 24.

3/ Estimates for 1979, 1980, and 1981 include only chum salmon value which represent over 99% of the total value. Estimates after 1981 represent total value.

Table 2. Commercial and subsistence salmon catches, Kotzebue District, 1914-1985.

Year 1/	Commercial Catch			Subsistence Catch			
	Chum 2/	Other 3/	Total	Chum	# fishermen interviewed	Avg. Catch Fishermen	Catches Combined
1914	8,550	-	8,550	-	-	-	-
1915	4,750	-	4,750	-	-	-	-
1916	19,000	-	19,000	-	-	-	-
1917	44,612	-	44,612	-	-	-	-
1918	27,407	-	27,407	-	-	-	-
1957	-	-	-	298,430 4/	-	-	-
1962	129,948	127	130,075	70,283	81	868	200,358
1963	54,445	143	54,588	31,069	67	464	85,657
1964	76,499	5	76,504	29,762	58	513	106,266
1965	40,034	-	40,034	30,500	89	343	70,534
1966	30,764	1	30,765	35,588	121	294	66,353
1967	29,400	-	29,400	40,108	135	297	69,508
1968	30,384 5/	-	30,384	20,814	65	126	51,198
1969	59,335	48	59,383	29,812	99	301	89,195
1970	159,664	-	159,664	28,486	164	174	188,150
1971	154,956	1	154,957	23,959	152	158	178,916
1972	169,664	3	169,667	11,085	96	115	180,752
1973	375,432	5	375,437	18,942	101	188	394,379
1974	634,479 6/	48	634,527	26,729	88	304	661,256
1975	563,682 7/	36	563,718	27,605	95	291	591,323
1976	159,796	2	159,798	15,765	91	173	175,563
1977	195,895	-	195,895	9,752	83	117	205,647
1978	111,533	7,007	118,540	12,864	85	151	131,404
1979	141,623	910	142,533	14,605	97	151	157,138
1980	367,284	1,654	386,938	10,945	111	98	379,883
1981	677,239	237	677,476	17,766	71	250	695,242
1982	417,790	57	417,847	30,133	204	148	447,980
1983	175,762	229	175,991	8,262 8/	46	180	184,253
1984	320,206	107	320,313	15,508 8/	66	235	335,714
1985	521,406	63	521,469	31,397 9/	245	128	552,866
5 year avg.	422,480	139					
10 year avg.	308,853	1,027					

- 1/ There was no commercial fishing during 1919-1961.
- 2/ Catches for 1914-1918 from pack data only; numbers of chums estimated at 9.5 per case (#48) and 34 per barrel.
- 3/ Includes pinks, chinook and sockeye salmon.
- 4/ Estimated mean annual catches prior to 1957 (study by Raleigh).
- 5/ Corrected from 1968 annual report due to addition of late catches.
- 6/ Includes 6,567 chum salmon harvested from Deering experimental fishery.
- 7/ Includes 10,704 chum salmon harvested from Deering experimental fishery.
- 8/ Partial survey.
- 9/ Does not include harvest from the villages of Noatak or Kivalina.

Table 3. Comparative chum salmon escapement data, Kotzebue District, 1962-1985.

	Average 1962-1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Noatak River 1/ Escapement	69,416	44,500	11,000 4/	37,500	19,700	164,500	166,400	20,682 4/	79,773	67,873	43,525 6/
Lower 2/ Kobuk River Escapement	19,111	8,390	1,758 4/	2,677	2,238 4/	21,992	14,563	8,330	7,752	6,944	8,961
Upper 3/ Kobuk River Escapement	10,143	2,522	5/	1,981	2,008	11,466	8,648	14,874	33,746	10,521	6,245 6/

- 1/ Reflects aerial survey counts in the main Noatak River only.
- 2/ Reflects aerial survey counts in the Squirrel and Salmon Rivers, which are the major index tributaries to the Lower Kobuk River.
- 3/ Reflects aerial survey counts in the main Kobuk River above the village of Kobuk.
- 4/ Poor survey conditions or incomplete survey.
- 5/ Not surveyed.
- 6/ Survey conducted well before peak spawning.

Table 4. Chum salmon commercial catch statistics by period, Kotzebue District, 1979-1985.

1985									
Chum Salmon									
Date	Period	Fishing Condition Index 1/	Hours	No. of Boats	Catch (X1000)	CPUE	Cum. Catch (X1000)	Cum. CPUE	
July	11-12	1	24	48	5.6	4.9	5.6	4.9	
	15-16	2	24	87	4.8	2.3	10.4	3.2	
	18-19	3	24	129	12.7	4.1	23.1	3.6	
	22-23	4	24	144	37.8	10.9	60.9	6.2	
	25-26	5	24	155	37.5	10.1	98.4	7.3	
August	29-31	6	36	163	72.4	12.3	170.8	8.8	
	1-3	7	48	169	69.2	8.5	240.0	8.7	
	5-7	8	48	177	46.5	5.5	286.5	8.0	
	8-10	9	48	158	57.5	7.6	344.0	7.9	
	12-14	10	48	173	85.8	10.3	429.8	8.3	
	15-18	11	72	154	46.3	4.2	476.1	7.6	
	19-21	12	48	136	20.9	3.2	497.0	7.2	
	22-24	13	48	124	15.4	2.6	512.4	6.8	
	26-28	14	48	79	6.6	1.7	519.0	6.6	
	29-31	15	48	37	2.4	1.4	521.4	6.4	

Six Year Average, 1979-1984 2/

Chum Salmon						
Period	Hours	No. of Boats	Catch (X1000)	CPUE	Cum. Catch (X1000)	Cum. CPUE
1	24	35	2.2	2.5	2.2	2.7
2	24	74	5.3	3.0	7.5	3.0
3	24	107	10.1	3.9	17.6	3.5
4	26	132	19.5	5.3	37.1	4.4
5	26	145	27.3	7.0	64.4	5.3
6	29	150	30.0	7.3	94.3	5.8
7	39	155	40.2	7.2	134.5	6.1
8	44	162	53.5	7.4	188.0	6.5
9	49	158	52.2	6.5	240.2	6.5
10	49	160	55.3	6.3	295.5	6.6
11	51	143	26.6	4.2	322.0	6.4
12	49	126	18.2	2.9	340.2	6.0
13	47	104	10.9	2.3	351.1	5.8
14	40	81	7.2	1.8	358.3	5.7
15	40	45	2.8	1.2	361.1	5.6

1. Commercial salmon fishing condition ratings, Kotzebue District, 1985.
 1. Excellent: turbid water, moderate seas, steady winds, frequent tidal action, overcast skies, no grass, steady effort by each participating fishermen.
 2. Good: calm to moderate seas, wind steady or absent, some tidal action, little or no grass, good effort by most participating fishermen.
 3. Fair: calm or marginally rough seas, calm or excessive wind, limited tidal action, some grass, good effort by only a portion of the participating fishermen.
 4. Poor: rough or calm seas, strong or calm winds, tidal action absent, low effort with some fishermen participating only during a small portion of the period.
 5. Unsatisfactory: low fishing effort of short duration due to inclement weather.
2. Averages are only for periods with effort.

Table 5. Commercial chum salmon catch by statistical area, Kotzebue District, 1985.

Area	Permits		Chum salmon harvest	
	Number	Percent	Number	Percent
331-01	171	90	259,308	50
331-02	120	64	103,653	20
331-03	93	49	96,500	19
331-04	50	26	43,345	8
331-05	38	20	18,600	4
TOTALS	189	1/	521,406	100

1/ Fisherman participated in more than one statistical area.

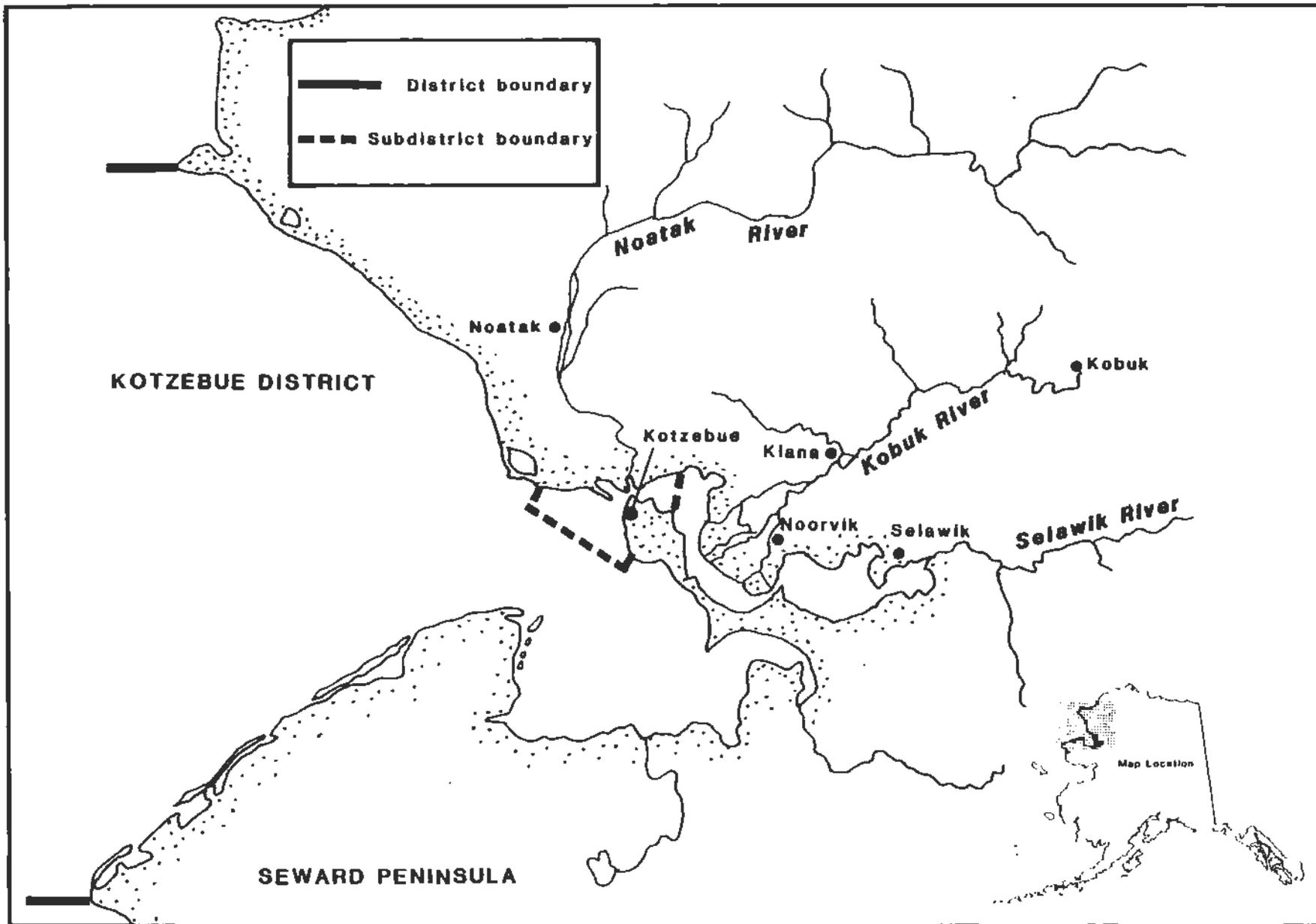


Figure 1. District boundaries and associated area, Kotzebue District.

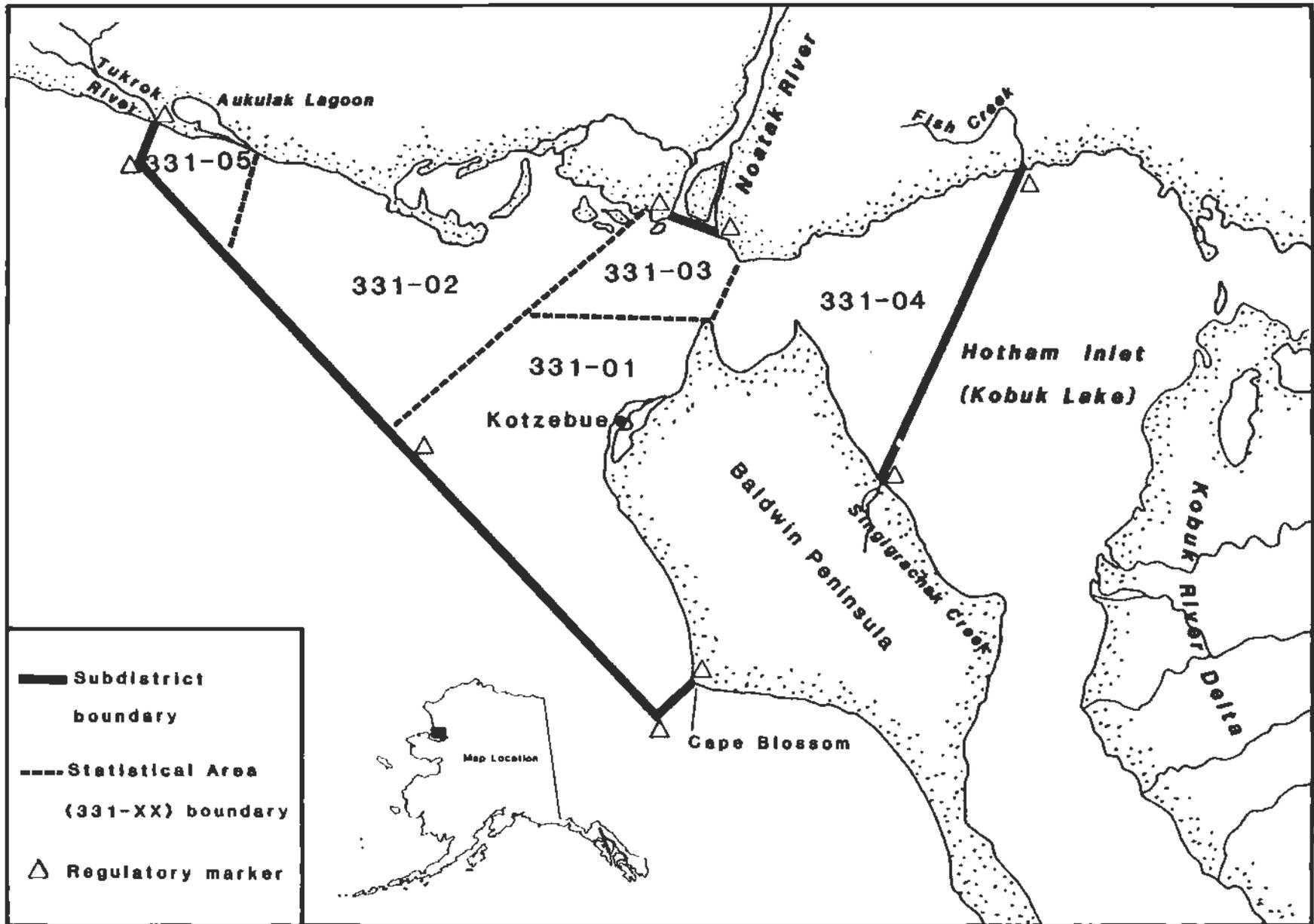


Figure 2. Commercial salmon fishing subdistrict boundaries, Kotzebue District, 1985.

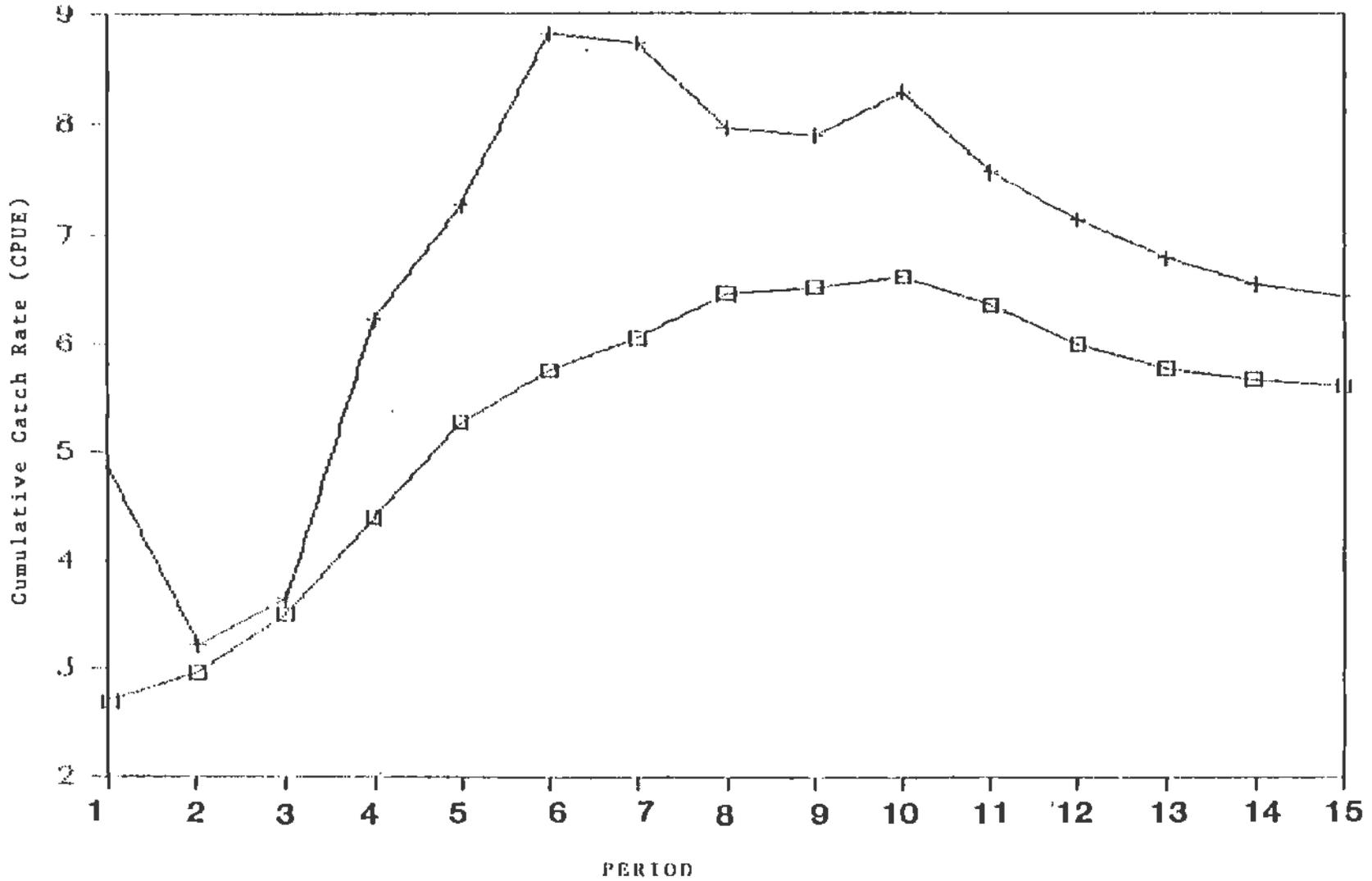


Figure 4. Commercial chum salmon cumulative catch rates (catch per unit effort) for 1985 (+) and for the prior 6-year average [1979 - 1984 (□)], Kotzebue District, 1985.

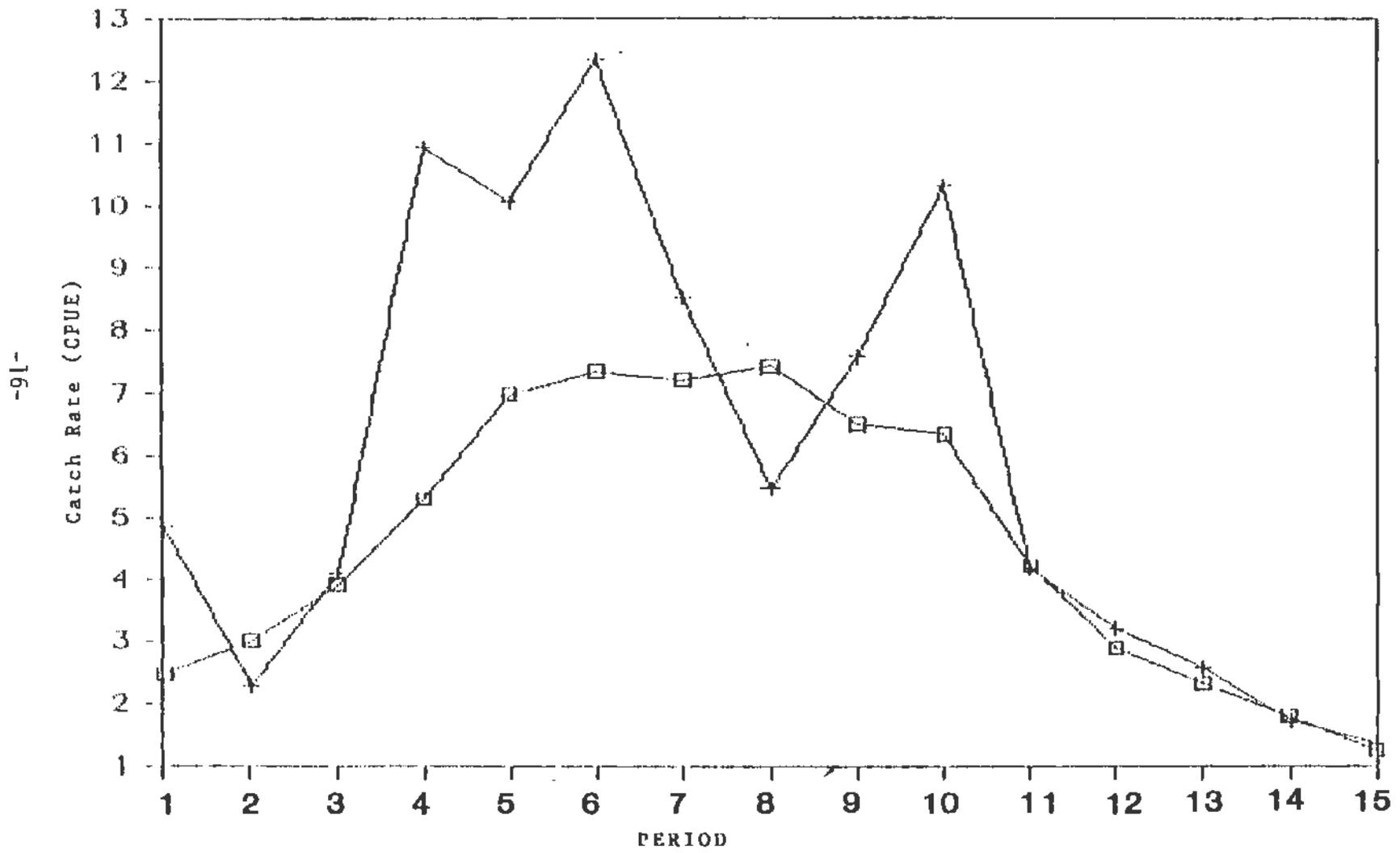


Figure 3. Commercial chum salmon catch rates (catch per unit effort) for 1985 (+) and for prior 6-year average [1979 - 1984 (□)], Kotzebue District, 1985.