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1996 SALMON FISHERIES MANAGEMENT PLAN
KOTZEBUE AREA

Charles Lean
Area Management Biologist
Tracy Lingnau
Asst. Area Biologist

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Alaska Department of Fish and Game
Commercial Fisheries Management and Development Division, AYK Region
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FISHERY BACKGROUND

The Kotzebue District includes all waters from Cape Prince of Wales to Point Hope. Chum salmon are the most abundant anadromous fish within this district. However, other salmon species (chinook, pink, coho, and sockeye) occur in lesser numbers as do arctic char and sheefish.

Subsistence Fishery

Fishing has long been an important food gathering activity for people of the Kotzebue Sound drainages. Remnants of fishing spears have been found within the area which date back as far as 1250 A.D. The subsistence fishery is still very important to the local people. A recent study of subsistence needs in the City of Kotzebue found that the estimated 1995 chum salmon catch by the residents of the City of Kotzebue and the immediate vicinity was 50,708. Subsistence surveys of Ambler, Kiana, Kobuk, Noorvik, Noatak, and Shungnak villages estimated a combined harvest of 45,225 chum salmon during the 1995 season. These harvest estimates would indicate the 1995 annual subsistence harvest was roughly 96,000 chum salmon.

Commercial Fishery

Commercial salmon fishing in the Kotzebue District dates back to 1914, when during a 4-year period, a canned and salt packed product was processed. The current chum salmon directed, commercial fishery was initiated in 1962 and occurs in ocean waters near Kotzebue (Figure 1). Commercial fishermen operate set gill nets primarily out of open skiffs powered by outboard motors. Buyers generally fly freshly caught, iced salmon out of the district in the round.

Commercial chum salmon harvests during the past 16 years (1979-1994) have ranged from 71,071 to 677,200 fish, the 16-year average being 282,300. Fishing effort during the same period has ranged from 199 to 109 fishermen, averaging 175 fishermen. During 1995, 290,730 chum and 5 chinook salmon were harvested by 92 fishermen. The total wholesale value of the harvest was $316,031 and ranked as the third lowest value within the last 16 years. The chum salmon price paid to fishermen was the lowest since 1967.

FISHERY OUTLOOK

Status of Stocks

Chum salmon abundance fluctuates greatly between years as noted by commercial harvests and escapements (Table 1). Although relative strength of parent-year escapements play an important role in the magnitude of chum salmon returns, other factors significantly influence the success of year classes. Such factors may include freshwater mortality of salmon eggs and fry due to temperature and water level fluctuations, and harvest of Kotzebue area origin salmon by foreign and domestic interception fisheries.

Enumeration surveys of the Noatak and Kobuk River systems have shown these two systems are the major salmon producers of the Kotzebue District. Noatak River bound chum salmon pass through the commercial fishery primarily during August. Kobuk River bound chum salmon are of two components: (1) stocks bound for lower Kobuk River tributaries, which pass through the commercial fishery during July, and (2) stocks bound for the upper Kobuk River, which pass through the commercial fishery during August intermixed with Noatak bound fish.

Chum salmon returning to the Kotzebue area are primarily 3, 4, and 5 year old fish. The 17 year average brood year return for 1979-1995 is 4.5% 3 year-olds, 57.4.0% 4 year-olds, 35.7% 5 year-olds, and 2.4% 6 year-olds. The number of fish on lower Kobuk River tributary spawning grounds peak by about August 15 while those of upper Kobuk River and Noatak River spawning grounds peak by about September 1. Salmon deposit eggs in stream gravel where egg to salmon fry development occurs through the winter. If water levels during spawning are above normal, winter freezing of eggs and fry may occur in areas dewatered during reduced winter flows, greatly increasing freshwater mortality. High spawning ground mortality may partially explain poor runs which follow good parent year escapements. Fry emerge from stream gravel primarily during May and June and out migrate to marine waters.

1996 Wild Stock Return

The outlook for the 1996 season is based on the returning age classes of the 1994 season. During the 1996 season, the four year old age component of the run is expected to be near average. While the five year old component is expected to be above average. The three and six year old components of the run are expected to be near normal. The commercial harvest is expected to fall within the range of 250,000 to 350,000 chum salmon, assuming an adequate market.

1996 Hatchery Stock Return

The Sikusuilaq hatchery brood stock is now at full production with 90,000 adults expected to return during the 1996 season based on parent year escapements. The 1996 hatchery contribution to the commercial catch is not expected to exceed 45,000 chum salmon, assuming an exploitation rate of 50% in that fishery, and an additional 7,500 are expected to be utilized in the Noatak River subsistence fishery, leaving a potential surplus of 37,500 salmon returning to the Noatak River in the vicinity of the hatchery and the Agashashok River. The hatchery stock is composed of the same age classes that comprise the natural return but the size of each age class may vary depending on the level of hatchery production during a given parent year. The hatchery stocks are subject to the same factors the wild stock faces once the fish are released from the environs of the hatchery.

The 1996 season is the fourth year that the hatchery production is not projected to be fully utilized by the harvest in the commercial fishery and brood stock needs at the hatchery. During the spring 1994 Board of Fisheries meeting, a terminal harvest was approved to facilitate the harvest of the surplus hatchery stock. The terminal area is restricted to only Sikusuilaq Creek thereby minimized the disturbance of the Noatak wild stock by an in-river fishery.

MANAGEMENT OBJECTIVES AND STRATEGIES

Primary fishery management objectives are to provide adequate chum salmon escapement through the commercial fishery: (1) to ensure sustained runs by allowing adequate natural escapement, and (2) to meet subsistence harvest needs. Fishery management will be dependent on comparing period and cumulative season catch rates to prior years. Figure 2 compares the 1979-1995 average catch by period and CPUE by period. A comparison of catch rates over the history of the fishery has shown a close relationship to escapement. The comparative data base will be limited to the 1979-1995 year data to address the increased fleet efficiency and to encompass the range of years when similar fishing schedules were in effect, thus providing the best available basis of comparison.

Age composition of catches will be closely monitored to determine the strength of age classes in the return. Older salmon tend to migrate into freshwater first; a fact that affects catch rate as the season progresses and affects the fishery managers evaluation of the catch statistics. Weak 3 and 4 year old age classes may tend to depress mid-season catches.

Aerial surveys will be attempted beginning in early August on the Kobuk River tributaries. Aerial surveys are not a direct count or estimate of the salmon population but are used as an index for comparison with surveys both in season and in prior years. Surveys will be attempted until mid-September. Aerial surveys are usually made too late to effect present year fisheries decisions but do provide useful information in critiquing the years management decisions and help project future salmon returns.

The Noatak sonar project will not operate during the 1996 season due to a shortage of trained technical staff. Escapement based management will not be possible during 1996. The department is working to correct this situation and the Noatak sonar is scheduled to operate in future years.

The test fishing project will continue on the Kobuk River, in the vicinity of Kiana, to provide an inseason index of chum salmon passage there. It is hoped that within a few years this project will be considered a reliable escapement index.

The Kotzebue District fishery generally occurs on a twice weekly schedule. July fishing periods have generally been kept to 24 hours in duration to protect the lower Kobuk River run from overharvest. The lower Kobuk run peaks in July and supports a major portion of the area's subsistence harvest. During August, when the Noatak River stock is dominant, fishing time has generally increased to two 36-hour periods per week or more if returns are large. Adjustments in fishing time will continue to be based on trends in commercial catch rates over a series of periods. During seasons with poor returns, escapement needs will be protected by (1) reducing fishing period length to 24 hours or (2) canceling blocks of two periods to be followed by two periods for reevaluation. The Kotzebue commercial fishing fleet appears to be very effective at capturing the majority of the fish in the district during any given period.

The first commercial fishing period of the 1995 season will begin Thursday, July 8 to allow for normal period scheduling. Initial fishing periods will be from 6:00 p.m. Monday to 6:00 p.m. Tuesday and from 6:00 p.m. Thursday to 6:00 p.m. Friday. This fishing schedule will allow for a comparison of catch rate with past year's fisheries. Based on commercial catch rates, age composition, and catch per unit effort (CPUE), a decision will be made to adjust the length of periods for the next week. Reduced salmon markets are likely to cause the fishing period length to be reduced from the those of the past. If there are no concerns for escapement, fishing period duration and frequency will be largely determined by the salmon market.

Chum salmon are not expected to be in high demand during the 1996 season. The poor markets experienced in 1995 may exist for much of the 1996 season as well. Openings in the commercial fishery may be dependent on available markets once again. The Department plans to hold meetings with Kotzebue fishermen prior to the season and as management concerns develop. The sampling program will be continued even if the fishery is closed, so that the age composition of the run can be tracked. Contact with the Kobuk River subsistence fishermen will also be maintained. However, the Kobuk Test Fishing Project will not be the primary index used in making management decisions.

ESCAPEMENT OBJECTIVES

Aerial survey enumeration of salmon within rivers are utilized: (1) to evaluate initial run strength while salmon are traveling to the spawning grounds, and (2) to document peak salmon abundance on the spawning grounds as an index to total escapement. These enumeration techniques are best initiated during times of low river water levels, high water clarity, and good sunlight penetration. Unfortunately, these conditions are not always available.

One of the primary fishery management strategies is to provide for minimum escapement levels within each river system. These minimum escapement levels are based on historic averages of peak spawning counts of specific index areas within major drainage. These aerial survey escapement objectives are: (1) subject to continued review, (2) intended to evaluate escapement trends between years, and (3) are not a total count of the salmon escapement. Systems which are flown annually with associated chum salmon escapement goals are as follows: Noatak River (mouth to Kelly Bar-80,000 chum), Squirrel River (entire-11,500), Salmon River (entire-7,000), Tutuksuk River (entire-2,000), and upper Kobuk River (Kobuk Village to the lower canyon-10,000). Other systems are flown as funding is available.

Table 2. Kotzebue District chum salmon fishery information, 1981–1995.

Commercial Catch	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Chum (in thousands)	677.2	417.8	175.8	320.2	521.4	261.4	109.5	352.9	254.6	163.3	239.9	289.2	71.1	149.5	290.7
Number of permits	187	199	189	181	189	187	160	193	165	153	143	149	114	109	92
Average catch per permit	3,621	2,099	930	1,769	2,759	1,398	684	1,828	1,543	1,067	1,678	1,941	623	1,371	3,160
Est. value (x 1,000)	$3,247	$1,962	$421	$1,149	$2,137	$933	$515	$2,605	$614	$438	$429	$527	$231	$234	$316
Est. value per fisherman (x 1,000)	$17.4	$9.9	$2.2	$6.3	$11.3	$5.0	$3.2	$13.5	$3.7	$2.9	$3.0	$3.5	$2.0	$2.1	$3.4
Escapement Index [a]															
Noatak	106,513	20,682 [c]	78,900	67,800	43,526 [c]	37,277 [c]	5,565 [c]	45,930 [c]	[b]	23,345 [c]	80,750	34,335 [c]	30,210 [c]	[b]	155,920
Upper Kobuk	8,648	14,674	33,746	10,621	6,200 [c]	6,015 [c]	8,210	11,895		14,935 [c]	24,645	10,935 [c]	11,334		32,361
Squirrel	9,854	7,690	6,075	5,473	6,145	4,982 [c]	2,708	4,848 [c]		5,500 [c]	4,606	2,765	4,463		10,605
Salmon	4,709	1,871 [d]	1,677	1,471	2,816	1,971 [c]	3,333	6,208		6,335 [c]	5,845	1,345	13,880		13,988
Tutuksuk	1,114	1,322	2,637	1,132	5,100	4,257	206 [c]	3,122		2,275 [c]	744	1,162	1,996		3,901
Total	130,838	46,239	123,035	86,497	63,787	54,502	20,022	72,003		52,390	116,590	50,542	61,883		216,775

Escapement Goals

Noatak River (mouth to Kelly Bar)	80,000
Upper Kobuk (Kobuk Village to Beaver Creek)	10,000
Squirrel River	11,500
Salmon River	7,000
Tutuksuk River	2,000
Total	110,500

[a] Peak aerial survey
[b] Aerial surveys not feasible due to unfavorable weather and water conditions.
[c] Poor aerial survey conditions.
[d] Foot surveys.

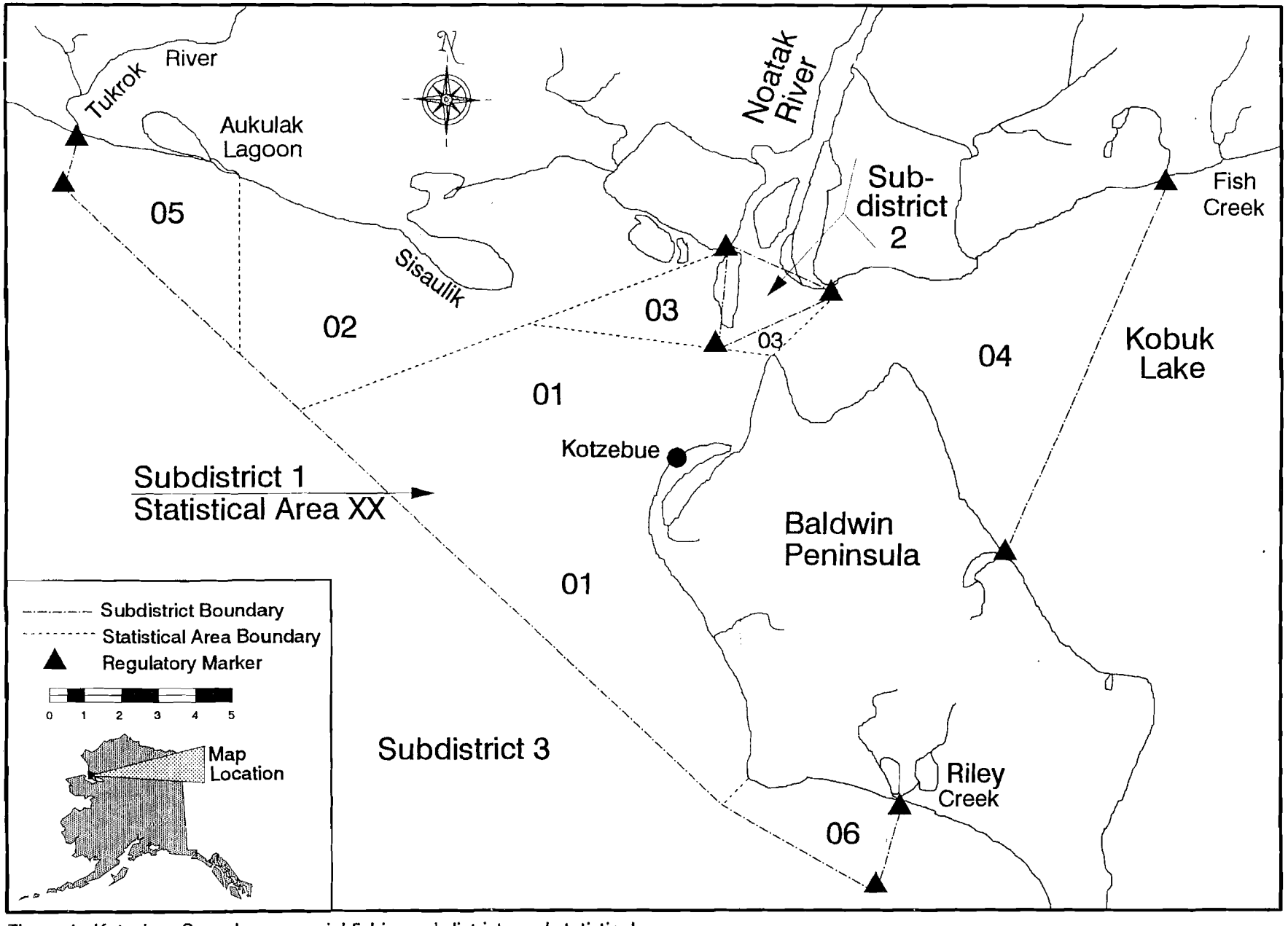
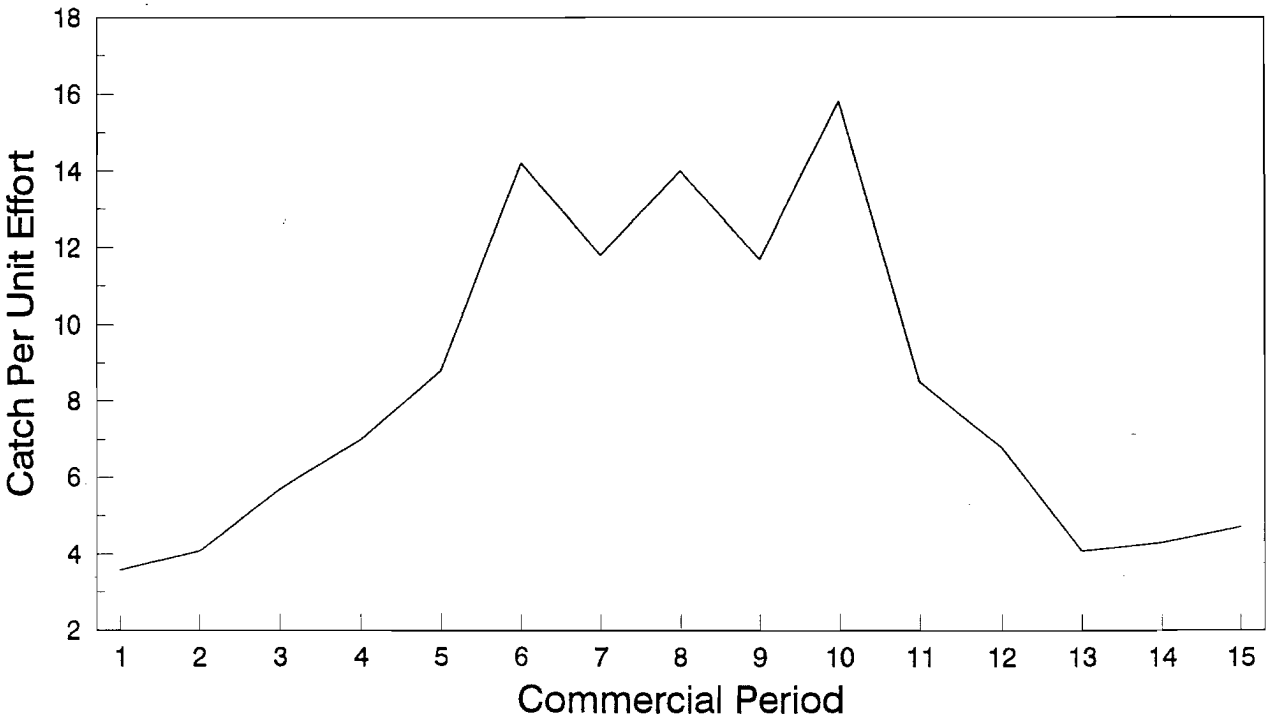


Figure 1. Kotzebue Sound commercial fishing subdistricts and statistical areas.

Kotzebue Sound District Chum Salmon

17 Year Average CPUE



17 Year Average Commercial Catch

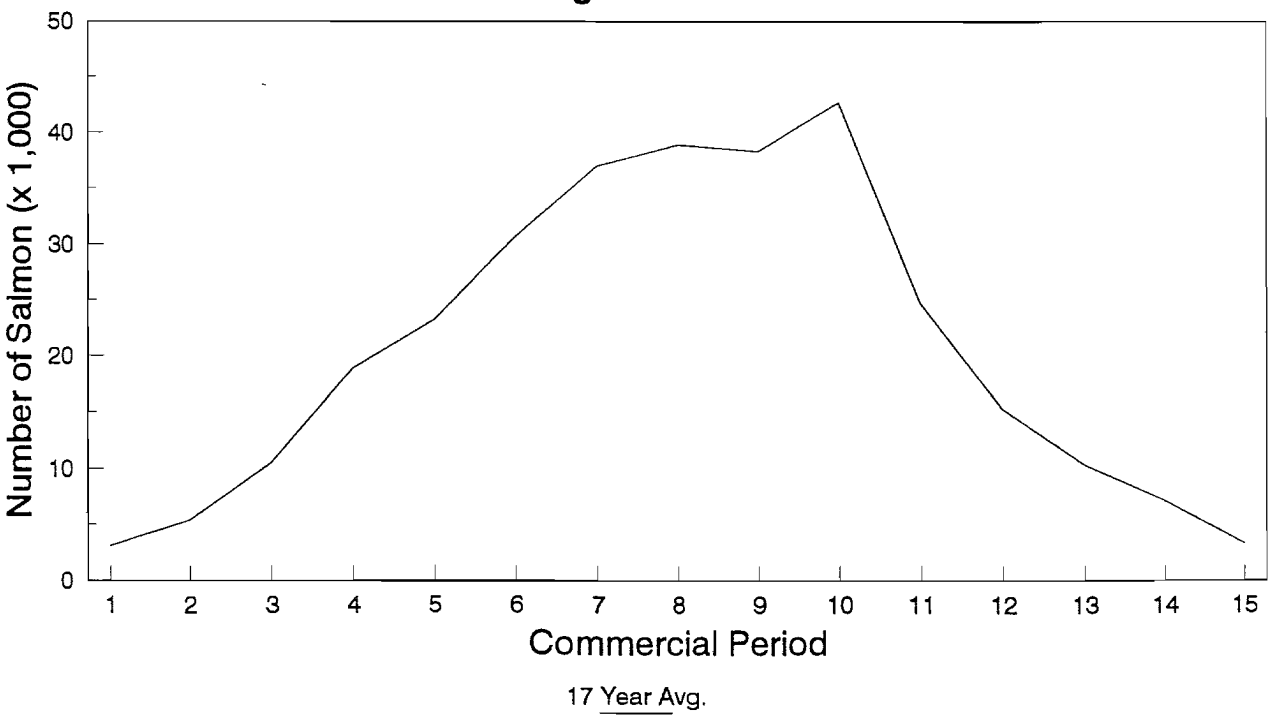


Figure 2. Kotzebue Sound chum salmon 17 year average (1979-95) commercial catch and catch per unit effort (CPUE) average.