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STATE OF ALASKA

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ANNUAL REPORT OF PROGRESS, 1960-1961

FEDERAL AID IN FISH RESTORATION PROJECT F-5-R-2

SPORT FISH INVESTIGATIONS OF ALASKA

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Introduction

This report of progress consists of the Job Completion Reports from the State of Alaska's Federal Aid in Fish Restoration Project F-5-R-2, "Sport Fish Investigations of Alaska".

The current Project is composed of eighteen separate studies and were designed to evaluate the various aspects of the State's recreational fisheries resources. The information gathered will provide the necessary background data for the development of future programs. During the current segment continued emphasis was placed on overall inventorying of accessible waters and the evaluation of general catch data.

Several problems of immediate concern appeared sufficiently defined to warrant independent studies. As a result, two independent creel censuses, one experimental silver salmon egg take and a Resurrection Bay area silver salmon population study were instigated. Data accumulated from prior jobs dealing with the Arctic grayling has resulted in the formulation of three separate investigations during the current segment.

The rapid expansion of Alaska's population is being reflected in the ever increasing numbers of "No Trespassing" signs encountered in the vicinity of population centers. Fortunately, much of Alaska's fishing waters are still in the public domain. An aggressive program of acquiring access to fishing waters, instigated in 1959, was continued during the present segment. Increased emphasis is being placed on this job and the successful continuation of this activity, now and in the immediate future, will forestall many of the serious recreational use problems currently facing other states.

The enclosed progress reports are fragmentary in many respects and the interpretations contained therein are subject to re-evaluation as the work progresses.

ANNUAL REPORT OF PROGRESS
INVESTIGATIONS PROJECTS
COMPLETION OF 1960 - 1961 SEGMENT

State: ALASKA

Project No: F-5-R-1

Name: Sport Fish Investigations
of Alaska

Job No.: 2-B

Title: Creel Census and Population
Sampling of the Sport Fishes
in the Kenai Peninsula.

Period Covered: May 7, 1960 to October 2, 1960

Abstract:

An investigation was initiated in the spring of 1960 to determine the magnitude of the sport harvest on anadromous fish species in the Anchor River. A creel census extending from May 7 to October 2 provided catch estimates for king salmon, silver salmon, steelhead and dolly varden. Fishing effort, escapement data and age and growth information were obtained for king salmon. Size composition and length-weight relationships are presented for all species. A review of past work conducted on this stream by the Bureau of Sport Fisheries and Wildlife provided background for the current study.

Objectives:

To evaluate the extent, potential and current status of the sport fishery on the Anchor River by obtaining estimates of harvest, angling effort and escapement. To determine the structure of the various anadromous fish populations. To provide recommendations for further management of these species.

Introduction:

The sport fishery on the Kenai Peninsula is primarily

for salmon. During late May and early June the majority of the angling effort is concentrated on four small streams on the west side of the Kenai; Anchor River, Stariski Creek, Deep Creek and Ninilchik River. The fishery during this period is intensively directed on king salmon but as summer progresses and fishing pressure subsides, dolly varden, silver salmon and steelhead are taken.

The Anchor River (Figure 1) is undoubtedly one of the most heavily fished king salmon streams in South-central Alaska. Previous investigations by the Bureau of Sport Fisheries and Wildlife (Allin 1954, 1957) have described the area and provided information on the anadromous salmonids utilizing the stream. Concern over the status of declining anadromous fish stocks in these coastal streams led to the initiation of a creel census on the Anchor River during the summer of 1960.

Methods:

A creel census clerk was billeted on the Anchor River from May 7 to October 2 for collection of data. The creel census sampling design used was a modified latin square. Week-ends and week-days were treated separately due to expected differences in angling pressure. Each day was divided into four eight-hour periods with a four hour overlap. The sampling area was arbitrarily divided into five sub-areas with the starting point for each days census alternated according to the latin square sampling plan. Each angler was interviewed on the fishing grounds in a progressive manner. Information collected was entered on I B M Port-A-Punch Cards. King salmon, silver salmon, steelhead and dolly varden were weighed, measured and scale samples obtained.

After the creel census had terminated it was discovered that the data collected could not be analyzed statistically. It was possible, however, from the existing information to make reasonable gross estimates of harvest and effort by multiplying the eight hours censused each day by a factor of three.

King salmon escapement was determined by aerial and foot surveys.

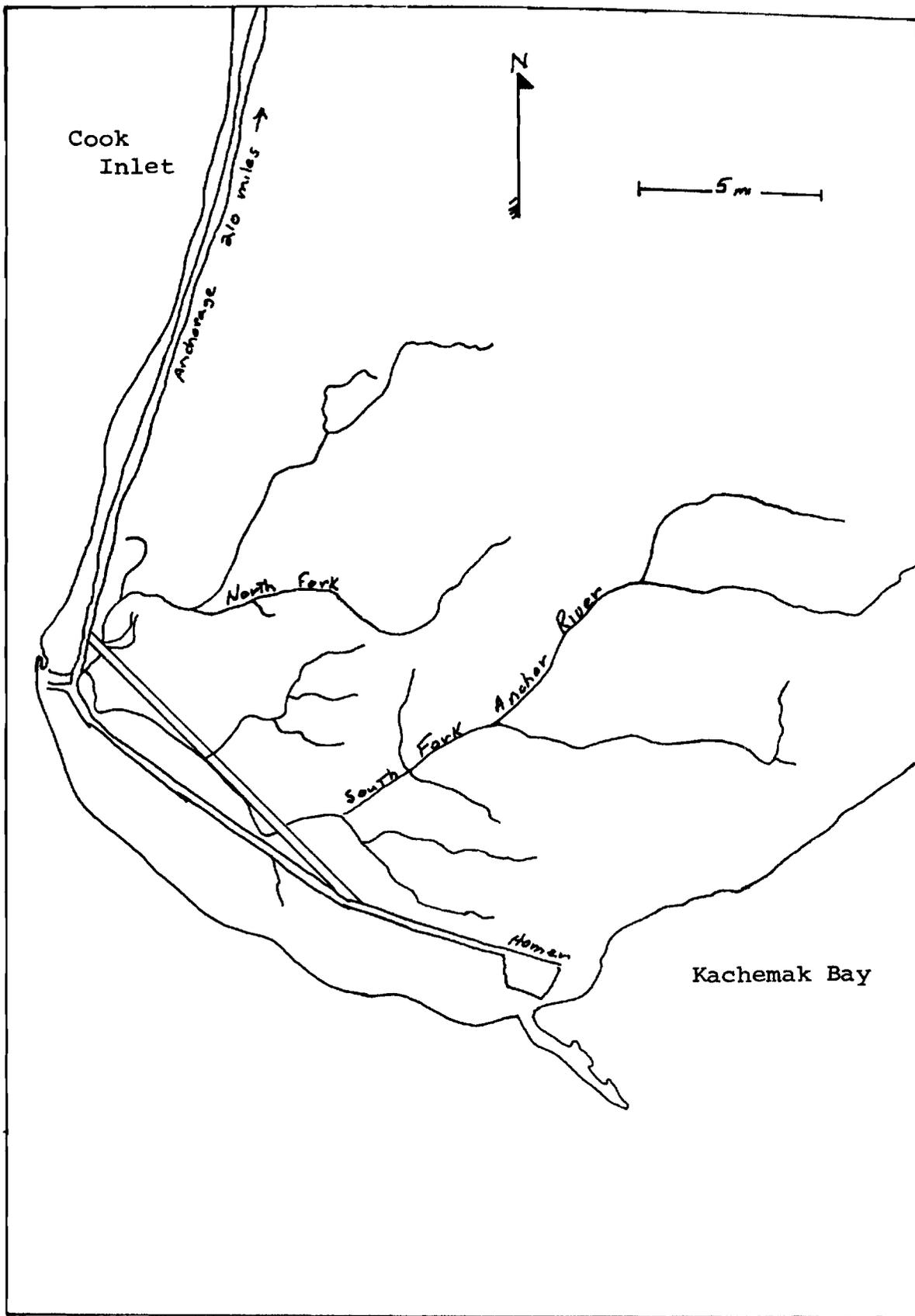


Figure 1. Anchor River and Vicinity

Results:

King salmon: Although the opening day of the salmon sport fishing season occurred on May 7, the first king salmon recorded in the catch was on May 22. Few fish were taken until the Memorial Day weekend when an estimated 140 king salmon were caught. During the second week in July king salmon fishing declined to almost nothing although an occasional fish was taken until mid-August. A total of 380 king salmon were observed in the anglers' creel with an estimated 1150 of these fish taken during the season. Allin (1954-1957) estimated 293 king salmon were taken from the Anchor River in 1954 and 335 in 1957.

Fishing effort paralleled the rise and fall of harvest peaks (Figure 2) during the king salmon season. From May 7 to July 14 a total of 1764 fishermen were contacted for an estimated 5300 man-days of effort. Allin reported an estimated 3000 man-days in 1954 and 5800 man-days in 1957 although these figures are for the entire fishing season.

King salmon escapement, based on aerial and foot surveys, was estimated at 1200 fish. This is considerably less than the weir counts of Allins in 1954 and 1957 when 2700 and 2400 king salmon were counted, respectively.

The sport fishery on the Anchor River can not be evaluated without examination of the Cook Inlet commercial fishery with the acknowledgement that the influence of commercial fishing on the Anchor River is unknown. The commercial king salmon harvest in Cook Inlet has declined gradually in spite of an increasing gear registration. (Figure 3.)

Age analysis was determined for 199 king salmon scales. The dominant age group was 5₂'s comprising 76.6 percent of the sample. Other age groups were as follows: 6₂'s, 11.5 percent; 4₂'s, 6.3 percent; 4₁'s, 2.5 percent; 3₂'s, 2.1 percent and 3₁'s, 1.0 percent. The average king salmon male weighed 19.7 pounds and the average female weighed 19.1 pounds. The size composition of 198 king salmon by sexes is presented in Figure 4 and the length-weight relationship of 157 king salmon by sexes is shown in Figure 5.

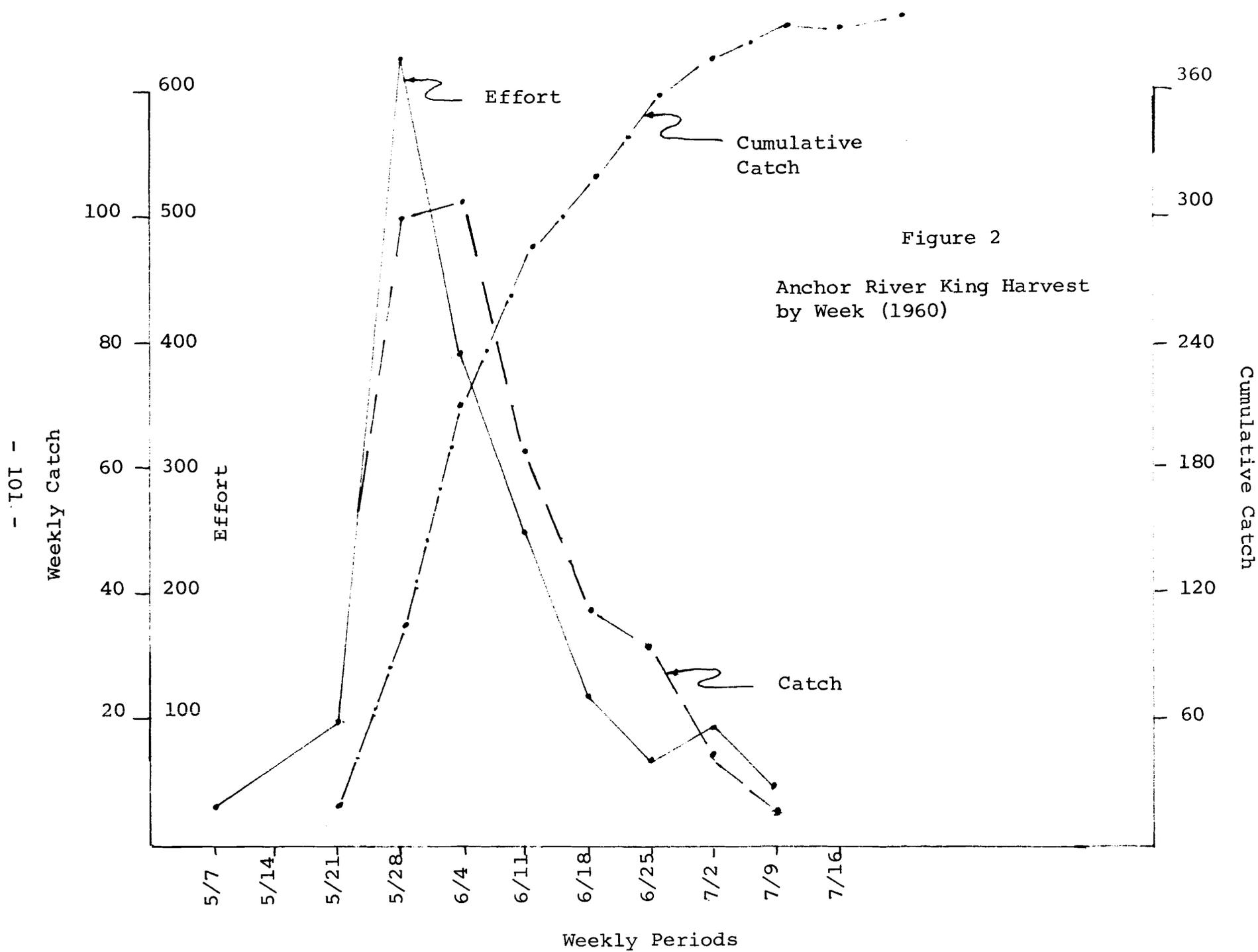
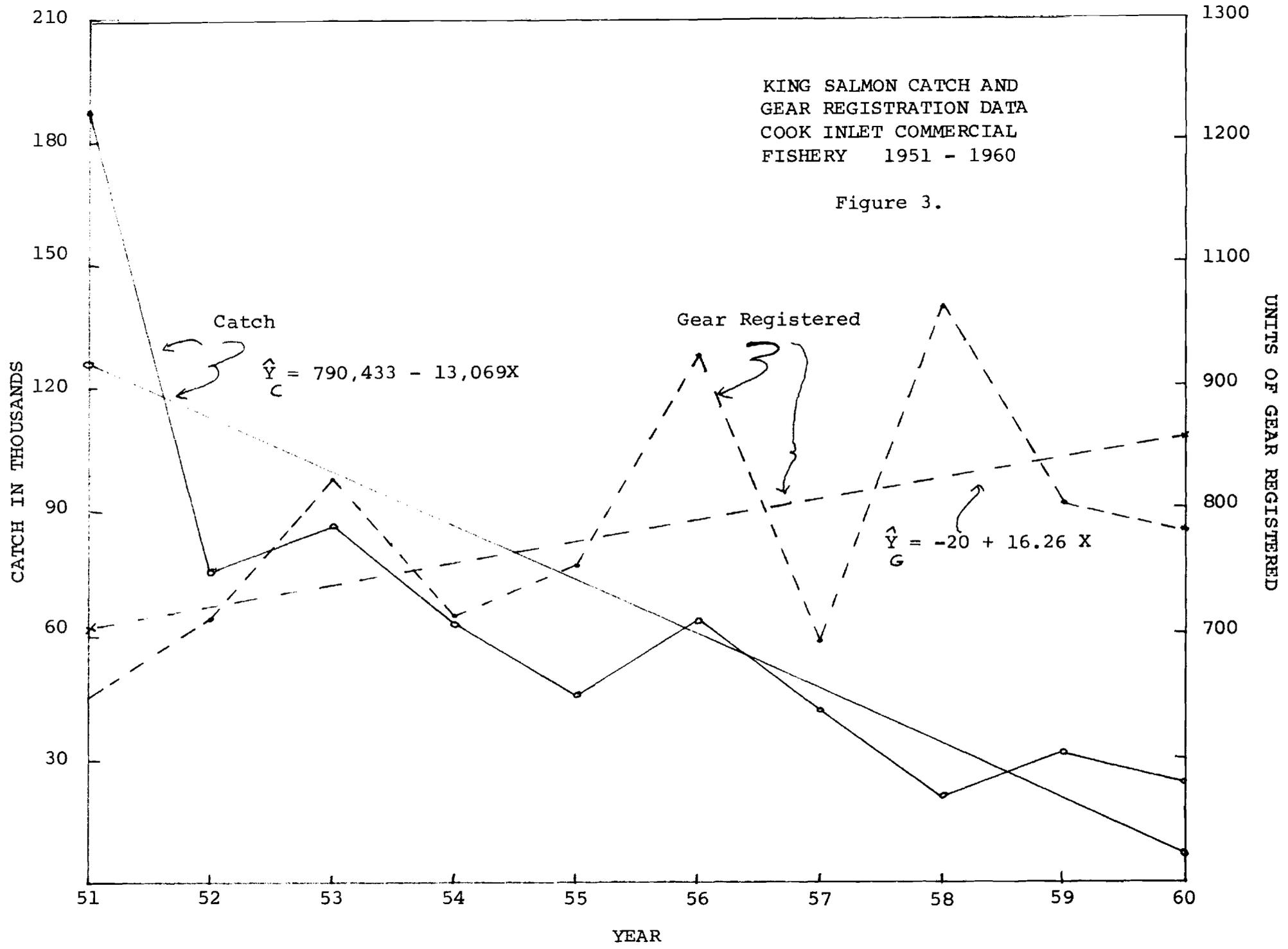


Figure 2

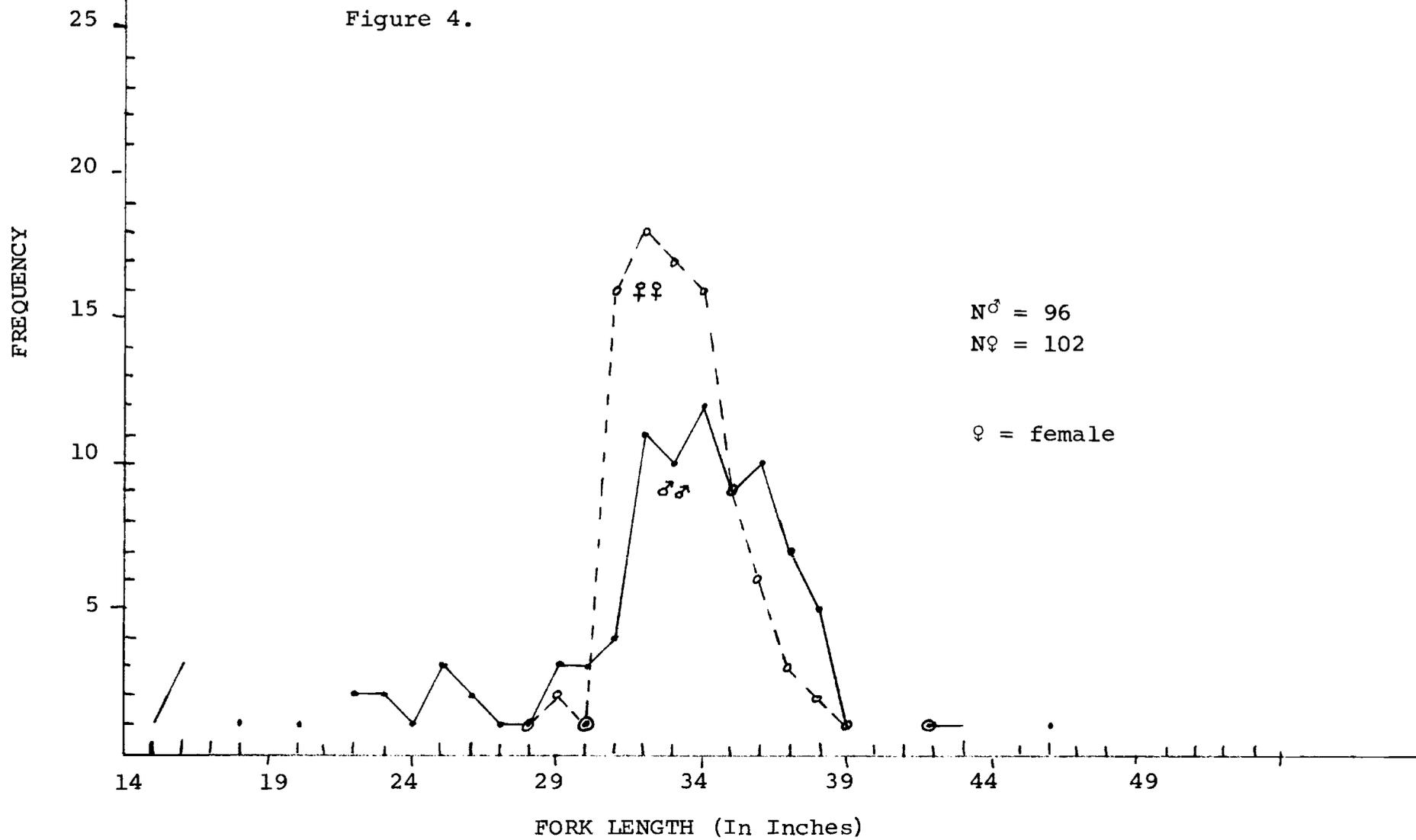
Anchor River King Harvest by Week (1960)



SIZE COMPOSITION
ANCHOR RIVER KING SALMON
1960
By Sexes

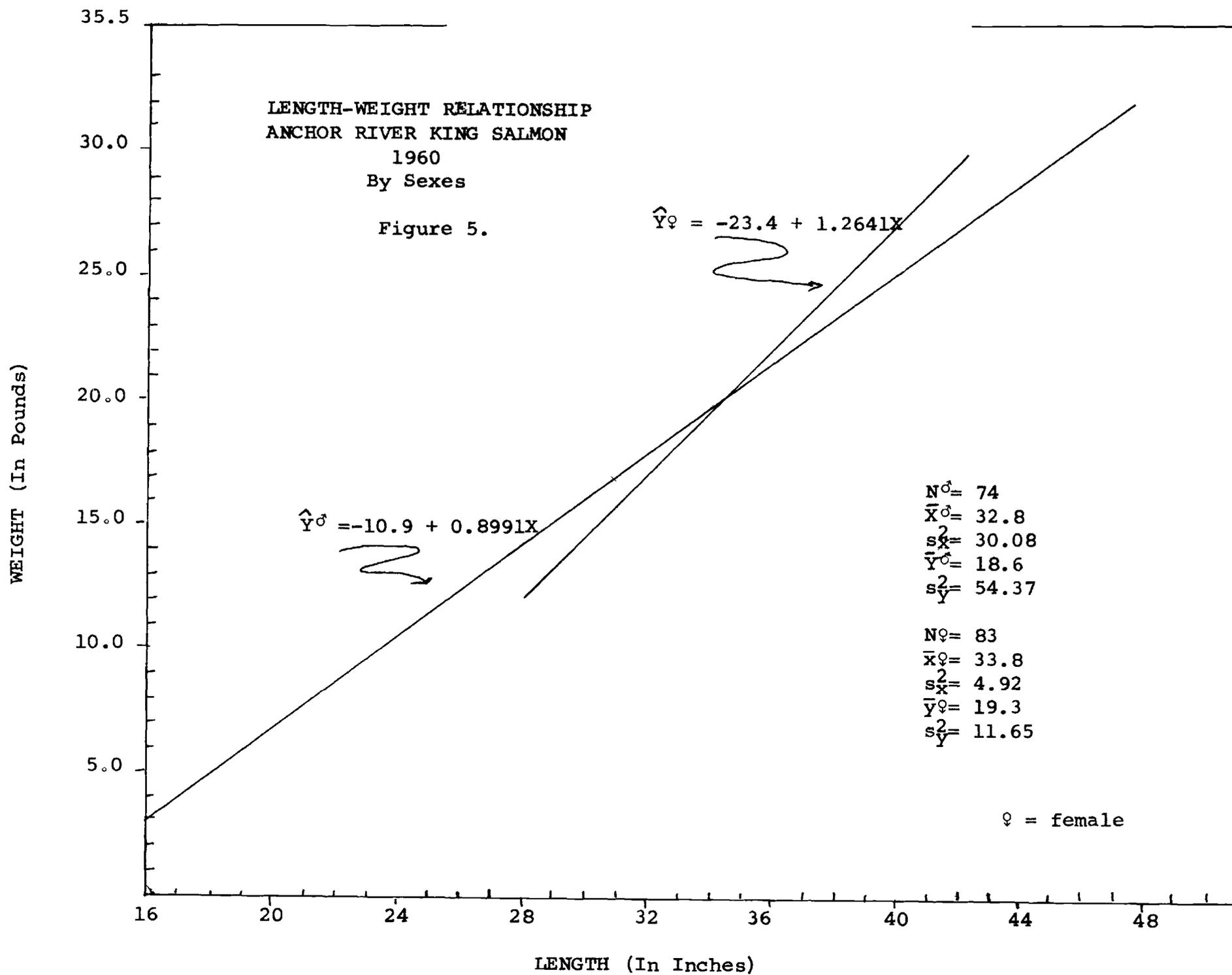
Figure 4.

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N♂ = 96
N♀ = 102

♀ = female



Silver salmon: Silver salmon were first recorded in the catch on July 31 while the peak of the harvest occurred during the middle of August. A total of 343 silver salmon were observed taken with an estimated 1000 caught during the season. Allin reported estimates of 90 silver salmon caught in 1954 and 395 in 1957. The observed weekly and cumulative catch are shown in Figure 6.

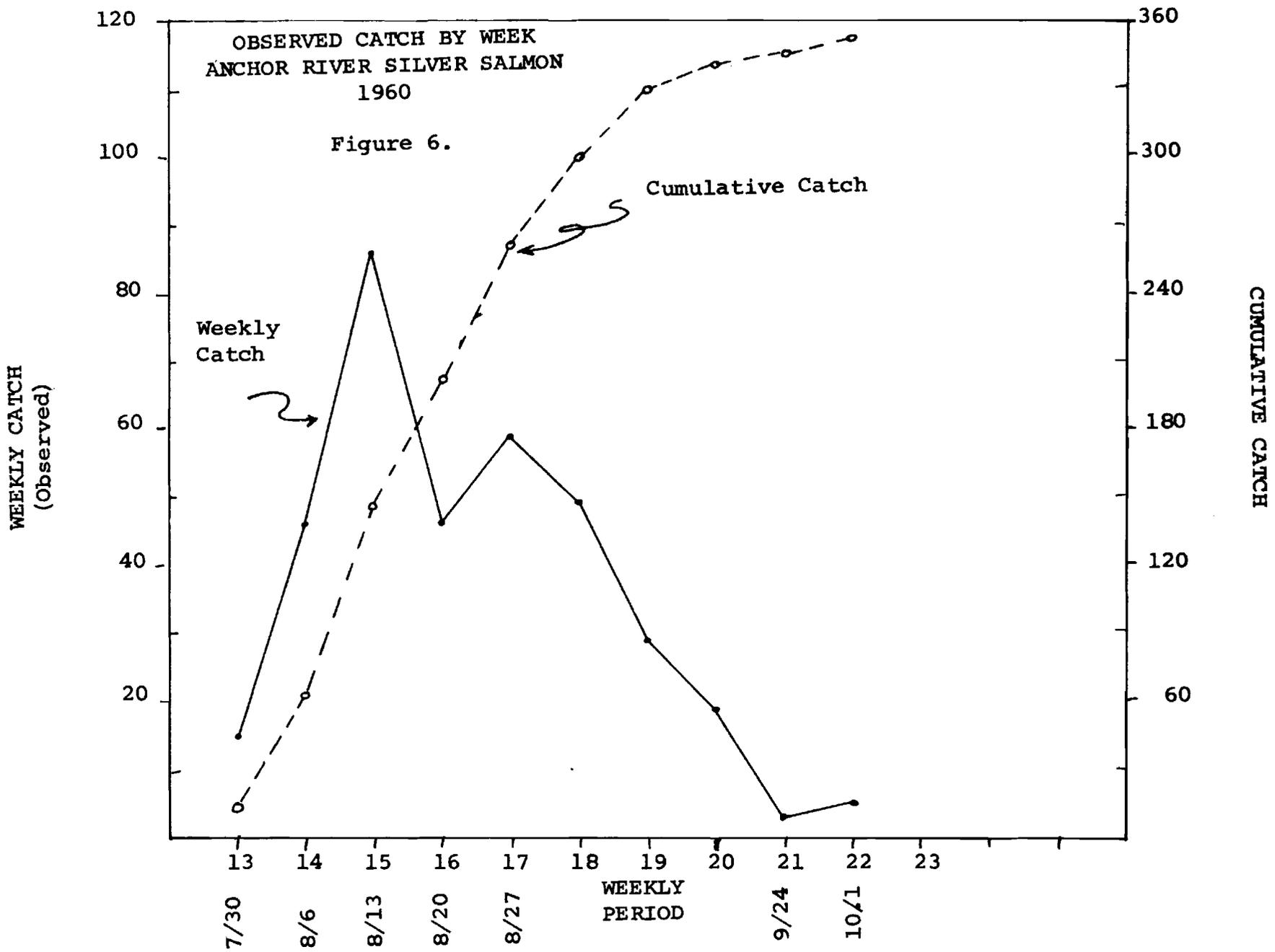
Sixty-four silver salmon were aged. The major age group was 4₂'s which constituted 84.4 percent while the only other age group 3₁'s comprised 15.6 percent. Size composition of 100 silver salmon by sexes is shown in Figure 7 with the 24.0 to 24.9 inch group most abundant. The length-weight relationship for 95 silver salmon is presented in Figure 8.

Steelhead: The first steelhead were taken by anglers on August 7 although the peak of the catch was not until the second week in September. Steelhead were still being caught when the creel census ended on October 2. During the census period a total of 137 steelhead were observed in the fishermen's creel with an estimated 400 taken. Allin estimated 247 steelhead were harvested in 1954 and 50 fish in 1957. The observed weekly and cumulative catch are shown in Figure 9. The length-weight relationship for 87 steelhead by sexes is shown in Figure 10 and the size composition of 90 steelhead by sexes is presented in Figure 11.

Dolly varden: Dolly varden first occurred in the catch on July 2. The harvest increased rapidly to a peak (240 fish) in the last week in July then declined gradually until another peak (210 fish) was attained during mid-September. The total observed catch was 1110 dolly varden while an estimated 3300 were taken during the duration of the creel census. Allin in 1957 estimated 400 were taken by anglers. The observed weekly and cumulative catch are shown in Figure 12. Size composition of 227 dolly varden (Figure 13) indicates the 12.0 to 12.9 inch length class is the most common.

References:

- Allin, Roger W.
1954 Stream Survey of Anchor River. U. S. Fish and Wildlife Service, Vol. 4, pp. 47-66.



SIZE COMPOSITION
ANCHOR RIVER SILVER SALMON
1960
By Sexes

Figure 7.

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FREQUENCY

20

15

10

5

21.0-21.9

22.0-22.9

23.0-23.9

24.0-24.9

25.0-25.9

26.0-26.9

27.0-27.9

28.0-28.9

29.0-29.9

LENGTH (By Inch Class)

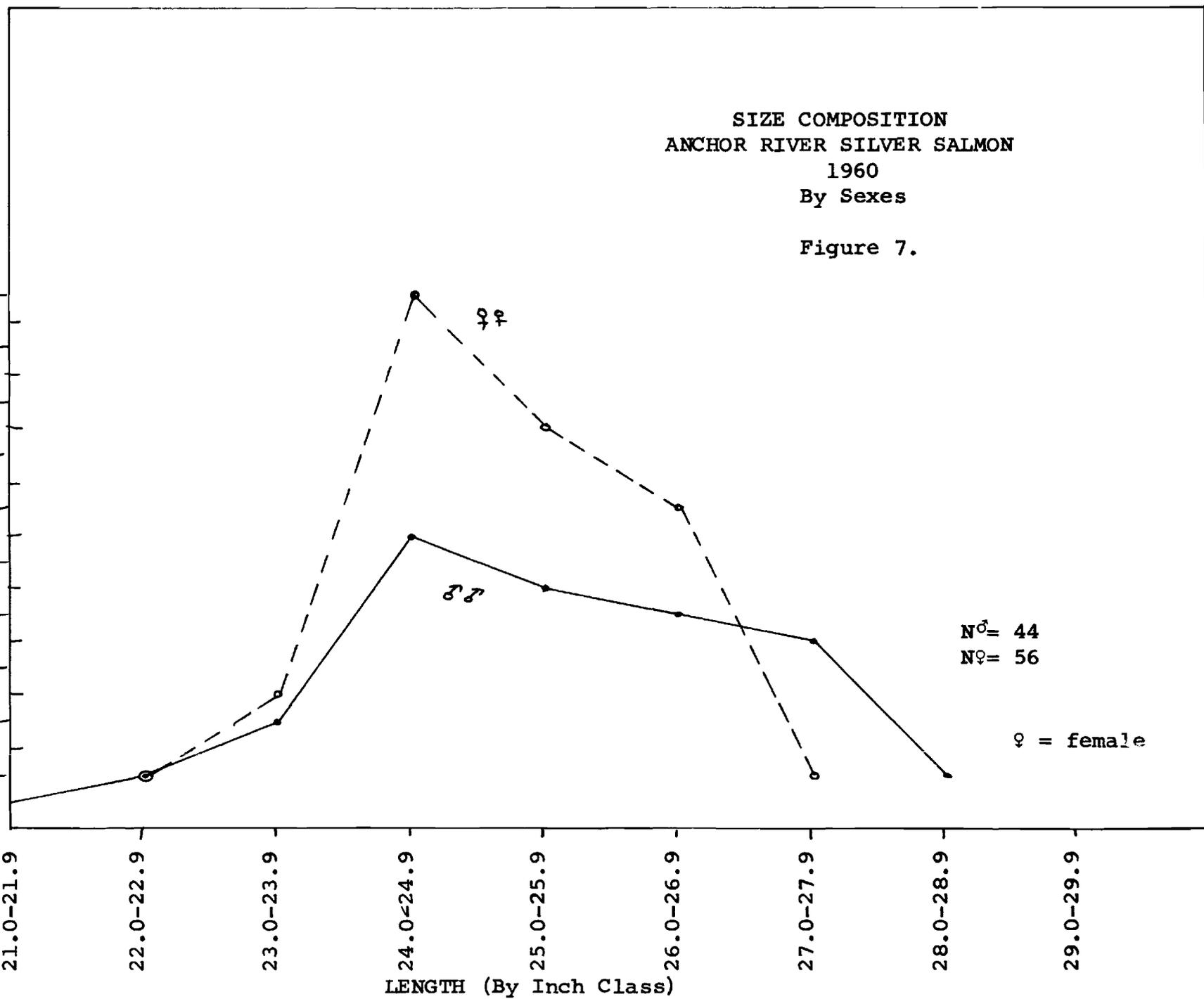
♀♀

♂♂

$N^{\sigma} = 44$

$N^{\text{♀}} = 56$

♀ = female



LENGTH-WEIGHT RELATIONSHIP
ANCHOR RIVER SILVER SALMON

1960

By Sexes

Figure 8.

$\hat{Y}^{\sigma} = -14.99 = 0.8960X$

$\hat{Y}^{\sigma}_{\varphi} = -13.11 = 0.8221X$

$N^{\sigma} = 43$
 $\bar{x}^{\sigma} = 25.2$
 $s_x^2 = 0.3729$
 $\bar{y}^{\sigma} = 7.59$
 $s_y^2 = 0.4054$

$N_{\varphi} = 52$
 $\bar{x}_{\varphi} = 24.85$
 $s_{x_{\varphi}}^2 = 125.17$
 $\bar{y}_{\varphi} = 7.32$
 $s_{y_{\varphi}}^2 = 1.52$

$\varphi = \text{female}$

WEIGHT (Pounds and tenths of pounds)

11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0

21 22 23 24 25 26 27 28 29 30

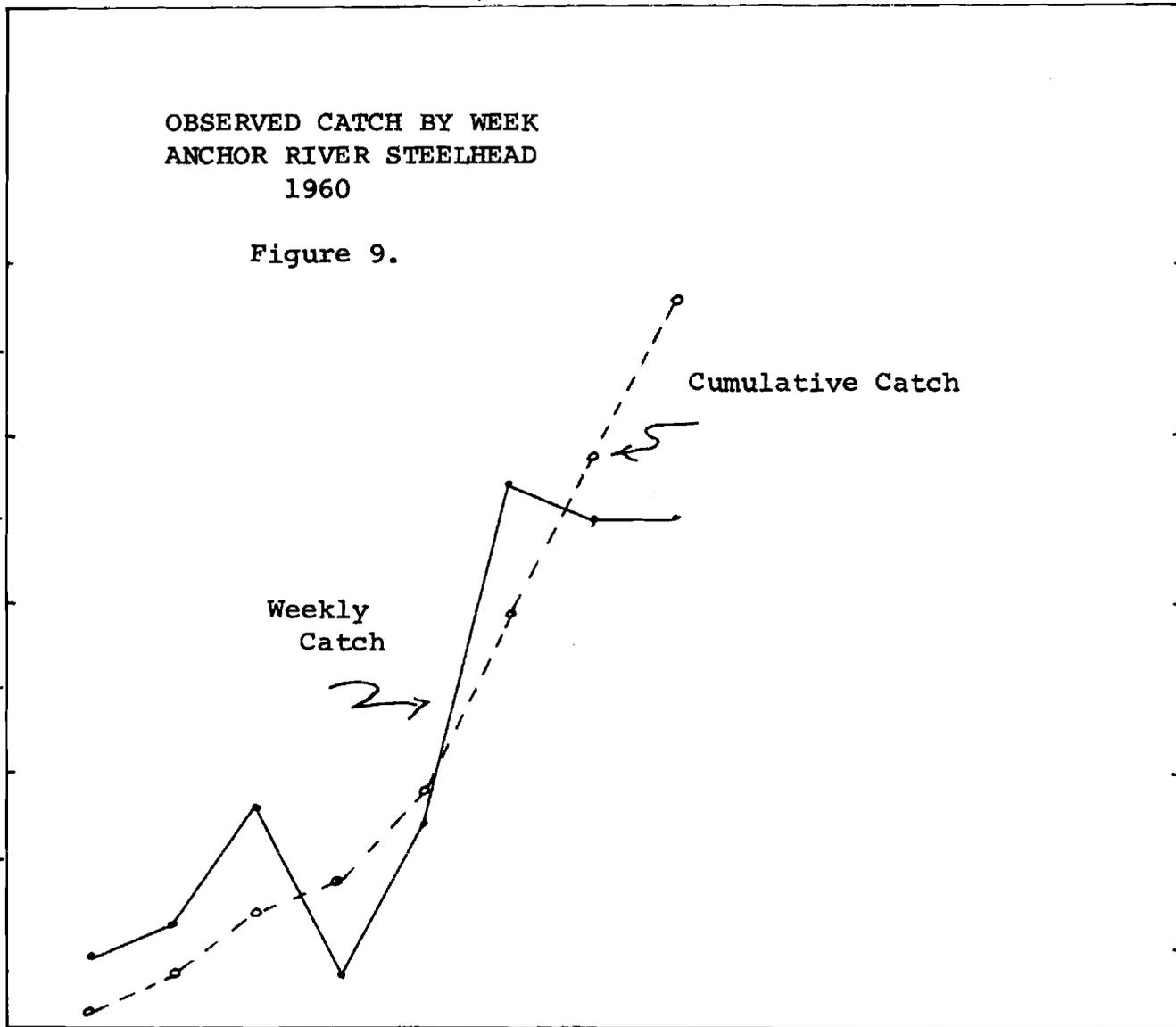
LENGTH (Inches and tenths of inches)

OBSERVED CATCH BY WEEK
ANCHOR RIVER STEELHEAD
1960

Figure 9.

WEEKLY CATCH (Observed)

40
30
20
10



Cumulative Catch

Weekly Catch

CUMULATIVE CATCH

150
120
90
60
30

8/6 8/13 8/20 8/27 9/3 9/19 9/24 10/1 10/8
WEEKLY PERIOD

WEIGHT (Pounds and Tenths of Pounds)

18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0

LENGTH-WEIGHT RELATIONSHIP
ANCHOR RIVER STEELHEAD

1960
By Sexes

Figure 10.

$\hat{Y}_{\sigma\sigma} = -20.34 = 1.0818X$



$\hat{Y}_{\varphi\varphi} = -13.53 = 0.8071X$



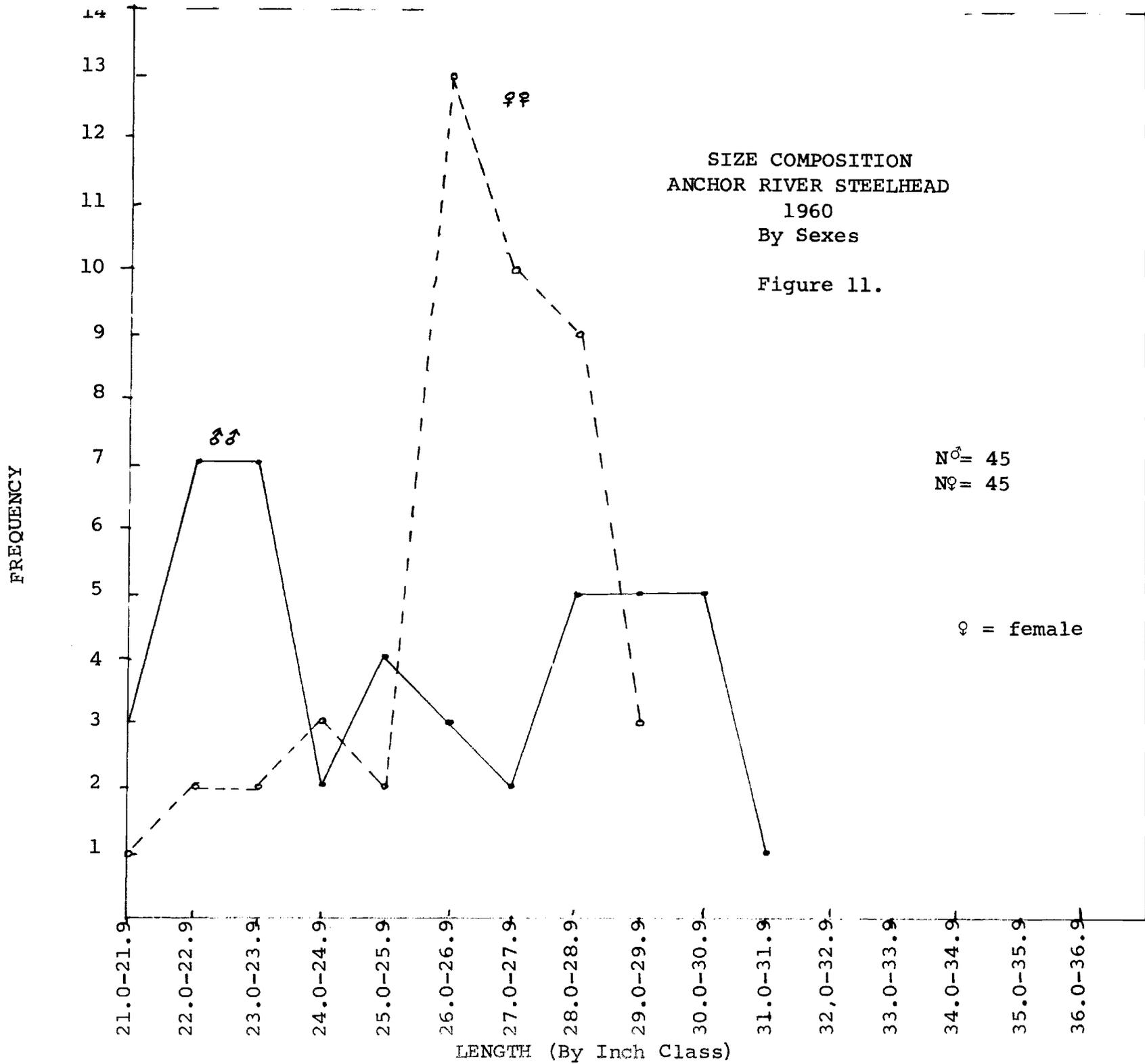
$N_{\sigma} = 41$
 $\bar{X}_{\sigma} = 26.1$
 $s_{x\sigma}^2 = 0.4790$
 $\bar{Y}_{\sigma} = 7.89$
 $s_{y\sigma}^2 = 0.5871$

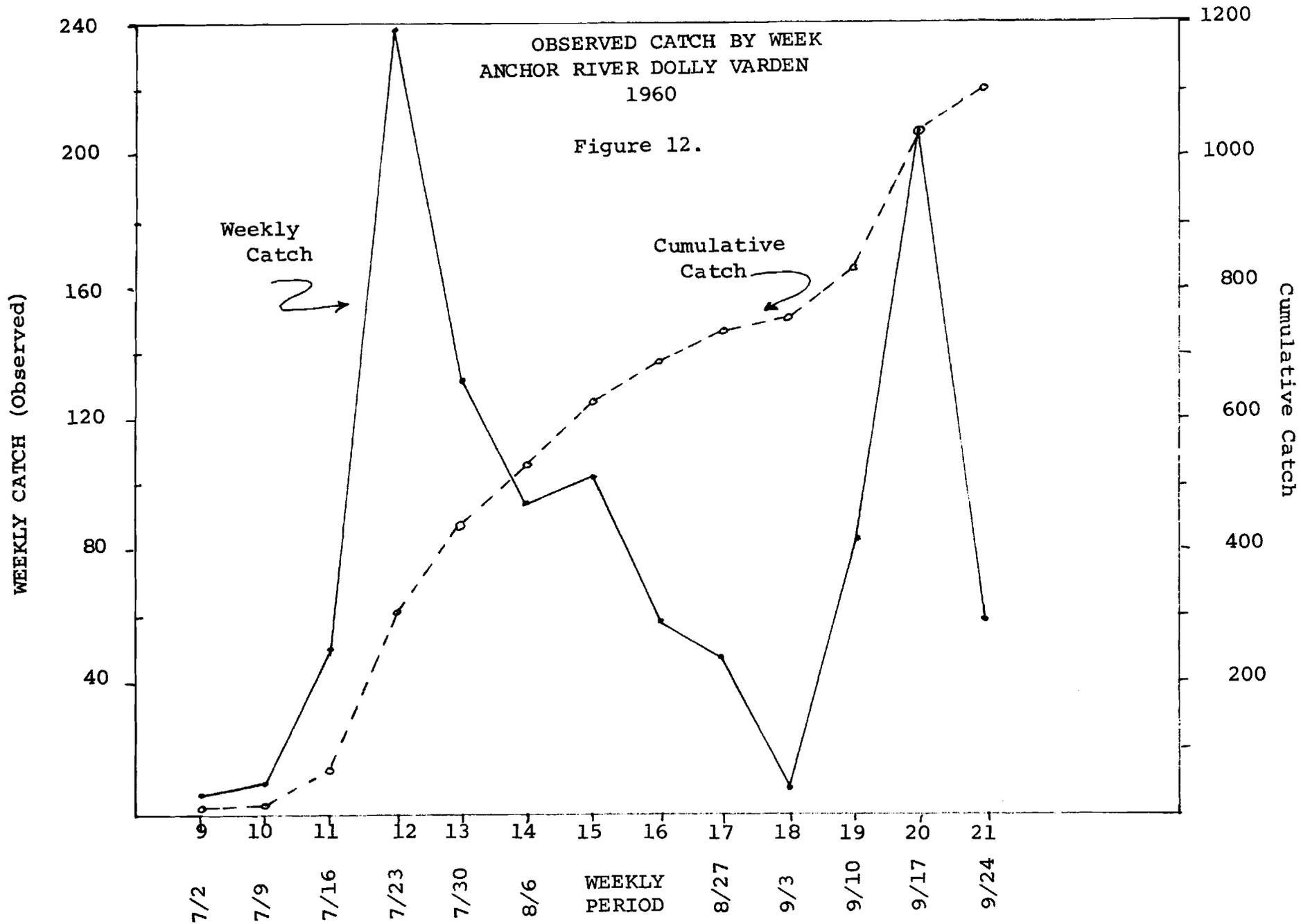
$N_{\varphi} = 46$
 $\bar{X}_{\varphi} = 26.5$
 $s_{x\varphi}^2 = 0.4963$
 $\bar{Y}_{\varphi} = 7.86$
 $s_{y\varphi}^2 = 0.6327$

$\varphi = \text{female}$

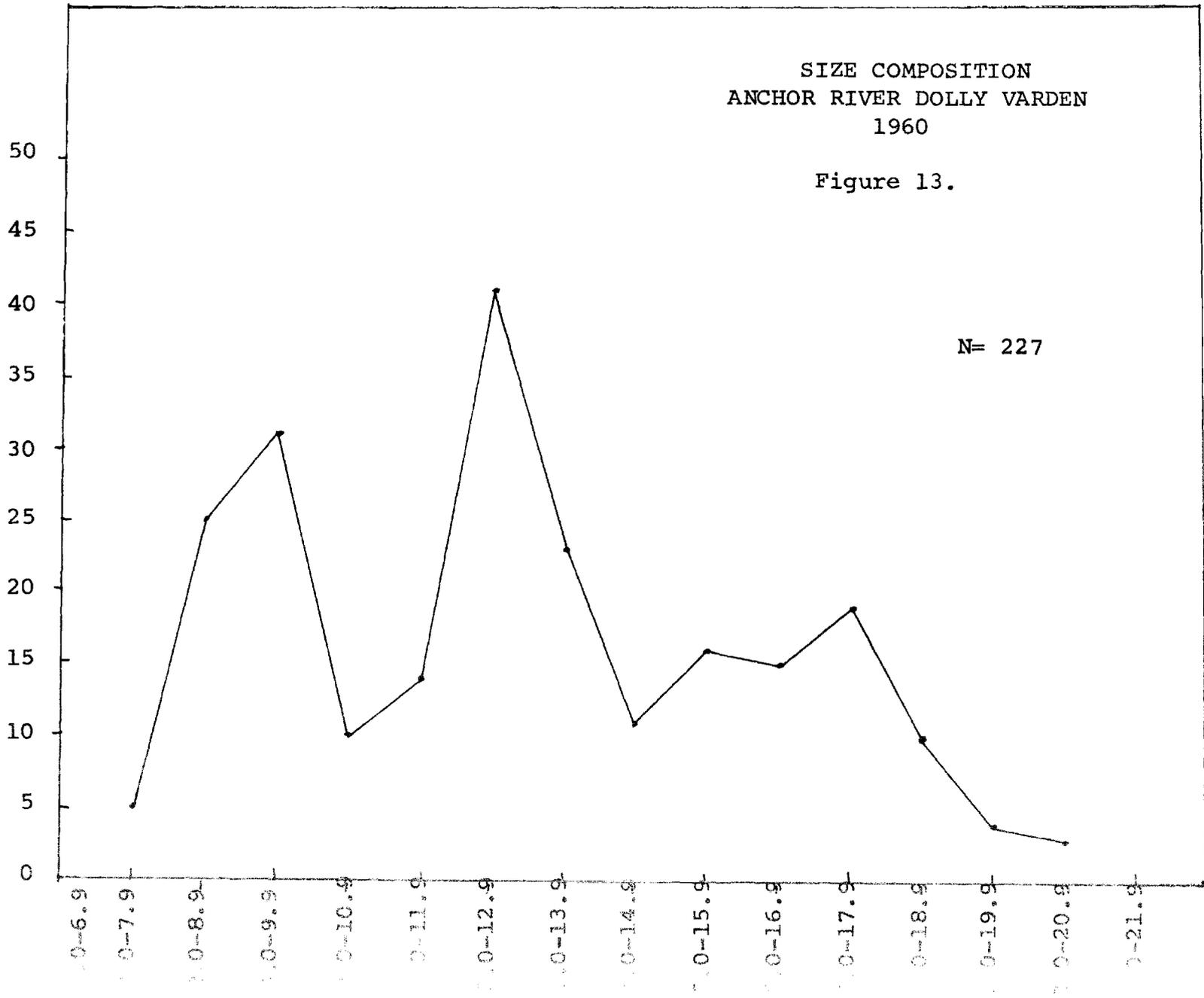
LENGTH (Inches and Tenths of Inches)

21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37





FREQUENCY



Allin, Roger W.

1957 Environmental Studies of the Steelhead of Alaska
as Related to their Spawning Habits, Age, Growth,
Fecundity, Migrations and Movements. U. S. Fish and
Wildlife Service, Vol. 7, No. 4, pp. 1-26.

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