

1989 SALMON FISHERIES MANAGEMENT PLAN  
KOTZEBUE AREA

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<sup>1</sup> The Regional Informational Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate needs for up-to-date information, reports in this series may contain preliminary data.

## 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) are available in lesser numbers as are char and sheefish.

### Subsistence Fishery

Fishing has long been an important food gathering activity for people of Kotzebue area 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 people of this area. A recent study of subsistence needs in Kotzebue found that the estimated 1986 chum salmon catch by Kotzebue residents was 35,000. Villages on the Noatak and Kobuk Rivers harvested an average of 15,000 chum salmon annually total over the past five years. By adding these two estimates an annual subsistence harvest of 50,000 chum salmon by Kotzebue area residents would seem reasonable. Reported harvest figures are considered to be minimal since not all communities or fishermen were contacted.

### Commercial Fishery

Commercial salmon fishing in the Kotzebue District dates back to 1914, when for a 4-year period, a canned and salt packed product was processed. The current day, 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 either in the round or partially processed (gilled and gutted).

Commercial chum salmon harvests during the past 7 years (1982-1988) have ranged from 109,500 to 521,400 fish, the 7-year average being 308,400. Fishing effort during the same period has ranged from 160 to 199 fishermen, averaging 185 fishermen. During 1988, 352,915 chum and 152 chinook salmon were harvested by 193 fishermen. Total wholesale value of the harvest, \$2.58 million ranks as the second highest value in the history of the fishery. Only the 1981 fishery exceeded this value when a record catch of the fishery occurred.

## 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 affect the success of year classes. Such factors may include fresh water mortality of salmon eggs and fry due to temperature and water level fluctuations, and harvest of Kotzebue origin salmon by foreign and domestic interception fisheries.

Enumeration surveys of the Noatak and Kobuk River systems have shown that of the two systems the Noatak system produces more salmon. 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 to 5 year old fish. The 27 year average brood year return for 1962-1988 is 13.7% 3-year-olds, 63.4% 4-year-olds, 21.7% 5-year-olds, and 1.2% 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, greatly increasing freshwater mortality. Such mortality may partially explain poor runs which follow good parent year escapements. Fry emerge from stream gravel primarily during May and June and outmigrate to marine waters.

## 1989 Wild Stock Return

The outlook for the 1989 Kotzebue chum salmon return and harvest is unclear. The cycle that has developed over the past eight years, or, two generations of chum salmon, would indicate a strong return, with a harvest approaching 500,000 chum salmon. However, the apparently poor return of the 1988 three-year-old class (brood year 1985), which was roughly one-half normal strength, would indicate a below average return. Since a reliable forecast method has not been developed for the Kotzebue fishery, only a very broad range of possible harvests will be stated. The 1989 Kotzebue chum salmon harvest is expected to fall between 200,000, and 500,000 chum salmon.

## 1989 Hatchery Stock Return

The Sikusuilaq hatchery is still building its brood stock and does not expect to reach full production for several years. The 1989 hatchery contribution to the commercial catch is expected to be approximately 15,000 chum salmon. The hatchery stock is composed of the same age classes that compose the natural return but the size of each age class is most dependent on the level of hatchery production during a given parent year. Because of increasing production in recent years the younger age classes will be more significant than the older age class fish in their catch contribution to the hatchery return since the hatchery has been expanding gradually over the years.

### MANAGEMENT OBJECTIVES AND STRATEGIES

Primary fishery management objectives are to provide adequate chum salmon escapement through the commercial fishery to ensure: (1) sustained runs by allowing adequate natural escapement, and (2) meeting subsistence harvest needs. Fishery management will be dependent on comparing period and cumulative season catch rates to prior years. Figures 2 and 3 display the 1979-1988 year averages of catch by period and CPUE by period. A comparison of catch rates over the history of the fishery showed a close relationship to escapement. The comparative data base will be limited to the 1979-1988 year data to account partially for increased fleet efficiency and to encompass a range of weak and strong runs, thus providing the best available comparative base.

Age composition of catches will be closely monitored to determine if an age class failure occurs. 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 5 and 6 year old age classes will tend to depress early season catches.

Aerial surveys will be attempted beginning in Mid-July on the Kobuk River tributaries. Aerial surveys are not a direct count or estimate of salmon population but are used as a means of comparison to previous surveys both inseason and in previous 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 Test Fishing project will be similar to the 1988 project. Test fishing will begin approximately July 17. With each years operation this project becomes more useful. This year the migration data gathered from the test catches will be used assess run timing inseason. The comparative size of the catch will be hard to evaluate since we have only two year's data to compare with, but will figure heavily in comparisons made in future years.

The Noatak sonar project will be continued this season, preliminary work began during August of 1988. Site selection was made during the peak of the 1988 salmon migration. Migration timing and movement patterns, and river bottom profiles were of primary consideration. For the sonar to be successful it is critical to cover as much of a cross sectional area of the river as possible with the sonar beam. The project will assess the feasibility of new sonar technology for enumerating migrating chum salmon in the Noatak River.

The Kotzebue District fishery generally occurs on a twice weekly schedule. July fishing periods will be 24 hours in duration to protect the lower Kobuk River run from overharvest. The lower Kobuk run peaks in July and supports the area's greatest subsistence harvest. During August when the more abundant Noatak River stock is dominant, fishing time is generally increased to two 36-hour periods per week or more if returns are large. Further adjustments in fishing time are based on trends of commercial catch rates over a series of periods. During seasons of poor returns fishing time within periods will be reduced or fishing periods will be canceled. 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 open commercial fishing period of the 1989 season will begin Monday, July 10 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 continue at least through July 20. Based on commercial catch rates, age composition, and catch per unit effort (CPUE) a decision will be made to adjust fishing time for the next week. In order to maintain the catch rate index used to manage the fishery, the fishing periods will not be shortened by more than 12 hours. Management decisions will be based primarily on comparisons of commercial catch rates to the 1979-1988 year averages, and the age class composition of the commercial catch.

Commercial salmon fishermen are reminded of the boundary changes which went into effect during the 1988 season. The former Cape Blossom boundary was moved south to the creek at Riley Wreck opening about 6 additional miles of beach. Also, a new

subdistrict was established at the Noatak River mouth. This subdistrict will be closed during below average fishing seasons. If the 1989 return appears normal, then period lengths would probably be extended before the new subdistrict 2 was opened. If the run is well above average, then both period length extensions and opening of subdistrict 2 could occur.

New net regulations will go into effect during 1989. Fishermen replacing nets should be aware of the new net specifications. All filaments making up the net twine must be of equal size. The twine should be made of 6 filaments of at least 0.2mm each or at least 30 filaments.

The Department plans to continue the meetings with the Kotzebue Fishermen's Association as management concerns develop. The Noatak test fishing project and contact with the Kobuk River subsistence fishermen will also be maintained. These two projects ~~will not be primary indices~~ used in making management decisions since they have not operated for enough years to have developed a data base for comparison.

#### ESCAPEMENT OBJECTIVES

Aerial survey enumerations 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, good water clarity with 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 drainages. These escapement objectives are subject to continued review, and are intended to evaluate escapement trends between years, and 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 Beaver Creek-10,000). Other systems are flown as possible based on available funding.

Table 1. Kotzebue District fishery information 1981-1988.

	1981	1982	1983	1984	1985	1986	1987	1988
<b>Commercial</b>								
Catch								
(thousands of fish)	677.2	417.8	175.8	320.2	521.4	261.4	109.5	352.9
No. Fishermen	187	199	189	181	189	187	160	193
Av. Catch per Fisherman	3,622	2,099	930	1,769	2,759	1,398	684	1,829
Est. Value (thousands)	3,247	1,962	421	1,149	2,137	933	515	2,581
<b>Escapements 1/</b>								
(thousands of fish)								
Noatak	116.4	20.7 2/	79.8	67.8	44.0 2/	37.2 2	38.0 4/	45.9 2/
Upper Kobuk	8.6	14.7	33.7	10.6	6.2 2/	6.0 2/	8.2	13.2
Squirrel	9.8	7.7	6.1	5.5	6.2	5.0 2/	2.7	4.8 2/
Salmon	4.7	5.4 3/	1.7	1.5	2.0	2.0 2/	3.3	6.2
Tutuksuk	1.1	1.3	2.6	1.1	5.1	4.3	0.2	3.1

1/ Escapement goals are: Noatak River (mouth to Kelly Bar - 80,000), Squirrel River (entire - 11,500), Salmon River (entire - 7,000), Tutuksuk (entire - 2,000) and upper Kobuk River (Kobuk Village to Beaver Creek - 10,000).

2/ Low escapement estimates due to poor survey conditions during peak spawning. Estimate achieved either under poor survey conditions (high turbid water) or before or after peak spawning.

3/ Foot surveys.

4/ Incomplete survey, estimated value based on tributaries historical contribution.

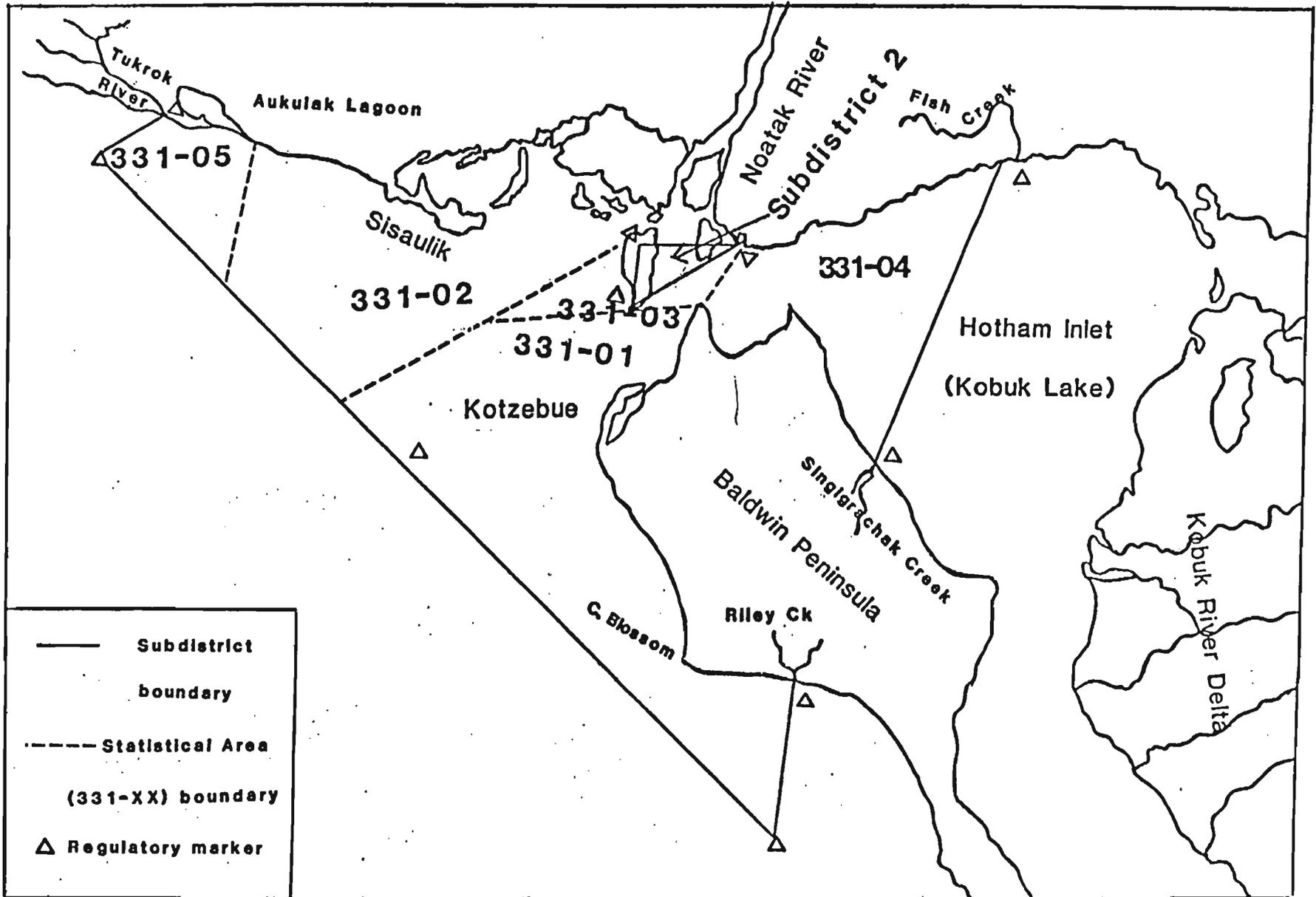


Figure 1. Kotzebue Sound commercial salmon fishing subdistricts.

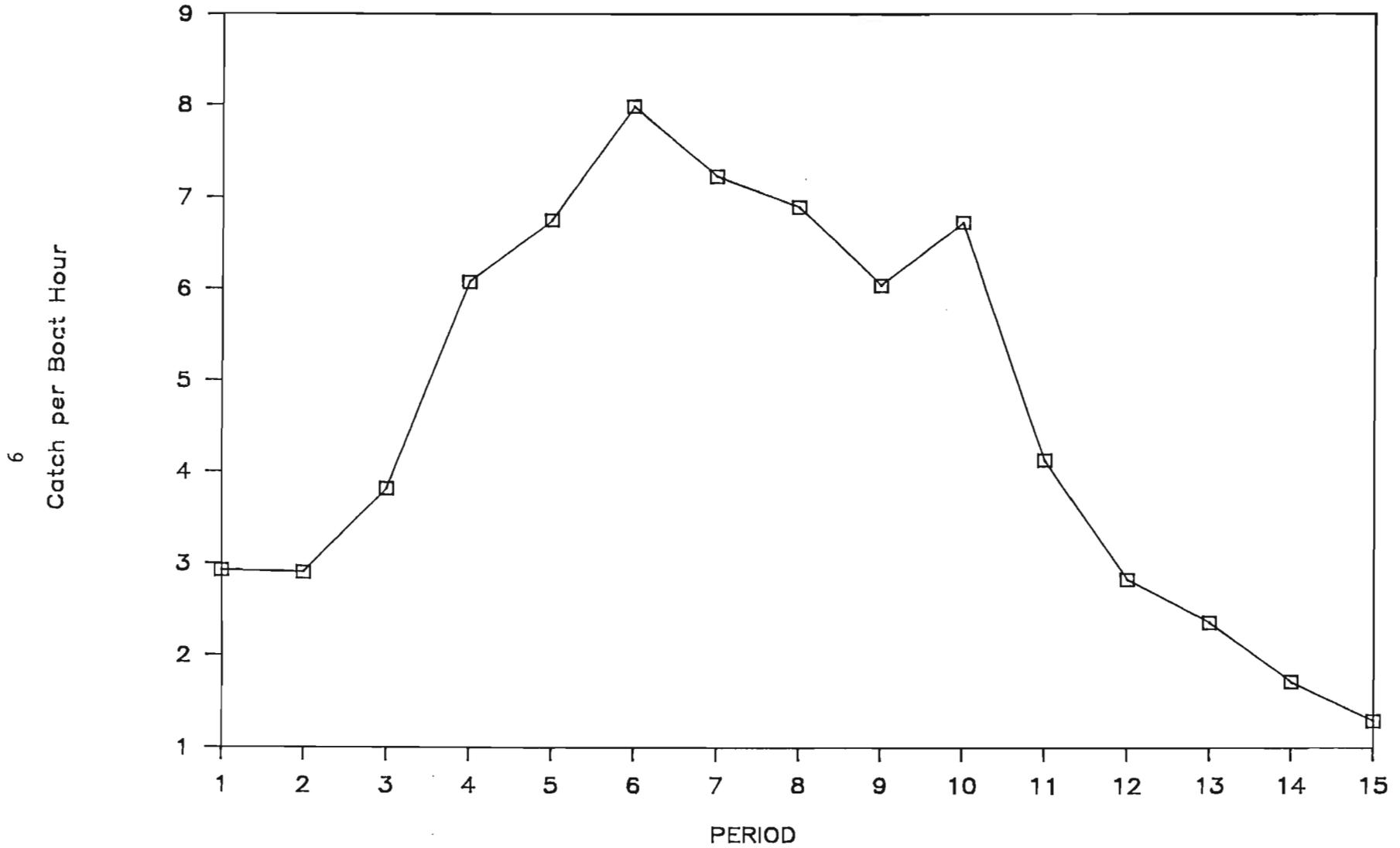


Figure 2. Average catch per boat hour by fishing period for chum salmon taken in the Kotzebue commercial fishery, 1979-1988.

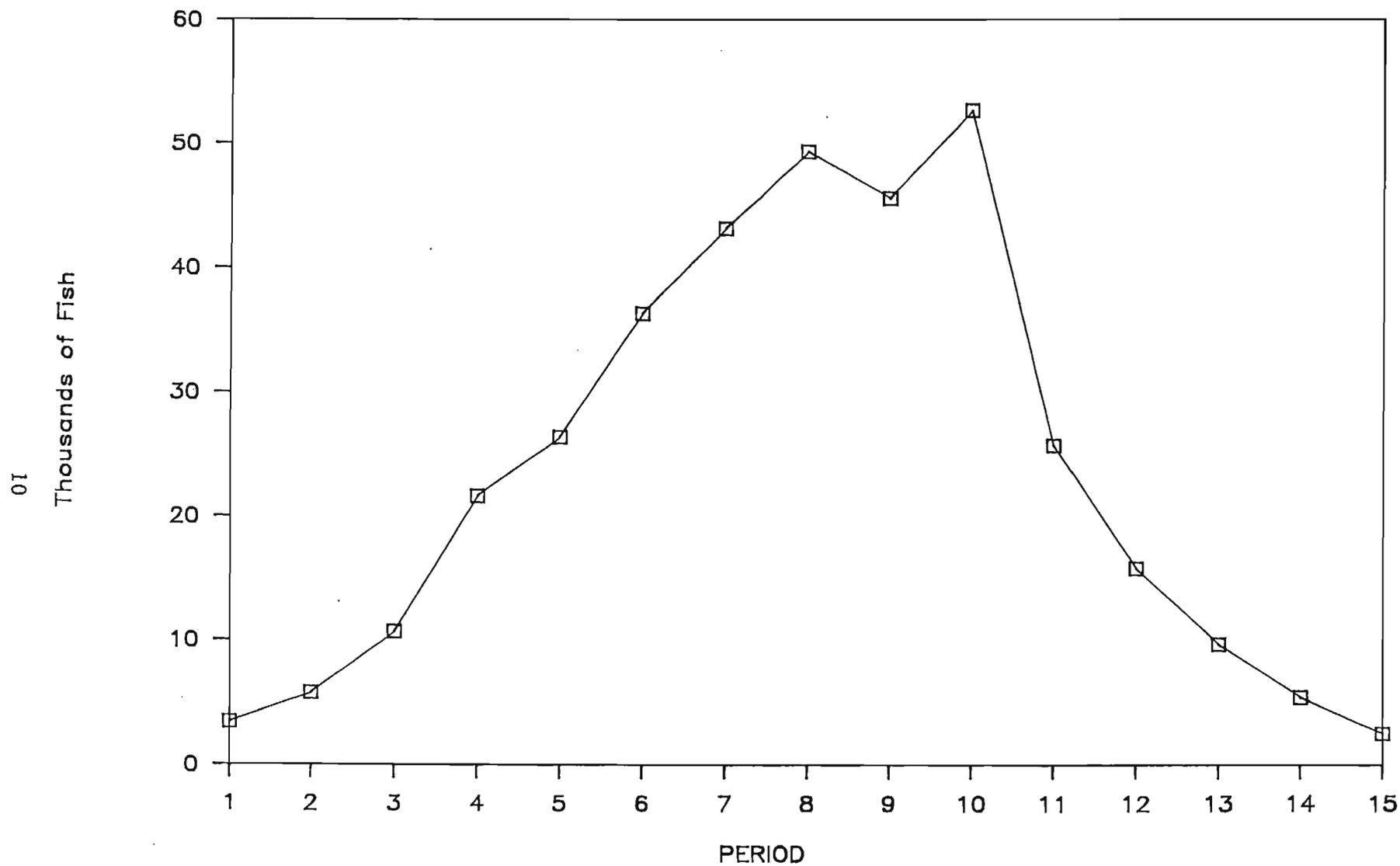


Figure 3. Average period catch by fish period for chum salmon taken in the Kotzebue fishery, 1979-1988.