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THE USE OF AVERAGE WEIGHT TO ESTIMATE THE AMOUNT OF INTERCEPTION OF NON-LOCAL SOCKEYE SALMON WITHIN SELECTED AREAS OF THE KODIAK MANAGEMENT AREA

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INTRODUCTION

Commercial salmon fishing occurs throughout the Kodiak Management Area (KMA) which encompasses the Kodiak Archipelago and the south side of the Alaska Peninsula from Cape Douglas south to Kilikok Rocks (Figure 1). Approximately 387 purse seine, 190 set gillnet and 36 beach seine limited entry permit holders are involved (K. Iverson, Alaska Department of Fish and Game, Juneau, personal communication). Seventy-six percent of the permit holders are Alaska residents, and 80% of those, reside on Kodiak Island including six Native villages.

For the KMA, salmon fishing time is regulated nearly entirely on local stock abundance. Most of the more than 450 salmon streams in the KMA are pink salmon producing systems. About 39 streams support sockeye runs. Some of the major sockeye systems are Karluk, Ayakulik, Frazer, and Upper Station. Run timing for KMA sockeye salmon begins in late May and ends in September. Peak abundance typically occurs in June and August. During July, most of the sockeye runs are in low abundance excluding the Ayakulik and Saltery stocks and a few others. Within the KMA, July fishing time is primarily regulated on local pink and early run chum abundance (ADF&G 1993). There are exceptions however, particularly on the southwest and southern ends of Kodiak Island where local sockeye run strength mainly dictates July fishing openings and closures.

Based on historic tagging studies and other work, Upper Cook Inlet (UCI) sockeye salmon enter KMA waters during July and subsequently contribute to the fishery (Bevan 1948, 1949; Barrett and Swanton 1992). In March 1990, the State Board of Fisheries established a management plan for the North Shelikof Strait that restricted the sockeye catch from 6-25 July. In this plan, it was recognized that an incidental harvest of UCI sockeye occurs while managing for local stocks (ADF&G 1993). At issue at the BOF 1994 March meeting in Anchorage will be further allocative concerns that an expanded interception may be occurring in other KMA fishing locations.

Quantifying the UCI sockeye harvest in the July KMA fisheries has been a persistent problem due to program limitations. In an attempt to provide a reasonable estimate of the UCI sockeye interception, this report focuses on using average sockeye weight from the July catch as an indicator of local and non-local stock composition, for the post 1982 years.

METHODS

Commercial catch data were compiled by the Commercial Fisheries Management and Development Division of the Alaska Department of Fish and Game (ADF&G). The data were based on computer tabulations originating from individual sales receipts (fish tickets) given to fishers at the time of delivery. Each ticket provided the name or number of the vessel from which the catch involved was taken, the permit holder's name, vessel license number, location and date of the catch, weight in pounds, and number of each species delivered. Fish tickets and computer generated summaries were edited by ADF&G Kodiak salmon management staff for errors and omissions. Further, the authors edited the sockeye weight data by not using any

average weight (per ticket) that was greater than 10 lbs or less than 3 lbs. This editing was done to ensure removal of gross entry errors.

We investigated the last 11 years (1983-1993, with 1989 excluded due to closure of the salmon fishery in Kodiak from the *Exxon Valdez* oil spill) of fish ticket data to estimate the yearly catch of non-local sockeye salmon harvested within the KMA. We excluded the North Shelikof Strait Management Area and Cape-Igvak Section because current management plans address non-local stock interception (ADF&G 1993). Additionally the Seven Rivers Section, Northeast Kodiak District, Karluk Section and Sturgeon Section; were not used due to the relatively small catch and strong local stock influence. We thus investigated catches for the following KMA sections:

Central	Halibut Bay
Inner and Outer Ayakulik	Cape Alitak
Sitkalidak	Ugak
Katmai	Alinchak

The Central Section of the KMA was split by: statistical areas with the prefix 253 (north Central Section) and statistical areas with the prefix 254 (south Central Section). This was done because it is a large section, and thus we suspected a potential lack of homogeneity, with regards to non-local sockeye interception, within this section. We, also, combined Katmai and Alinchak Sections due to possible low catches in these areas.

We excluded some areas during some years from analyses, founded upon two criteria. First, if the difference between the average sockeye weight in the UCI drift and set gillnet catch and the estimated Kodiak local stock average weight (from methods 1 and 2, see below) was not greater than 3/4 lbs, no estimates were made. This was done to minimize the effect of potential gear selectivity biases between UCI and KMA. Secondly, if the difference between the observed (actual catch) and estimated local (methods 1 & 2 see below) average weight in July was not greater than 1/2 lbs, then no further estimates were made for that year. This was to avoid unreasonable results, such as negative proportions.

To estimate the proportion of non-local sockeye salmon in the commercial catch during the intercept time period, the following equation was used:

$$\hat{p}_{NL} = \frac{\mu_{IP} - \hat{\mu}_{Kod}}{\hat{\mu}_{NL} - \hat{\mu}_{Kod}}, \qquad (1)$$

where:

$\hat{p}_{NL}$ = the estimated proportion of non-local salmon in the sockeye catch,
μ_{IP} = the average weight of sockeye salmon during the intercept period,
$\hat{\mu}_{NL}$ = the estimated average weight of non-local sockeye salmon during the intercept period,
$\hat{\mu}_{Kod}$ = the estimated average weight of local (Kodiak) sockeye salmon during the intercept period.

To determine the proportion of non-local sockeye caught within specific statistical sections, the average weight of sockeye caught during the intercept period was considered a known quantity from the fish ticket data. It was necessary, however, to estimate two parameters, average weight for non-local sockeye, and average weight for local sockeye.

The average weight during the intercept period was estimated as the average weight of sockeye caught between June 30 and August 1. This was the total weight caught divided by the total number caught. The entire month of July was used due to four reasons. First, the intercept period varies possibly between years and Kodiak fishing sections, but occurs within July for all sections. The second reason was establishing a local weight lent itself to a month interval, i.e. a comparison between June versus July versus August. The third reason was a smaller time interval might not yield a sufficient sample size. Finally, annual comparisons were desired however fishing periods vary yearly, but vary less when comparing a month between two years than when comparing a week between two years.

Two procedures were employed for estimating the non-local average sockeye weights, from the fish tickets. The first procedure estimated the average weight of non-local sockeye by combining both the set gillnet and drift gillnet catches of UCI. The second procedure used only the drift gillnet catches of UCI. We used UCI sockeye caught between July 5 and August 8, a 5 week period, during which most of the UCI run occurs. For both procedures, the non-local average weight was determined by dividing the total weight caught (between July 5 and August 8) by the total number caught.

The final estimate, the local average weight of sockeye salmon ($\hat{\mu}_{Kod}$), was the most difficult to determine. The estimated average weight of local sockeye salmon caught during July, both island wide and within areas, was estimated using two different methods. For the first method (m1) we divided combined June and August catch weights by the catch number:

$$\hat{\mu}_{Kod}=AVG_{m1}=\frac{WT_{Jun}+WT_{Aug}}{n_{Jun}+n_{Aug}}, \qquad (2)$$

where:

WT_{Jun} = the June total catch in pounds,
WT_{Aug} = the August total catch in pounds,
n_{Jun} = the June total number caught,
n_{Aug} = the August total number caught,
AVG_{m1} = the estimated average weight for July, using method 1.

The second method (m2), we used the estimated average of the average June and August weights. Mathematically it becomes:

$$\hat{\mu}_{Kod}=AVG_{m2}=\frac{AVG_{Jun}+AVG_{Aug}}{2}, \qquad (3)$$

where:

AVG_{Jun} = the average weight of sockeye salmon caught in June (WT_{Jun}/n_{Jun}),
AVG_{Aug} = the average weight of sockeye salmon caught in August (WT_{Aug}/n_{Aug}),
AVG_{m2} = the estimated average weight for July.

However, an estimate using method 2 was not done for all years, we excluded method 2 for years with only June or August catch data.

To estimate the variance and confidence intervals for each proportion estimate, we used the formula for the variance of the sum of two random variables, and the formula for the variance of the quotient of two random variables. For the sum of two random variables the variance is calculated as (Mood et al. 1974):

$$var[X \pm Y] = var[X] + var[Y] \pm 2cov[X, Y] . \quad (4)$$

For the quotient of two random variables the Taylor series approximation ("delta method") was used (Mood et al. 1974):

$$var\left[\frac{X}{Y}\right] \approx \left(\frac{\mu_X}{\mu_Y}\right)^2 \left(\frac{var[X]}{\mu_X^2} + \frac{var[Y]}{\mu_Y^2} - \frac{2cov[X, Y]}{\mu_X \mu_Y}\right). \quad (5)$$

For our proportion estimate the variance was estimated as:

$$Var(\hat{p}_{NL}) = var\left(\frac{\mu_{IP} - \hat{\mu}_{Kod}}{\hat{\mu}_{NL} - \hat{\mu}_{Kod}}\right) \approx \frac{1}{(\hat{\mu}_{NL} - \hat{\mu}_{Kod})^4}\left[(\hat{\mu}_{NL} - \mu_{IP})^2 S^2_{\hat{\mu}_{Kod}} + (\mu_{IP} - \hat{\mu}_{Kod})^2 S^2_{\hat{\mu}_{NL}}\right], \quad (6)$$

where, within a specific area:

μ_{IP} = the average weight of all sockeye caught in the intercept period (July),
$\hat{\mu}_{Kod}$ = the estimated average weight of Kodiak sockeye salmon in July (estimated by either of the two methods as noted above),
$\hat{\mu}_{NL}$ = the estimated average weight of UCI sockeye salmon, as given in fish tickets caught between July and August,
$S^2_{\hat{\mu}Kod}$ = the estimated variance of the estimated average weight of Kodiak sockeye salmon in July,
$S^2_{\hat{\mu}NL}$ = the estimated variance of the estimated average weight of UCI sockeye salmon caught between July and August.

The variance for the sample average weight of non-local sockeye, $S^2_{\hat{\mu}NL}$, was estimated one of two ways. For the years 1987 and 1988, sockeye samples were taken from the UCI set and drift

gillnet fishery, in which weight of individual fish was measured. From these weights the sample variance of weight, S^2_{NL}, was computed and the variance of the estimated average weight was estimated by (for 1987 and 1988 only):

$$S^2_{\hat{\mu}_{NL}} = \frac{S^2_{NL}}{n_{NL}}, \tag{7}$$

where:

n_{NL} = the total catch number from UCI (either drift and set gillnet combined or drift gillnet).

In years when no individual weights were taken from the UCI fishery, a uniform distribution was used to estimate the variance of non-local weight, as described below.

For Kodiak, no individual sockeye weight data exists, therefore $S^2_{\hat{\mu}Kod}$ was estimated in one of four different ways. In years and areas for which length information was available, an allometric equation was used to transform the lengths to weights. The parameters for the allometric equation were estimated from the UCI sockeye lengths and weights, then adjusted for Kodiak sockeye salmon. Thus, the variance for the average weight using method 1 of sockeye salmon was estimated by:

$$S^2_{\hat{\mu}_{Kod}} = \frac{S^2_{Kod}}{n_{Kod}}, \tag{8}$$

where:

S^2_{Kod} = the sample variance of sockeye weight estimated from the allometric transform,
n_{Kod} = the total number of sockeye salmon caught in June and August.

For areas and years when no length or weight data was collected from the fishery, the variance was estimated by assuming that the fish ticket average weights represented a uniform distribution of the individual weights of the sockeye run. Using a uniform distribution to model sockeye weight will tend to overestimate the true variance of weight; hence, confidence intervals for proportion estimates will tend to be conservative, in that they will be broader than necessary for the stated confidence level. So, the weight variance was estimated by (Mood et al. 1974):

$$S^2_{Kod} = \frac{(AVGWT_{max} - AVGWT_{min})^2}{12}, \tag{9}$$

where:

$AVGWT_{max}$ = the largest average weight,
$AVGWT_{min}$ = the smallest average weight.

With this variance, the average weight variance ($S^2_{\hat{\mu}Kod}$) was calculated as in equation (8).

To determine the variance of the average weight estimate from the second method, June and August variances were estimated as in the allometric equation or equation (9) (depending on the availability of individual sockeye length information). From these variance estimates the variance for the July Kodiak average weight was calculated as:

$$S^2_{\hat{\mu}_{Kod}} = \frac{S^2_{Jun}}{4n_{Jun}} + \frac{S^2_{Aug}}{4n_{Aug}}, \qquad (10)$$

where:

S^2_{Jun} = the average weight variance in June with either the length-weight or uniform (equation (9)) variance estimators,

S^2_{Aug} = the average weight variance in August with either the length-weight or a uniform (equation (9)) variance estimators.

Confidence limits for the proportion of non-local sockeye caught in July were estimated by:

$$\hat{p}_{NL} \pm 1.96\sqrt{var(\hat{p}_{NL})}, \qquad (11)$$

where:

$\hat{p}_{NL}$ = the proportion of sockeye catch estimated to be non-local salmon within a specific area.

It is important to note that the reliability of our proportion estimates rests on the validity of the following four assumptions:

1. Average weights from the June and August Kodiak fishery can be used to approximate the July average weights of local (Kodiak) sockeye salmon, or more specifically, July average weight of local sockeye salmon will be between (or equal to) the Kodiak June and August average weights.

2. Species weight and count recorded on fish tickets are accurate, or at least no systematic bias in the data occurs.

3. Only UCI and Kodiak fish are present in the July catch of sockeye salmon in the intercept area, while June and August sockeye salmon are strictly of Kodiak origin.

4. Average weight of fish caught in UCI using set and drift gillnets is the same as the average weight of UCI bound sockeye salmon caught off Kodiak using seine gear.

For assumptions 1, 3 and 4, it should be noted that we are dealing with an average to represent the overall average weight of the local and non-local sockeye. We are not, however, classifying

individual fish as to either "local" or "non-local"; rather our procedure estimates the local and non-local contribution to the catch based on the characteristics of the overall catch. Under the assumptions stated above, variability in individual weights of sockeye salmon can affect the precision of our estimates but will have a negligible affect on biasing our estimates The average weight should represent the tendency of the sockeye for a specific area and year.

To estimate the number of non-local sockeye salmon in the catch during the intercept period, we simply multiplied the total number of sockeye salmon caught (for a specific area) during July by the estimated proportion of non-local sockeye salmon. The local component was estimated by the total catch minus the non-local catch estimate. To determine the variance of these estimates, the square of the total number caught during July was multiplied by the estimated proportion variance. The lower and upper bounds of the confidence interval for the proportion estimate was multiplied by the total number caught during July to obtain the estimated confidence interval for the non-local sockeye catch.

RESULTS

In general, if the difference between UCI and the Kodiak average weights was less than 3/4 lbs (first criteria for exclusion), then the difference between the observed and estimated average weight in July was less than 1/2 lbs (second criteria for exclusion). For all areas considered within the KMA (Central (253*), Central (254*), Halibut Bay, Inner and Outer Ayakulik, Cape Alitak, Sitkalidak, Ugak, and Katmai/Alinchak Sections), estimates were not computed for 1984, 1986 and 1991. With but one exception (Ugak), estimates were computed for all areas in 1988 and 1992 (Tables 1-4).

The estimated proportions, variances and confidence intervals varied extensively between years and areas (Appendix A). The non-local proportion estimate of the catch ranged from 0.29 to 5.76, with a proportion of 5.76 being associated with a very small sample size (2 landings, 8 fish). There were a total of 14 out of 104 proportion estimates that were greater than one; such estimates were confined to only three areas (Central (253*), Sitkalidak and Katmai/Alinchak Sections). These proportion estimates, greater than one, occur when the July catch average weight within a selected area of the KMA is greater than the estimated non-local average weight for that year. In 1987, there were 6 of the 14 proportion estimates greater than one, which may be attributed to UCI having many large sockeye salmon late in the season (Figure 2). Variances were even more variable than the proportions, with a range of 1.17×10^{-7} to 232.0, however most variances were less than 10^{-4}.

The Central (253*) and Central (254*) Sections estimated proportions were different for all years, with the greatest proportion difference in 1987 of 0.80. Furthermore, in all years, except 1992, Central (253*) had a higher estimated proportion of non-local sockeye salmon than Central (254*).

As would be expected, the estimated number of sockeye salmon, and the associated variances and confidence intervals also varied extensively (Tables 3-4; Figures 3-12; Appendix B). For the individual areas, the number of non-local sockeye salmon caught ranged from 600 to

346,300. With the areas combined, the number of non-local sockeye salmon caught ranged from 600 to 1,098,500. The estimated harvest of non-local sockeye salmon was highest in the 1992 Kodiak fishery (1,041,600-1,098,500), followed by 1988 (381,700-402,400) and 1987 (216,000-229,300). Of the years for which estimates were made, the lowest estimated harvest of non-local sockeye salmon by the Kodiak fishery was in 1985, with an estimated catch of 600 to 700. However, in 1983, the year with the second lowest estimated non-local harvest, the estimated non-local harvest was between 74,100 and 80,600.

As well as by year, the estimated non-local catch varies within the intercept period (Figures 13-40). Furthermore, there seems to be a spurious trend that when the average weight between periods increases so does the catch for that period. There are two general trends in the average weights, within the intercept period: after the initial increase in average weights, the decrease occurs in either a gradual or abrupt manner.

The relationship between total UCI run and the estimated Kodiak catch of UCI sockeye salmon appears to be reasonably, positively correlated (Table 5, Figures 41-43), assuming that industry knowledge of where and how to catch UCI migrants in the KMA changed dramatically following the 1987 season. In the pre-1988 years, the estimated exploitation rate of UCI stocks was fairly constant and less than 2% of the total UCI run. Post-1987, KMA fishers averaged a higher percent harvest of the total UCI run and a greater percent harvest on the larger than the smaller UCI runs. As an example of the latter, in 1992 the estimated harvest was about 9.3% of the 10.5 million UCI run, while in 1990 about 1.6% of the total 4.9 million run was caught. Annual variations in the total number of fishing hours for Kodiak and Afognak Islands does not account for the differences between the pre-1988 and post-1987 estimated UCI sockeye interception rates (D. Prokopowich, Alaska Department of Fish and Game, Kodiak, personal communication). For example in 1987, fishing time was about 200 hours and yet the estimated UCI interception was about 2% of the total UCI run. In 1992, similar fishing time resulted in an estimated 9.3% harvest rate.

DISCUSSION

One of the most distinguishing characteristics of the proportion estimates, are the small variances and narrow confidence intervals for most areas and years. The small variances and narrow confidence intervals for both the proportion and number estimates of non-local sockeye harvested, can be attributed to the sample sizes, which ranged from 10,000 to 450,000 fish. Therefore, even with conservative estimators for the sample variances of sockeye weight, the variances and confidence intervals for the proportions and numbers are relatively small.

We had a problem explaining proportion estimates which have ridiculous values, i.e. proportions which are greater than one. As noted above, the confidence intervals are narrow, so in most circumstances when the proportion is greater than one, so is the lower confidence interval. We do not believe this problem is caused directly from the calculations but in the assumptions of the model itself, as listed here:

1. Average weights from the June and August Kodiak fishery can be used to approximate the July average weights of local (Kodiak) sockeye salmon, or more specifically, July average weight of local sockeye salmon will be between (or equal to) the Kodiak June and August average weights.

2. Species weight and count recorded on fish tickets are accurate, or at least no systematic bias in the data occurs.

3. Only UCI and Kodiak fish are present in the July catch of sockeye salmon in the intercept area, while June and August sockeye salmon are strictly of Kodiak origin.

4. Average weight of fish caught in UCI using set and drift gillnets is the same as the average weight of UCI bound sockeye salmon caught off Kodiak using seine gear.

We feel the first assumption will have little affect on the overall outcome of this model, as can be seen by the similar proportions using the two different methods (Appendix A). We have done the estimations in two ways to see how much variability there was between the two methods and rarely did the proportion estimates vary by greater than 0.05 (Appendix A). This does not, however, test how good the estimate is or any assumptions. Furthermore, in analyses not presented in this report, we found no evidence from other terminal fisheries that this assumption was unreasonable.

We also believe the second assumption is reasonable. Unless a concerted effort were made to over or under-estimate the number of fish, the sheer number of landings would tend to smooth minor errors per landing. Though we do not feel that all individual fish tickets are 100% accurate, the average weight estimates from such large numbers of fish tickets will have high precision. Also, for the Kodiak area in 1993, fish ticket and average sockeye weights were found to have no measurable bias (Barrett et. al, 1994).

Occasionally, average sockeye weight for sockeye salmon in the July catch within certain KMA sections (Central (253*); and Sitkalidak 1987) was greater than that of the UCI drift gillnet average weight, which led to proportion estimates greater than one. One explanation is that assumption three was not entirely correct and there may have been non-local stocks, other than UCI fish, contributing to the July catch. Certainly, it is reasonable to expect that some Chignik sockeye salmon may have contributed based on earlier tagging work reported by Bevan (1948, 1949). Also, Chignik sockeye salmon tend to be larger than UCI and Kodiak sockeye salmon (e.g. 7.5 lbs for Chignik verses 6.7 lbs for UCI and 5.7 lbs for Kodiak in 1987). The inclusion of a minor component of Chignik sockeye salmon in the July Kodiak catch would be difficult to assess since no stock composition is known and this methodology cannot address a three stock configuration.

Another explanation for the unreasonable proportions (>1), is gear selectivity. While seines tend to be a non-selective toward fish size (Roos 1957), gillnets can be highly selective. According to Todd and Larkin (1971), a 4 7/8 inch mesh gillnet has a maximum efficiency for catching 550 mm length (approximately 5.0 lbs) sockeye salmon, and a 5 1/4 inch mesh net for 590 mm length (approximately 5.8 lbs) fish. Since the mesh size of UCI gillnets most closely approximate 5 1/4 inch mesh, it could be expected that the average weight of sockeye caught

in UCI would underestimate the true average weight when the average weight was greater than 5.8 lbs. Therefore by using average weights from UCI gillnet caught fish to describe average fish weight for the UCI run, the proportion estimate will tend to over-estimate the non-local component within the KMA when the UCI average weight is greater than 5.8 lbs.

We feel that errors in the last two assumptions are undistinguishable. The error in the estimate of non-local average weight can be either due to gear selectivity or stock composition. However, in both cases, the use of average weights from the UCI gillnet catch will tend to over-estimate the non-local component. Thus the results should be viewed as the maximum proportion or harvest of non-local sockeye caught within the KMA.

During years of low UCI runs, such as 1984 (3.4 million) and 1991 (3.5 million) it was not possible to estimate the proportion of UCI sockeye caught in the KMA. This is further confounded by the tendency for the UCI average weight to be low during small UCI runs (Table 1). Therefore, this methodology would not seem useful in determining the magnitude or even presence of interception of UCI sockeye salmon by Kodiak fishers in years UCI has low sockeye runs. However, it is likely that the proportion of non-local sockeye in these years are very low.

As noted in the Results, it can not be assumed that non-local sockeye salmon are present and are fished uniformly throughout July. We have found that the larger average weights usually occur within a two or three week period, with the timing of the increased average weights varying with area and, to a certain degree, years (Figures 13-40).

CONCLUSIONS

From our data, we can conclude that Kodiak fishers intercept non-local sockeye in other areas besides the North Shelikof Strait and Cape Igvak management areas. However, the study further shows, the fishers do not intercept non-local sockeye with the same frequency for all areas within the KMA. It is also likely, though not specifically investigated, that different statistical areas, within different sections of the KMA, will tend to yield more non-local sockeye than other statistical areas within the same section.

The detectability of interception using this method seems to be positively correlated with UCI run strength. It does not seem possible to estimate or even detect, from this methodology, interception of non-local sockeye salmon during years that UCI has low sockeye runs (< 4 million). Furthermore, in most years and areas when a detection of non-local salmon was not possible, we feel it would be logical to assume that few non-local sockeye salmon were harvested and indeed the majority of the catch (for those years and areas) are local sockeye salmon.

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Table 1. Summary for 1983-1993 (excluding 1989), of Upper Cook Inlet (UCI) and estimated Kodiak sockeye (caught by seine gear) average weight, and differences between UCI and Kodiak, and between observed and expected Kodiak average weights by area.

Year	UCI average weights	July Kodiak estimated average weights from seine gear		Difference between UCI and Kodiak combined average weights		Differences between observed minus estimated July average weights					
						Central Section (253*)		Central Section (254*)		Halibut Bay Section	
		Method 1	Method 2	Method 1	Method 2	Method 1	Method 2	Method 1	Method 2	Method 1	Method 2
1983	6.4775	5.4117	5.3900	1.0658	1.0875	0.5307	0.5362	0.5595	0.7707	a	a
1984	5.9476	5.0438	5.0971	0.9039	0.8505	0.0960	-0.1392	0.0900	0.0942	-0.0272	b
1985	5.6579	4.5009	4.5080	1.1570	1.1499	0.0756	0.0906	-0.5800	-0.1753	a	a
1986	5.7724	5.5815	5.5166	0.1909	0.2558	0.0968	0.1388	-0.3251	-0.0967	-0.2492	-0.2434
1987	6.7392	5.7500	5.5497	0.9892	1.1895	1.2714	1.2582	0.6899	0.8028	-0.0553	0.1874
1988	6.6428	4.8156	4.8114	1.8272	1.8314	1.2247	1.2305	1.1508	1.1896	0.6860	0.6423
1990	6.4380	4.9981	5.0232	1.4400	1.4149	0.1922	0.3268	0.2498	0.6937	0.1015	b
1991	5.6456	4.9825	4.9995	0.6631	0.6461	0.2399	0.3163	0.2319	0.4043	0.2803	0.2659
1992	6.6006	4.7826	4.9002	1.8180	1.7004	1.2200	1.2316	0.5834	0.7885	1.1374	0.9751
1993	5.8870	4.8451	4.9106	1.0419	0.9765	0.7794	0.6871	0.2134	0.2147	0.1427	b

-Continued-

Table 1. (page 2 of 2)

	Differences between observed minus estimated July average weights									
	Ayakulik Sections		Cape Alitak Section		Sitkalidak Section		Ugak Bay Section		Katmai and Alinchak Sections	
Year	Method 1	Method 2	Method 1	Method 2	Method 1	Method 2	Method 1	Method 2	Method 1	Method 2
1983	[a]	[a]	-0.0332	0.0443	0.6969	[b]	-0.3882	-0.7202	1.3096	[b]
1984	0.5743	0.1836	0.1618	0.5703	-0.4160	[b]	-0.0222	-0.0067	-0.8533	0.2257
1985	0.3778	0.2793	0.2933	0.1932	0.4917	[b]	-0.0199	-1.1856	0.9482	[b]
1986	0.6912	0.2817	0.0411	0.7722	-0.2354	[b]	0.8982	[b]	1.7893	[b]
1987	[a]	[a]	0.5963	0.8112	1.4894	[b]	[a]	[a]	0.1354	0.2634
1988	0.9258	[c]	0.6051	0.6232	1.3451	[b]	-0.1350	0.4600	1.3828	[b]
1990	0.4513	0.1607	-0.0528	-0.0681	1.1584	1.2668	1.1788	[b]	0.5664	[b]
1991	0.2468	0.1449	-0.1047	-0.0896	-0.1955	-0.2881	0.7344	[b]	-0.4074	-0.1148
1992	1.4968	1.2766	0.8281	0.7237	1.1356	1.1578	0.3980	[b]	0.7354	[b]
1993	0.1143	0.2708	0.1582	0.0550	0.6469	0.7360	0.3725	0.3784	0.4226	[b]

[a] There were no sockeye caught during July for this year and area.
[b] There were no sockeye caught during June for this year and area.
[c] There were no sockeye caught during August for this year and area.

Table 2. Summary for 1983-1993 (excluding 1989), of Upper Cook Inlet (UCI) and estimated Kodiak sockeye (caught by set gillnet gear) average weight, and differences between UCI and Kodiak, and between observed and expected Kodiak average weights by area.

Year	UCI average weights	July Kodiak estimated average weights from set gillnets		Difference between UCI and Kodiak combined average weights		Differences between observed minus estimated July average weights					
						Central Section (253*)		Central Section (254*)		Alitak Bay Section	
		Method 1	Method 2	Method 1	Method 2	Method 1	Method 2	Method 1	Method 2	Method 1	Method 2
1983	6.4775	5.7106	5.5747	0.7668	0.9028	0.0462	0.1930	0.5634	0.7111	-0.2003	-0.0896
1984	5.9476	5.7398	5.6614	0.2078	0.2863	0.1145	0.1954	0.0829	0.1012	0.2623	0.4149
1985	5.6579	4.8548	4.8368	0.8031	0.8211	0.1671	0.3534	0.1133	0.2777	0.1212	0.1671
1986	5.7724	6.0039	5.7028	-0.2315	0.0696	0.0454	0.1250	-0.1800	0.0310	0.1054	0.7686
1987	6.7392	5.9602	5.8552	0.7790	0.8840	0.3211	0.3778	0.2657	0.3375	0.1978	0.3763
1988	6.6428	5.3974	5.2797	1.2455	1.3631	0.5769	0.5970	0.3517	0.4039	0.0918	0.2989
1990	6.4380	5.4903	5.2936	0.9477	1.1444	0.1706	0.3282	0.4556	0.1790	-0.2452	-0.1118
1991	5.6456	5.2740	5.1867	0.3716	0.4589	0.3989	0.4671	0.3643	0.5093	-0.1092	-0.0644
1992	6.6006	5.0917	5.1095	1.5089	1.4911	0.5567	0.5430	0.3464	0.3436	0.4939	0.4763
1993	5.8870	4.9942	5.1297	1.0419	0.9765	0.4166	0.2774	0.5860	0.4637	0.0169	-0.1102

Table 3. Estimated local and non-local sockeye catch during July, by area, using set and drift gillnet combined Upper Cook Inlet average weight, 1983-1993 (excluding 1989).

			Estimates (in thousands)			
Kodiak Areas	Year	Catch (in thousands)	Non-local method 1	Local method 1	Non-local method 2	Local method 2
Central (253*)	1983	45.8	24.9	20.9	25.0	20.8
	1987	149.3	149.3	0.0	149.3	0.0
	1988	83.9	83.9	0.0	83.9	0.0
	1992	149.2	112.9	36.3	113.1	36.1
	1993	188.4	136.9	51.5	132.1	56.3
Central (254*)	1983	9.6	4.3	5.3	5.1	4.5
	1987	36.0	21.9	14.1	23.2	12.8
	1988	50.0	48.2	1.8	48.3	1.7
	1992	76.4	26.4	50.0	31.8	44.6
Halibut Bay	1988	233.6	97.7	135.9	93.9	139.7
	1992	417.4	280.7	136.7	266.1	151.3
Ayakulik	1988	12.7	6.2	6.5	a	a
	1992	208.7	163.7	45.0	157.8	50.9
Cape Alitak	1987	69.9	46.4	23.5	51.0	18.9
	1988	172.5	52.9	119.6	54.0	118.5
	1992	138.3	63.2	75.1	58.6	79.7
Sitkalidak	1983	4.6	1.9	2.7	b	b
	1987	6.3	6.3	0.0	b	b
	1988	52.8	48.4	4.4	b	b
	1990	63.8	59.3	4.5	59.6	4.2
	1992	436.6	344.9	91.7	346.3	90.3
	1993	124.5	64.6	59.9	68.6	55.9
Ugak	1990	12.7	7.1	5.6	b	b
Katmai/ Alinchak	1983	.7	.7	0.0	b	b
	1985	.7	.7	0.0	b	b
	1988	28.3	28.3	0.0	b	b
	1990	25.9	13.7	12.2	b	b
	1992	104.3	70.0	34.2	b	b
Central 253* (gillnet)	1988	55.9	36.8	19.1	37.2	18.7
	1992	95.7	36.7	59.0	36.1	59.6
Central 254* (gillnet)	1983	66.3	44.6	21.7	47.9	18.4
Total for Kodiak	1983	247.2[c]	76.4	170.8	80.6	166.6
	1985	380.2[c]	0.7	379.5	0.7	379.5
	1987	440.0[c]	223.9	216.1	229.8	210.2
	1988	742.1[c]	402.4	339.7	400.2	341.9
	1990	1,368.9[c]	80.1	1,288.8	80.4	1,288.5
	1992	1,804.3[c]	1,098.5	705.8	1,079.8	724.5
	1993	1,399.1[c]	201.5	1,197.6	200.7	1,198.4

[a] There were no sockeye caught during August, for this year and area.
[b] There were no sockeye caught during June, for this year and area.
[c] The total catch for Kodiak represents the above sections only.

Table 4. Estimated local and non-local sockeye catch during July, by area, when using drift gillnet Upper Cook Inlet average weight, 1983-1993 (excluding 1989).

Kodiak Areas	Year	Catch (in thousands)	Estimates (in thousands)			
			Non-local method 1	Local method 1	Non-local method 2	Local method 2
Central (253*)	1983	45.8	24.2	21.6	24.3	21.5
	1987	149.3	149.3	0.0	149.3	0.0
	1988	83.9	82.7	1.2	82.7	1.2
	1992	149.2	109.1	40.1	109.4	39.8
	1993	188.4	121.6	66.8	116.1	72.3
Central (254*)	1983	9.6	4.2	5.4	5.0	4.6
	1987	36.0	19.7	16.3	21.1	14.9
	1988	50.0	44.8	5.2	44.9	5.1
	1992	76.4	25.5	50.9	30.9	45.5
Halibut Bay	1988	233.6	92.7	140.9	89.0	144.6
	1992	417.4	271.7	145.7	256.8	160.6
Ayakulik	1988	12.7	5.9	6.8	[a]	[a]
	1992	208.7	159.1	49.6	152.8	55.9
Cape Alitak	1987	69.9	40.7	29.2	45.7	24.2
	1988	172.5	50.5	122.0	51.6	120.9
	1992	138.3	61.3	77.0	56.7	81.6
Sitkalidak	1983	4.6	1.9	2.7	[b]	[b]
	1987	6.3	6.3	0.0	[b]	[b]
	1988	52.8	45.5	7.3	[b]	[b]
	1990	63.8	55.3	8.5	55.9	7.9
	1992	436.6	332.1	104.5	333.6	103.0
	1993	124.5	58.3	66.2	62.3	62.2
Ugak	1990	12.7	6.8	5.9	[b]	[b]
Katmai/ Alinchak	1983	.7	0.7	0.0	[b]	[b]
	1985	.7	0.6	0.1	[b]	[b]
	1988	28.3	28.3	0.0	[b]	[b]
	1990	25.9	12.6	13.3	[b]	[b]
	1992	104.3	66.6	37.7	[b]	[b]
Central 253* (set gillnet)	1988	55.9	33.3	22.6	33.8	22.1
	1992	95.7	35.3	60.4	34.8	60.9
Central 254* (set gillnet)	1983	66.3	43.1	23.2	46.5	19.8
Total for Kodiak	1983	247.2[c]	74.1	173.1	78.4	168.8
	1985	380.2[c]	0.6	379.6	0.6	379.6
	1987	440.0[c]	216.0	224.0	222.4	217.6
	1988	742.1[c]	383.7	358.4	381.7	360.4
	1990	1,368.9[c]	74.7	1,294.2	75.3	1,293.6
	1992	1,804.3[c]	1,060.7	743.6	1,041.6	762.7
	1993	1,399.1[c]	179.9	1,219.2	178.4	1,220.7

[a] There were no sockeye caught during August for this year and area.
[b] There were no sockeye caught during June for this year and area.
[c] The total catch for Kodiak represents the above sections only.

Table 5. The percent of Upper Cook Inlet (UCI) sockeye run, estimated to have been harvested by Kodiak fishers for study areas combined, 1983-1993 (excluding 1989).

Year	UCI sockeye run (in millions)	Estimated percent of UCI sockeye run caught in the KMA (using combined average weight for UCI)		Estimated percent of UCI sockeye run caught in the KMA (using drift gillnet average weight for UCI)	
		method 1	method 2	method 1	method 2
1983	6.5	1.16%	1.23%	1.13%	1.19%
1984	3.4	a	a	a	a
1985	5.6	0.01%	0.01%	0.01%	0.01%
1986	6.0	a	a	a	a
1987	11.9	1.84%	1.90%	1.78%	1.84%
1988	8.4	4.56%	4.53%	4.35%	4.33%
1990	4.9	1.61%	1.62%	1.51%	1.52%
1991	3.5	a	a	a	a
1992	10.5	9.49%	9.35%	9.20%	9.05%
1993	6.2	3.15%	3.14%	2.82%	2.80%

[a] No estimate of non-local interception was made within the KMA for these years.

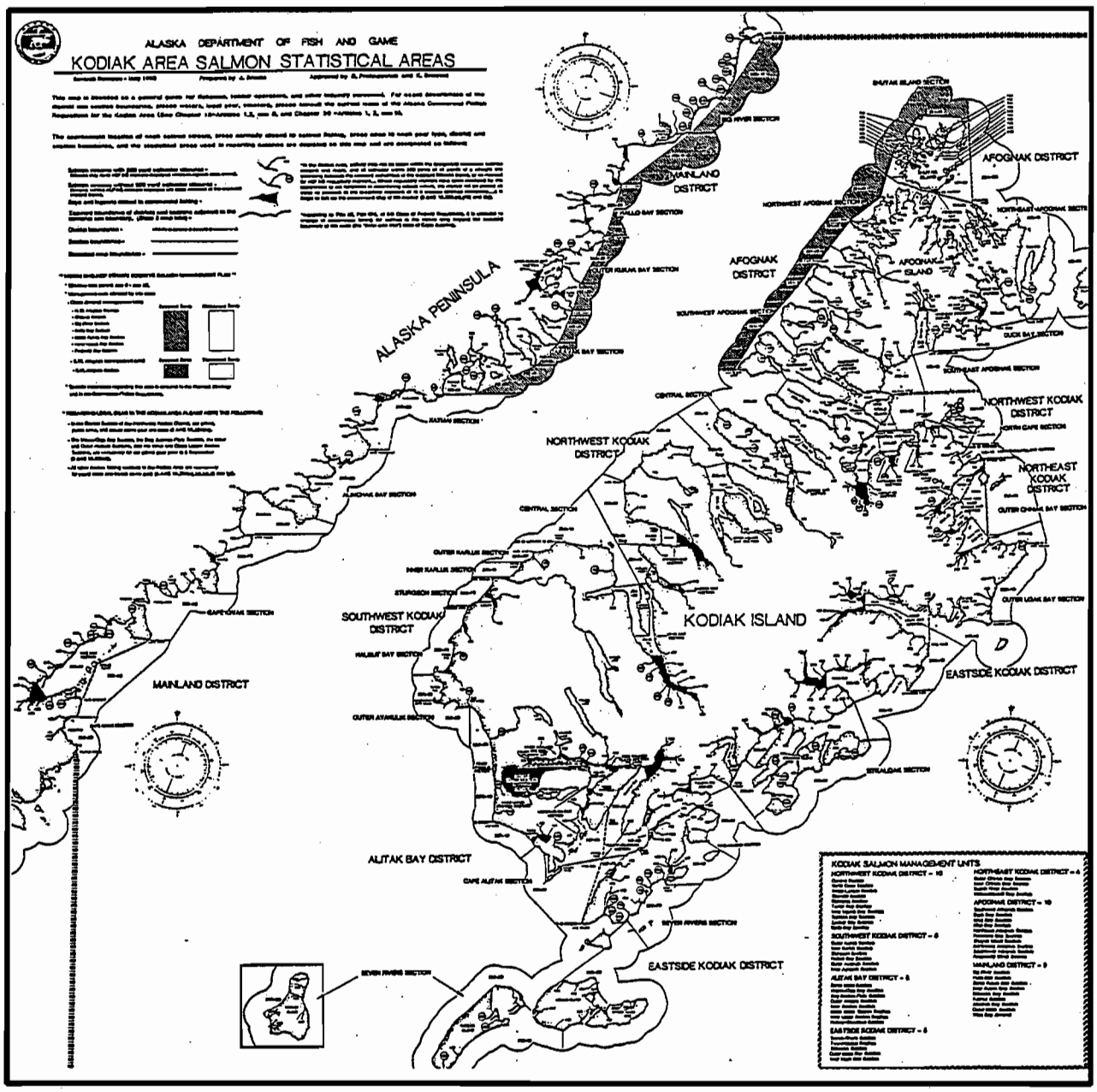

Figure 1. Map of the Kodiak Management Area with salmon statistical areas shown.

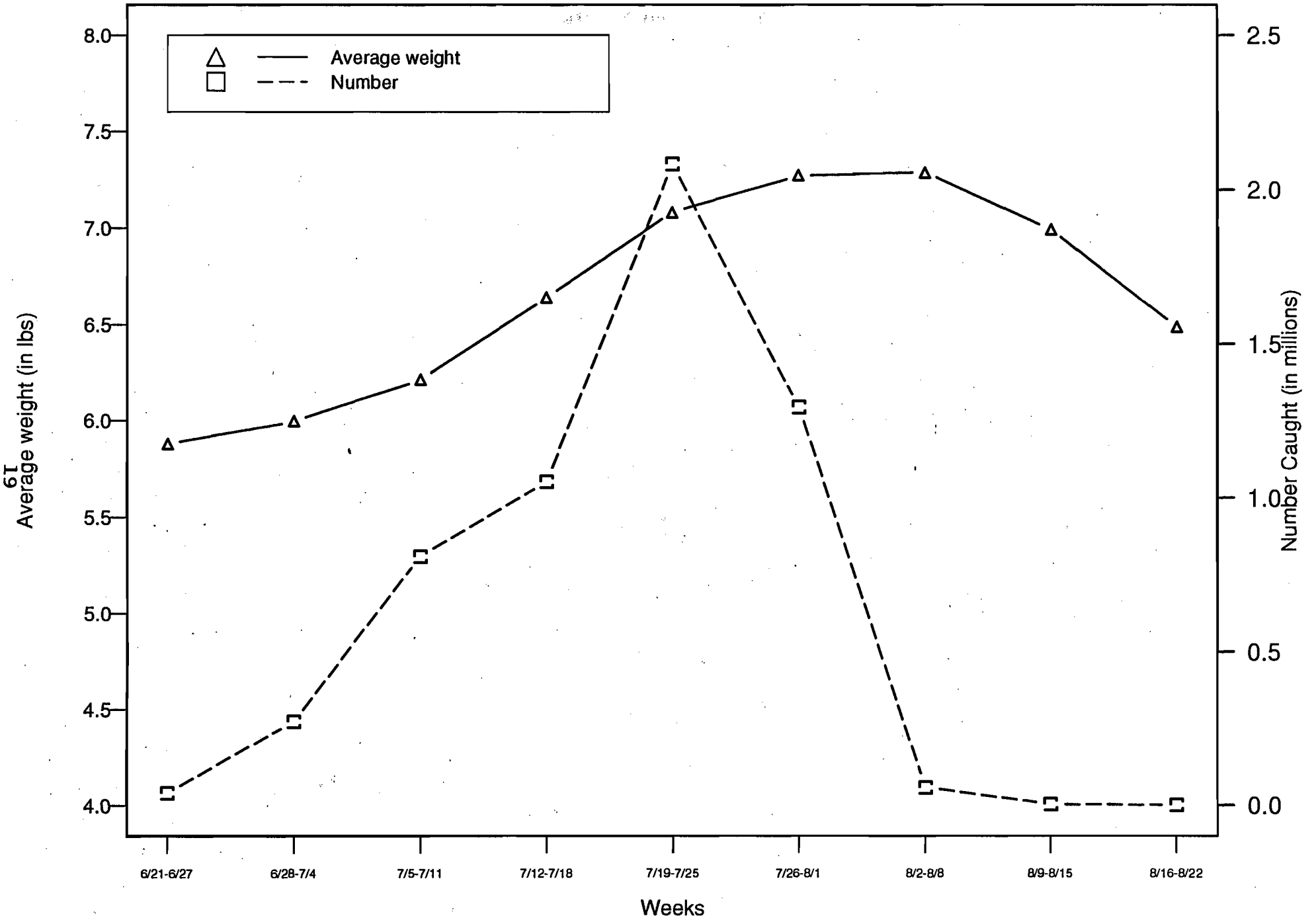

Figure 2. Upper Cook Inlet drift gillnet catch and average weights for sockeye salmon by week, 1987.

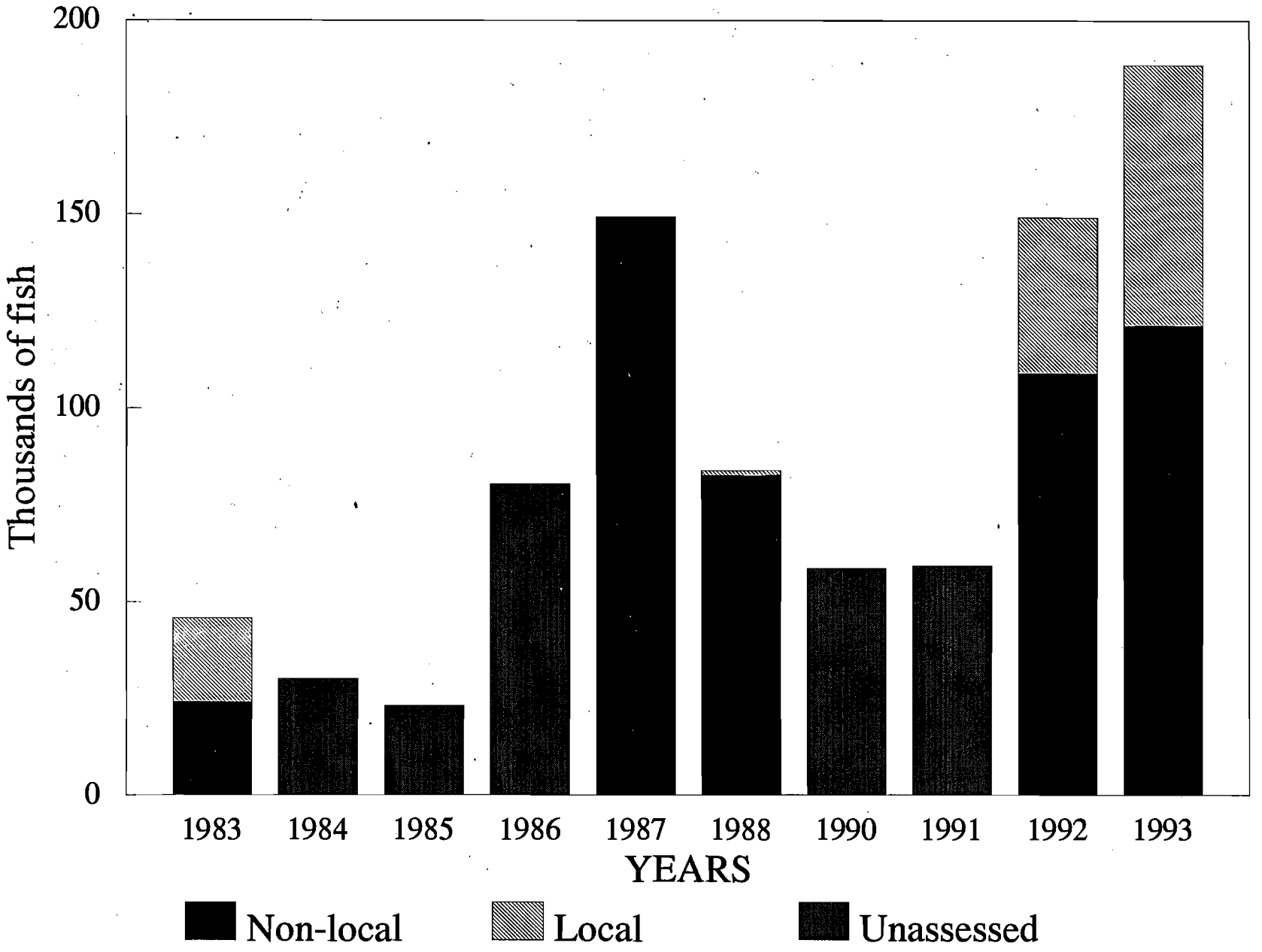

Figure 3. Central (253*) Section estimated local and non-local sockeye seine catch during July using drift gillnet average weights from UCI, for selected years.

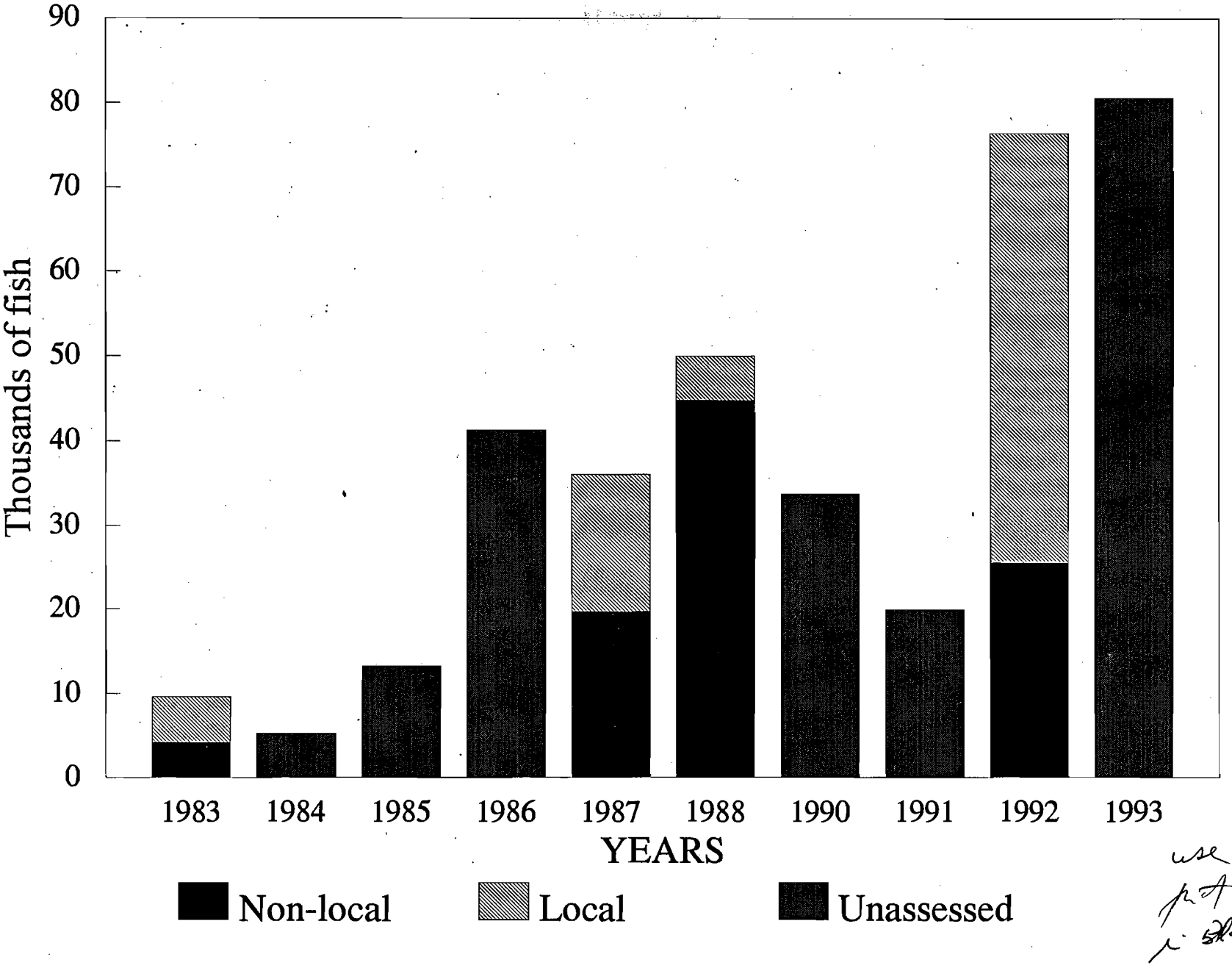

Figure 4. Central (254*) Section estimated local and non-local sockeye seine catch during July using drift gillnet average weights from UCI, for selected years.

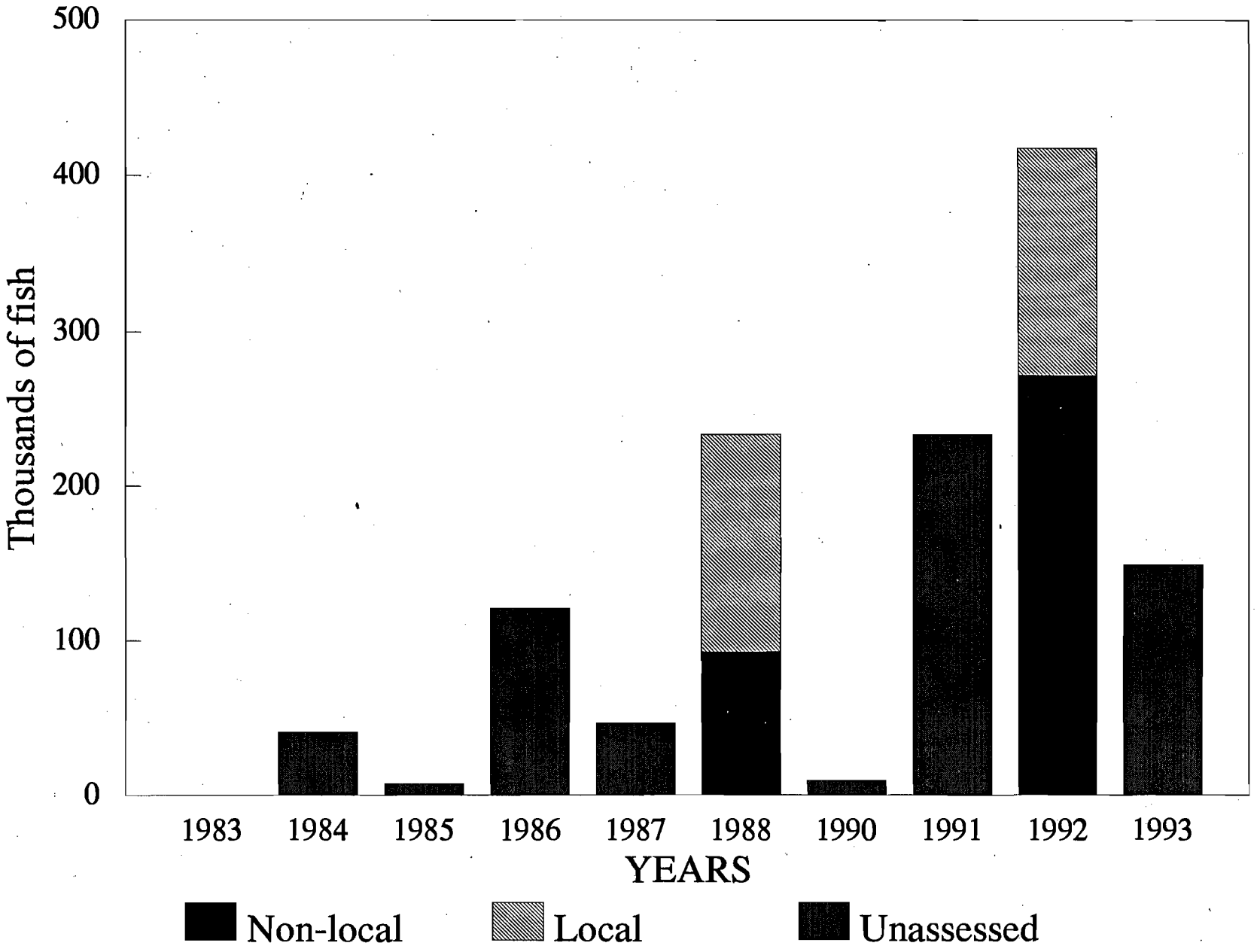

Figure 5. Halibut Bay Section estimated local and non-local sockeye seine catch during July using drift gillnet average weights from UCI, for selected years.

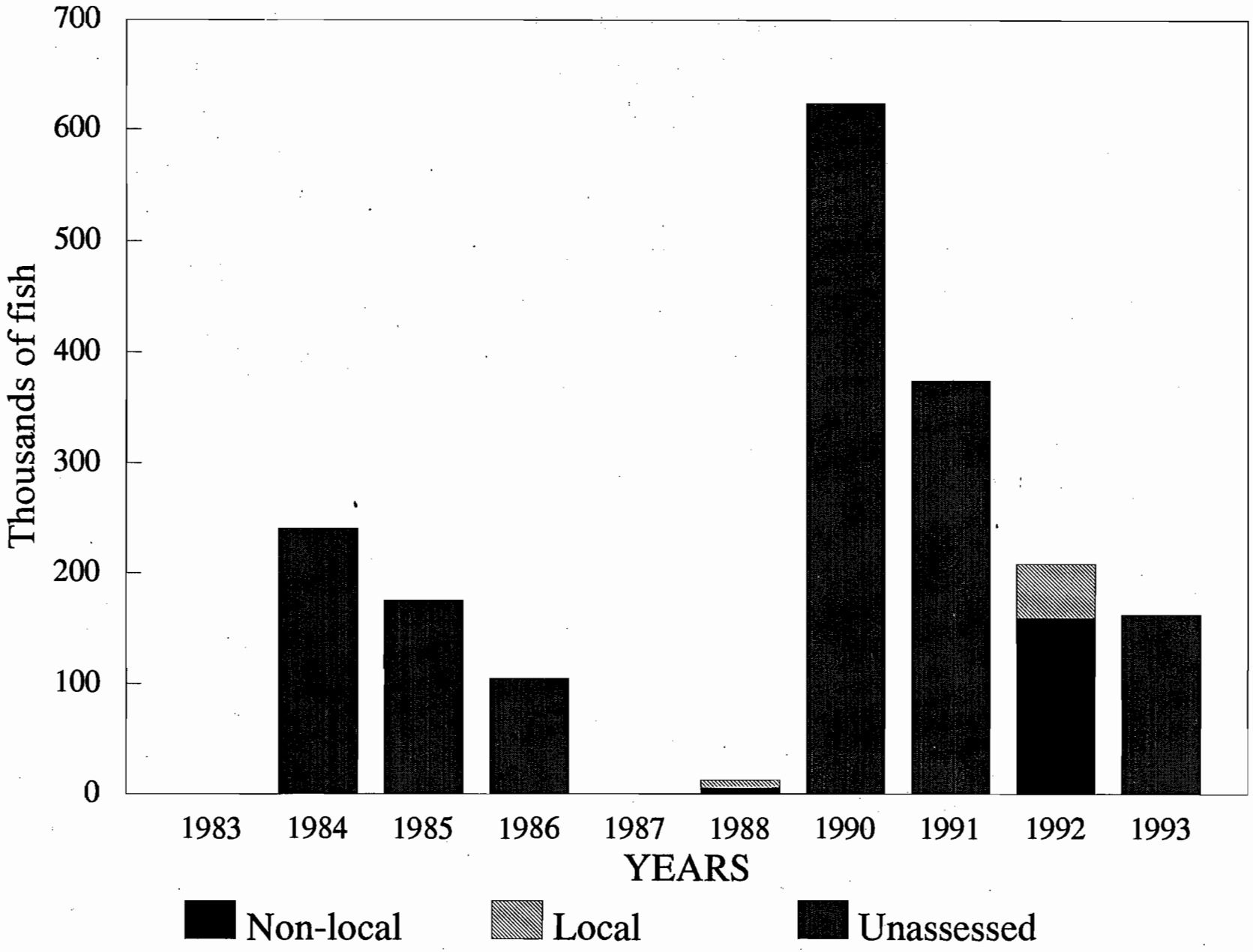

Figure 6. Ayakulik Sections estimated local and non-local sockeye seine catch during July using drift gillnet average weights from UCI, for selected years.

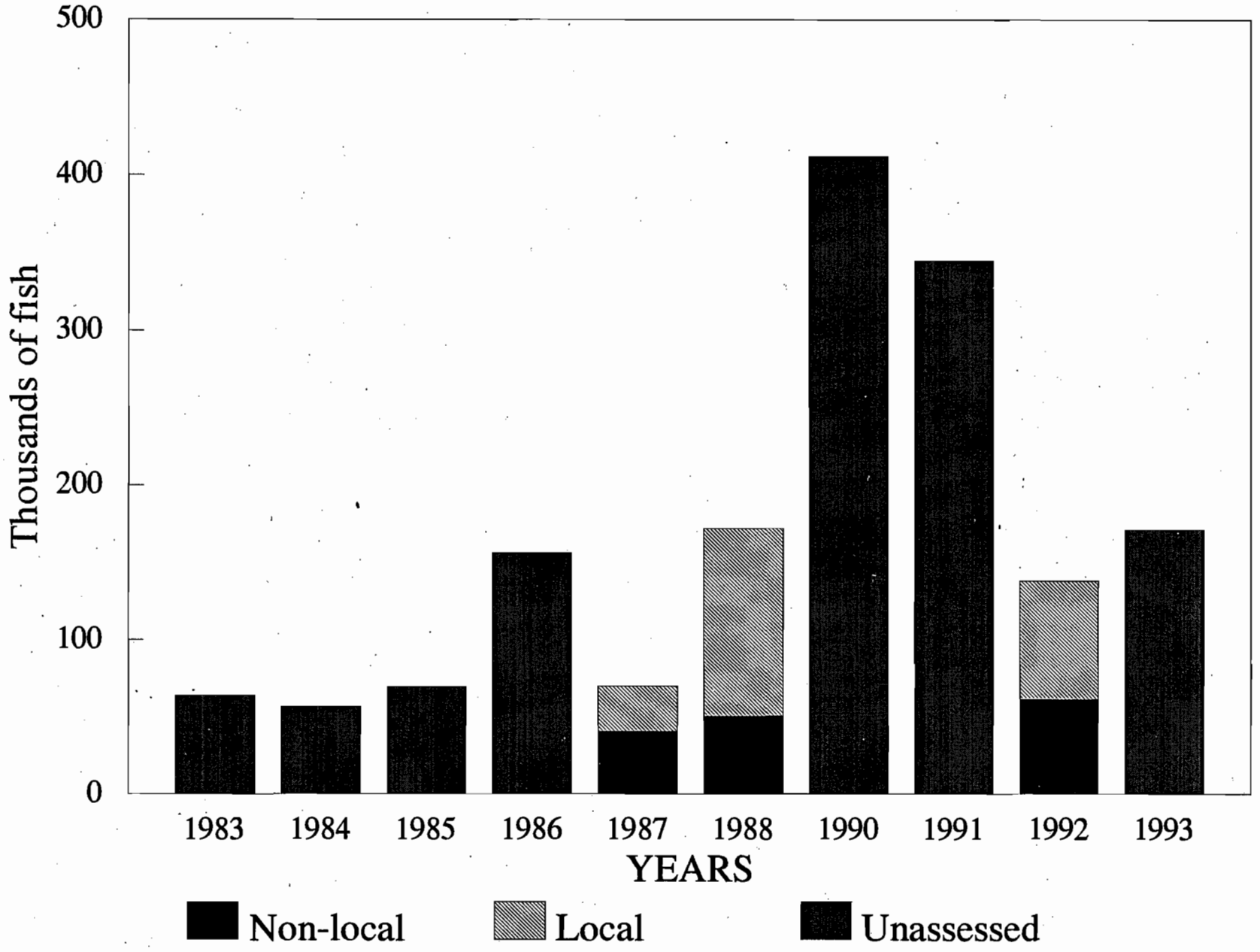

Figure 7. Cape Alitak Section estimated local and non-local sockeye seine catch during July using drift gillnet average weights from UCI, for selected years.

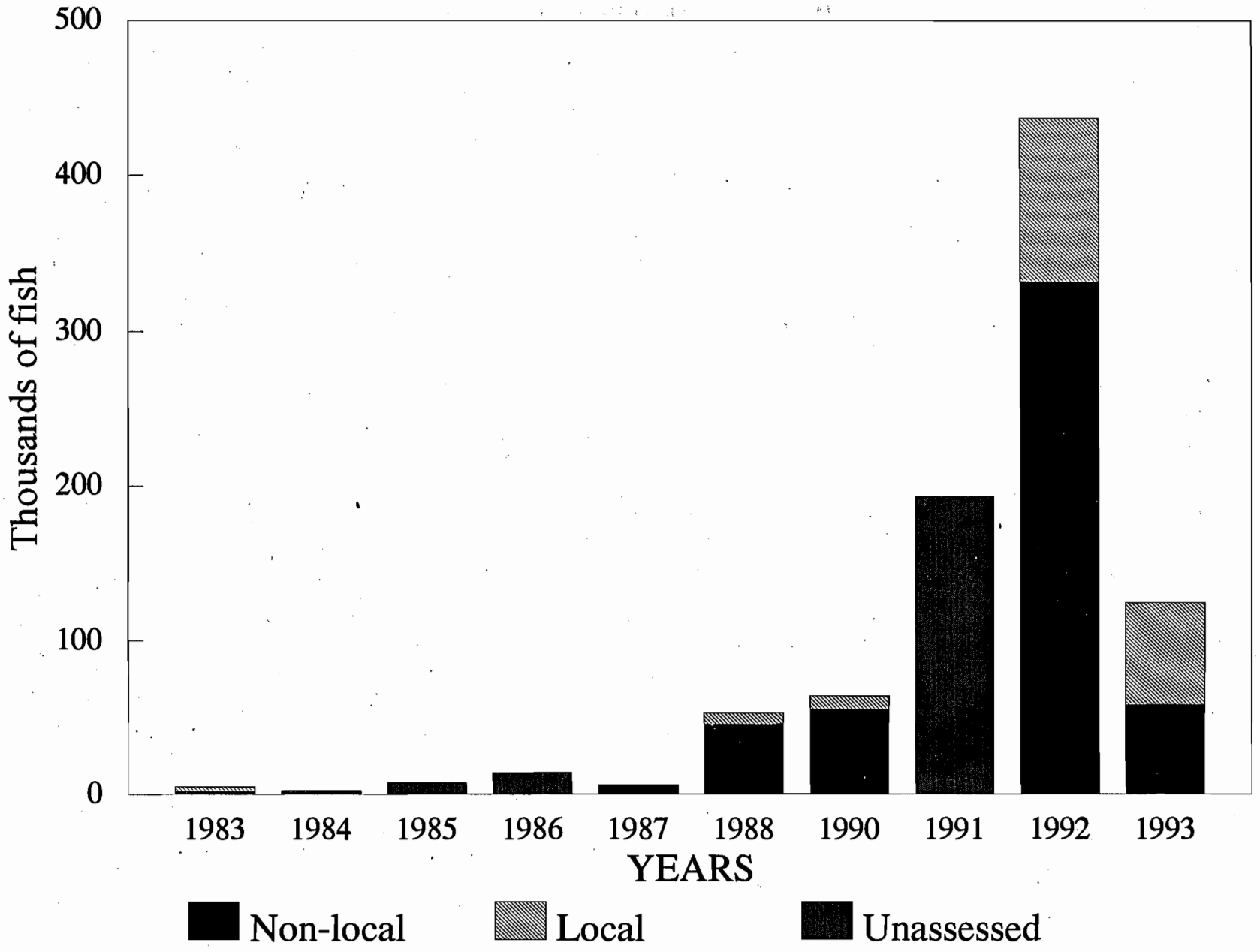

Figure 8. Sitkalidak Section estimated local and non-local sockeye seine catch during July using drift gillnet average weights from UCI, for selected years.

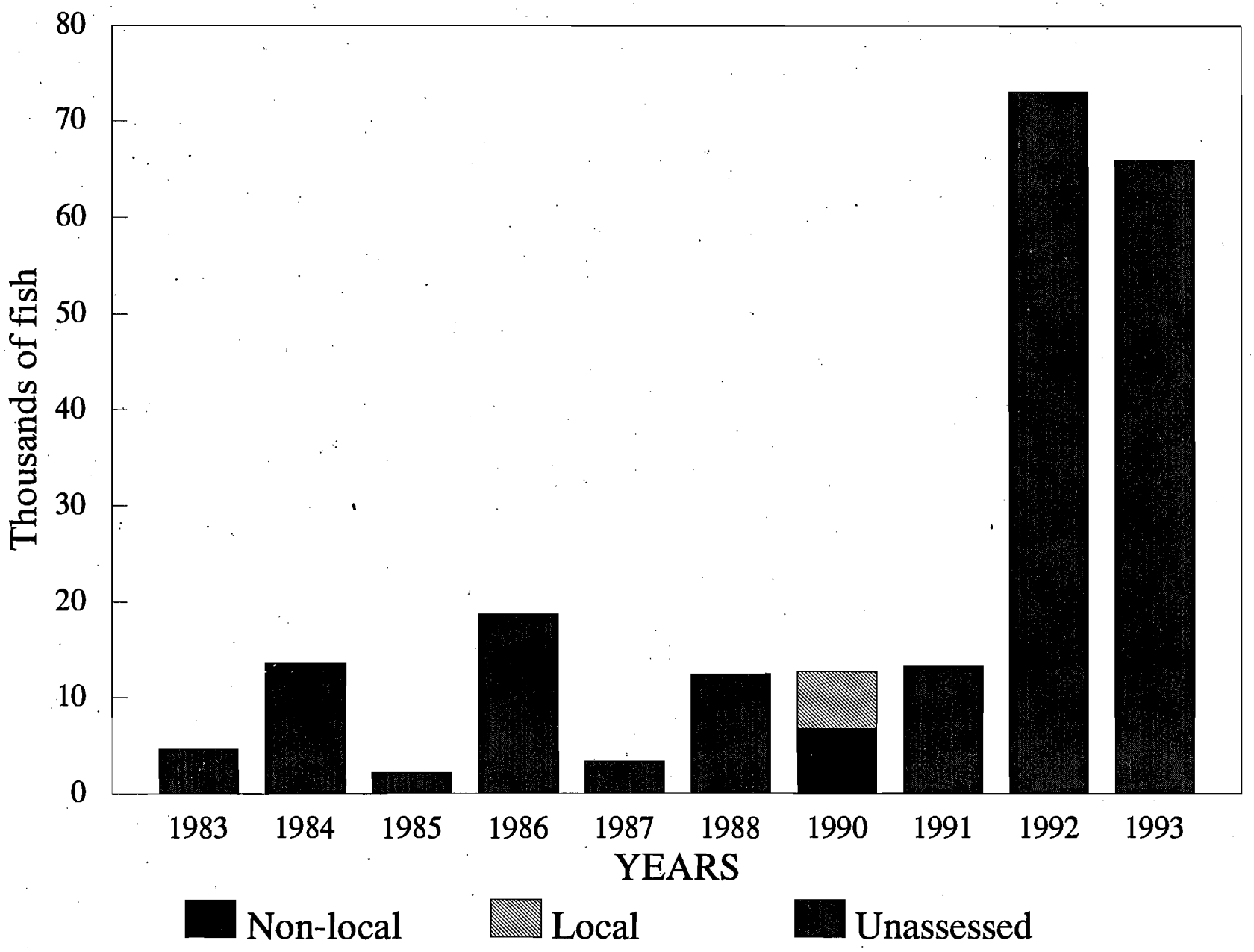

Figure 9. Ugak Section estimated local and non-local sockeye seine catch during July using drift gillnet average weights from UCI, for selected years.

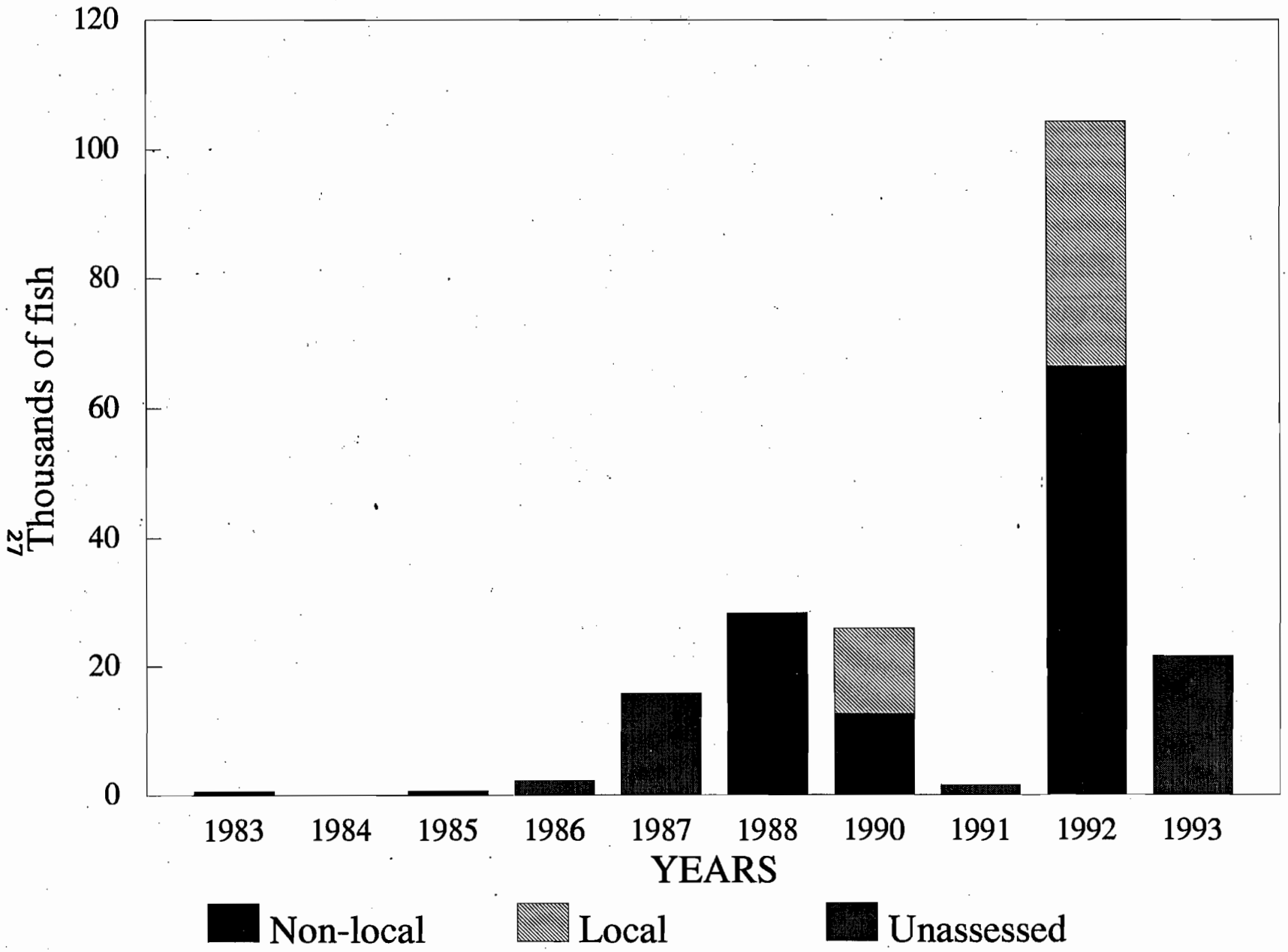

Figure 10. Katmai and Alinchak Sections estimated local and non-local sockeye seine catch during July, using drift gillnet average weights from UCI, for selected years.

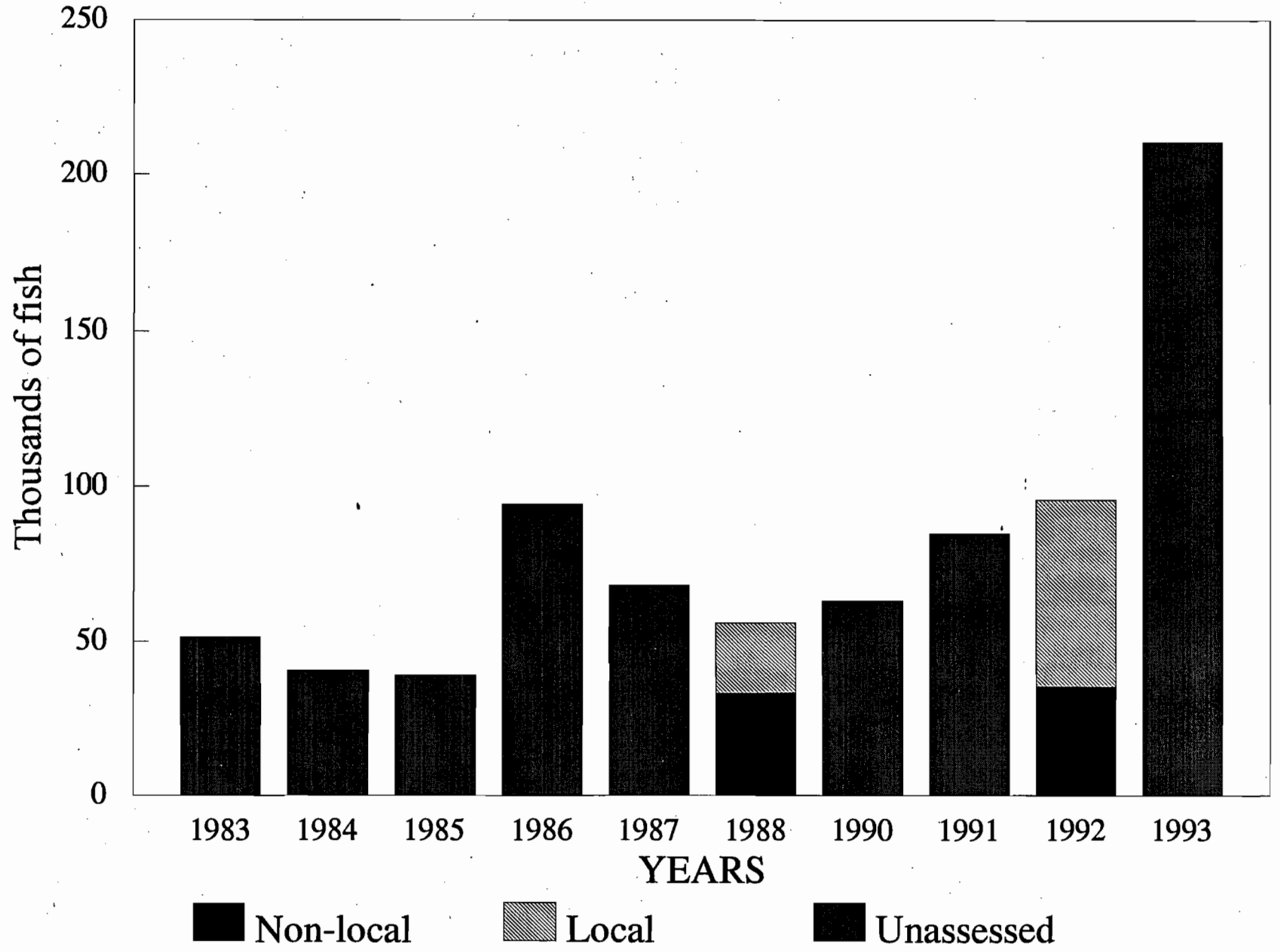

Figure 11. Central (253*) Section estimated local and non-local sockeye set gillnet catch during July, using drift gillnet average weights from UCI, for selected years.

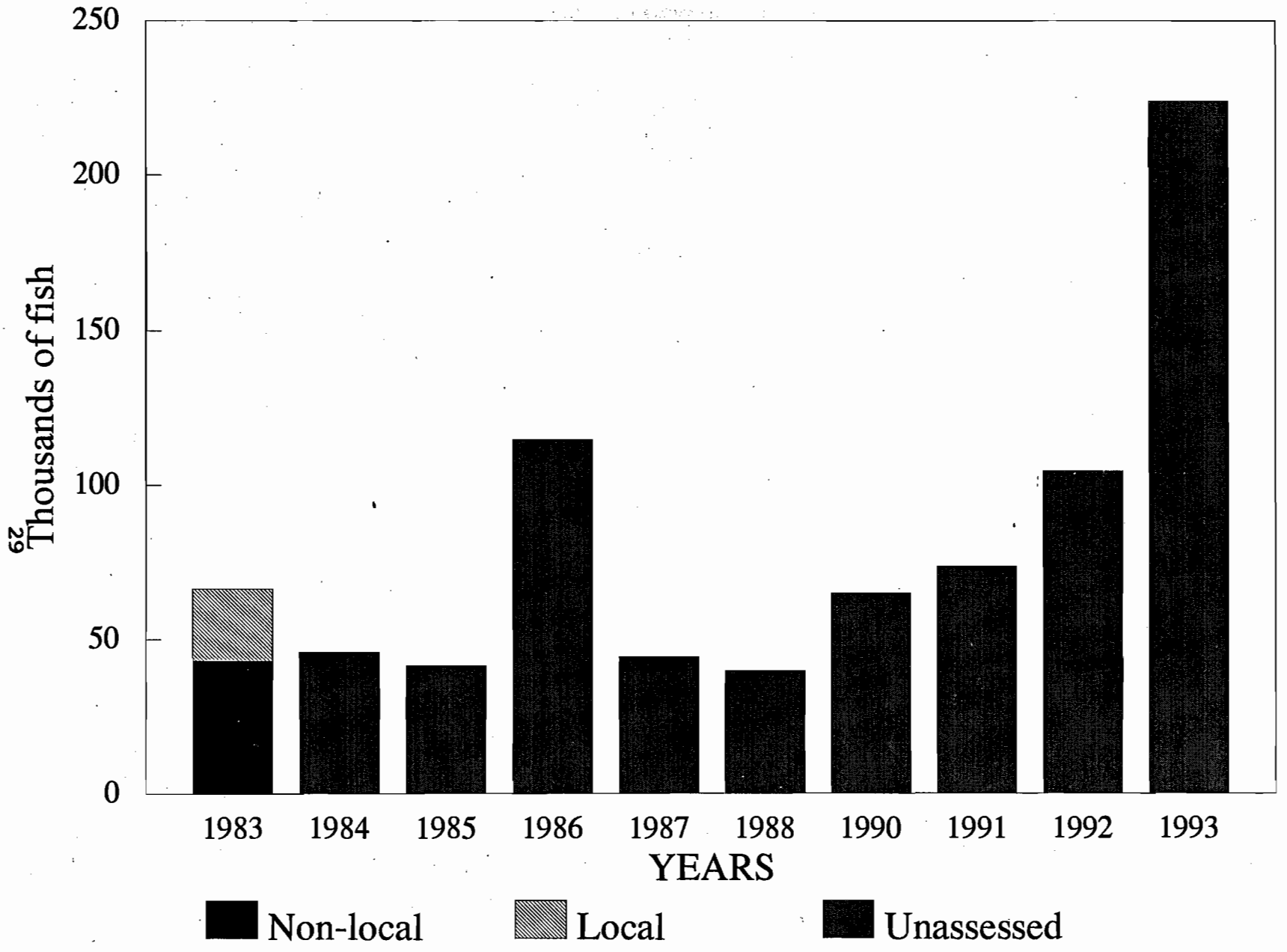

Figure 12. Central (254*) Section estimated local and non-local sockeye set gillnet catch during July, using drift gillnet average weights from UCI, for selected years.

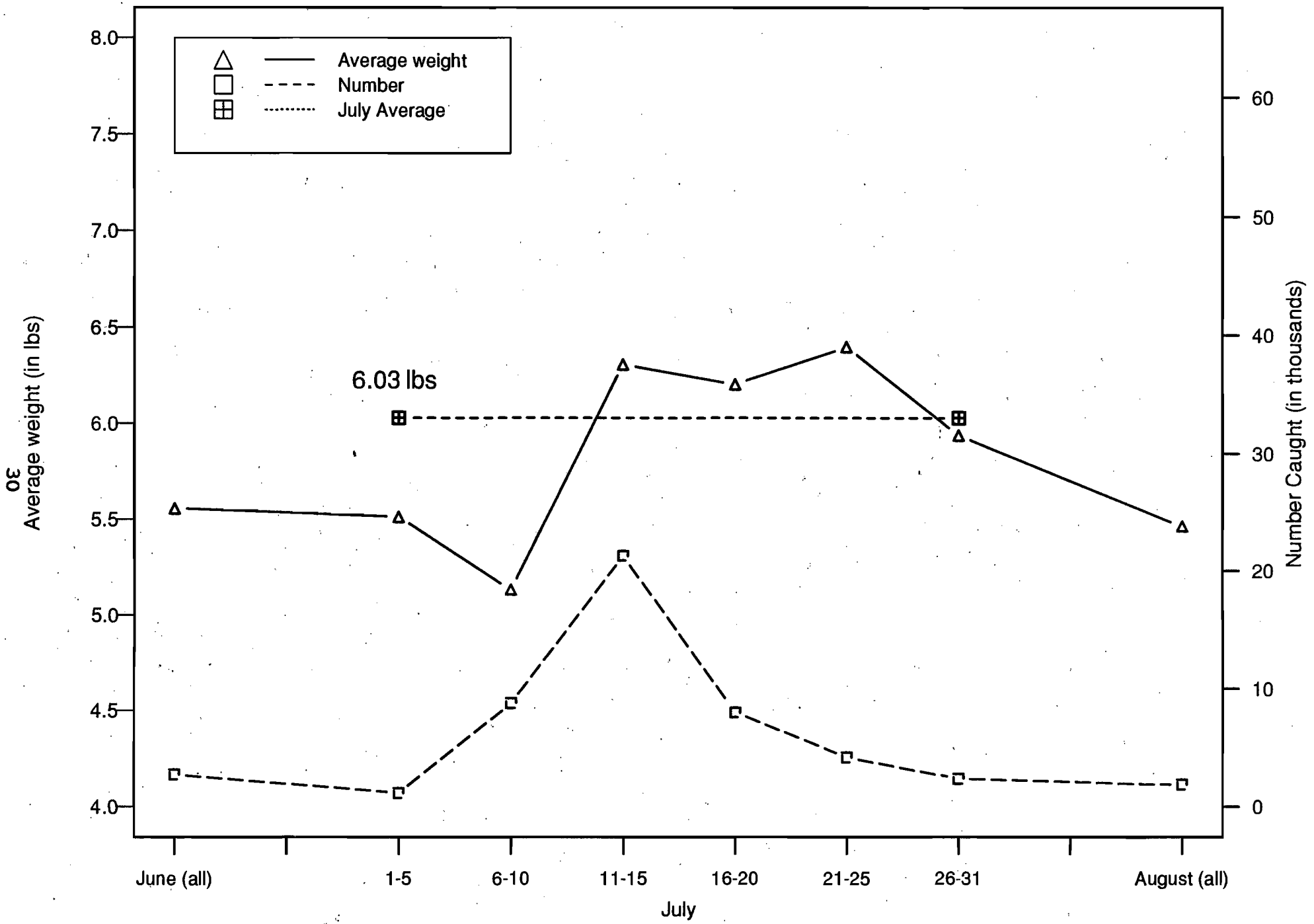

Figure 13. Central Section (253*), average weights and catch for sockeye salmon by selected periods, 1983.

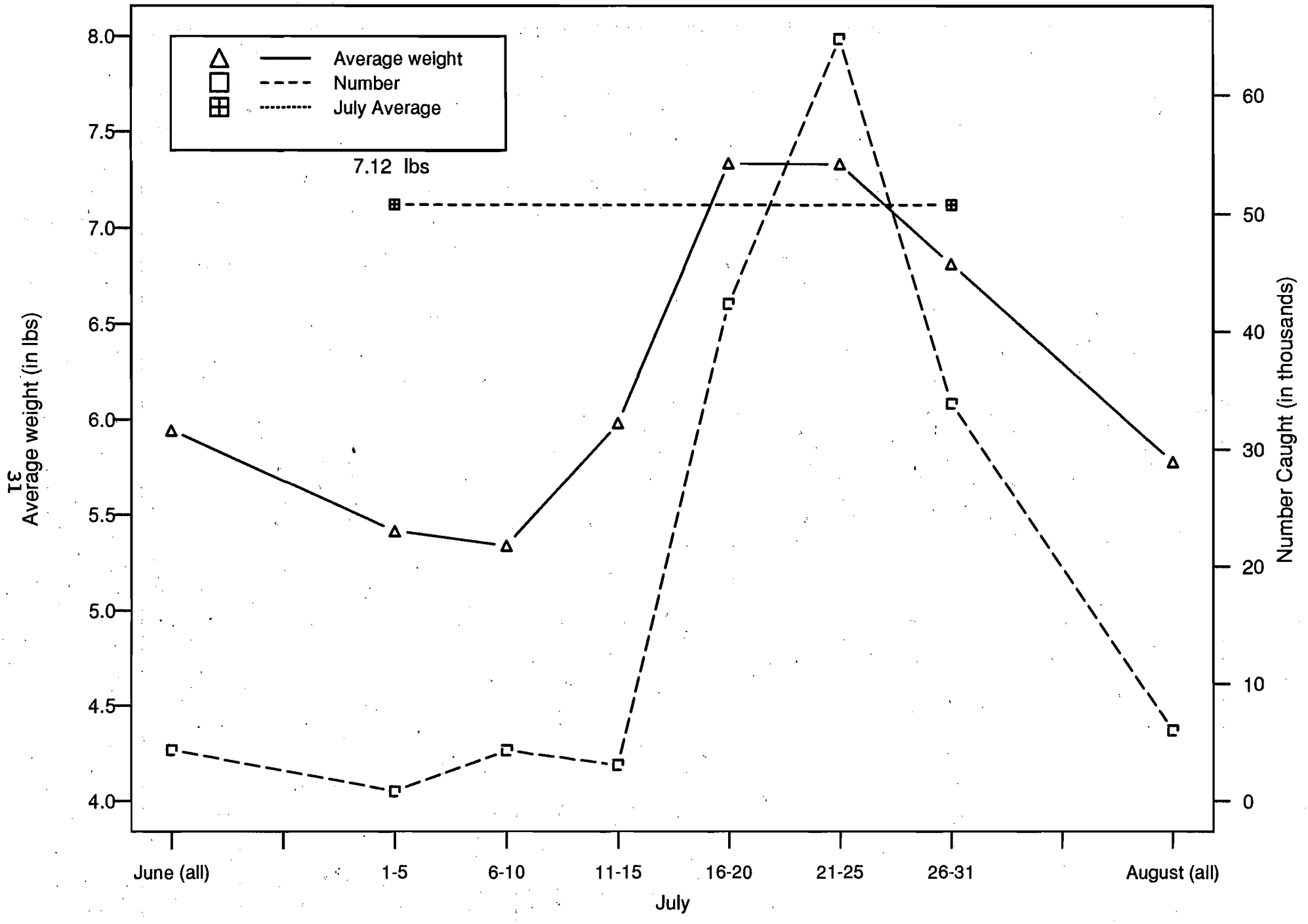

Figure 14. Central Section (253*), average weights and catch for sockeye salmon by selected periods, 1987.

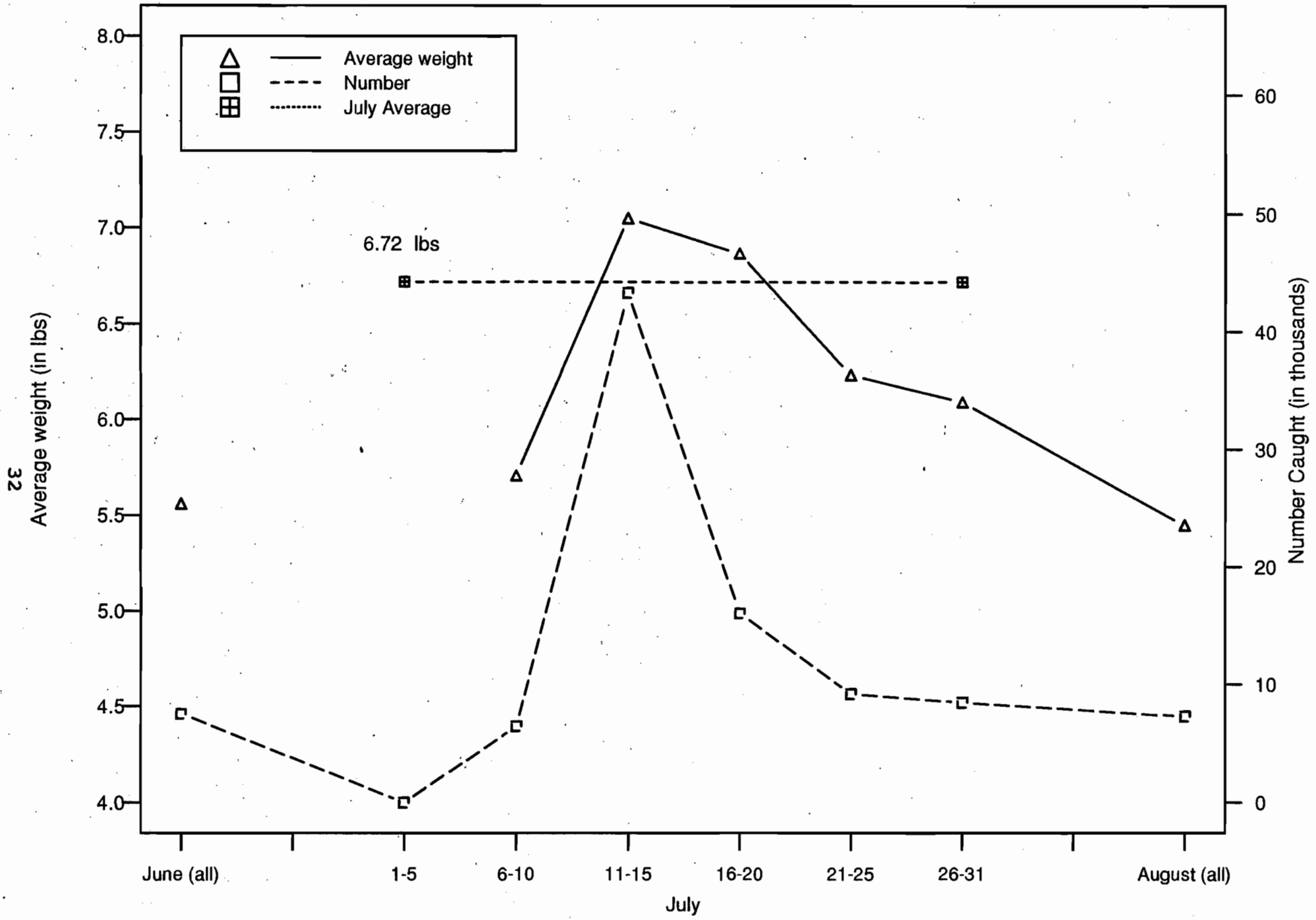

Figure 15. Central Section (253*), average weights and catch for sockeye salmon by selected periods, 1988.

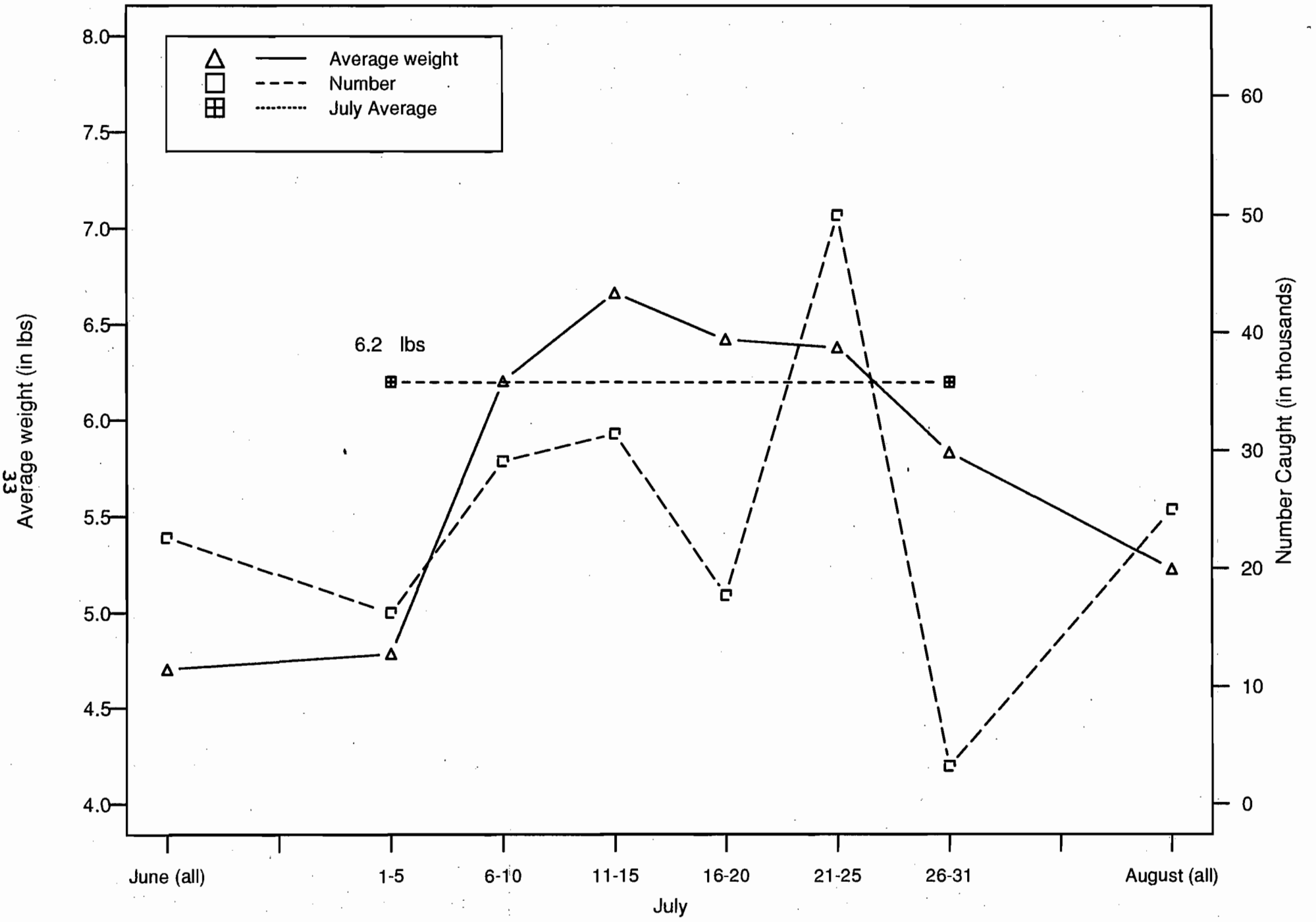

Figure 16. Central Section (253*), average weights and catch for sockeye salmon by selected periods, 1992.

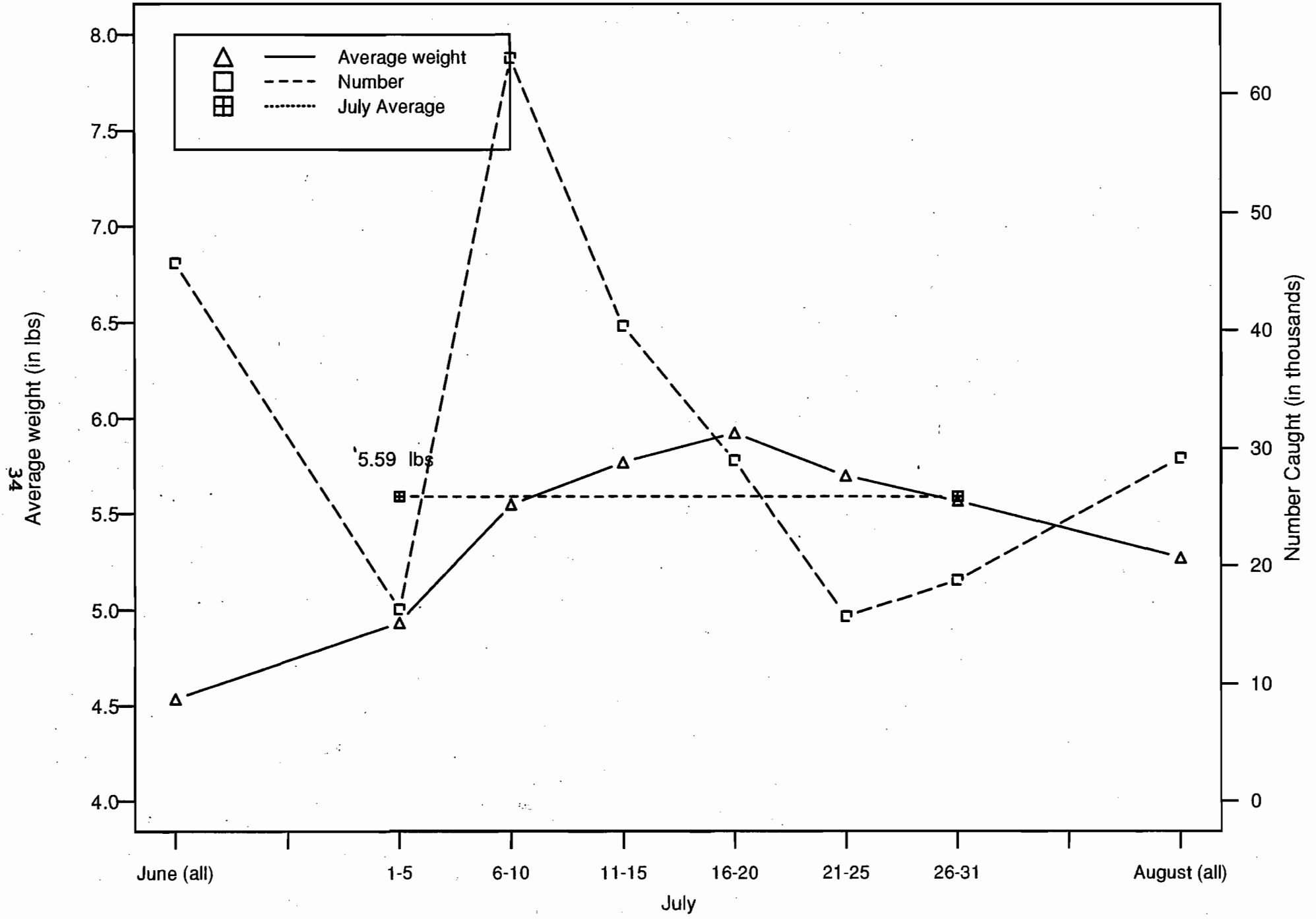

Figure 17. Central Section (253*), average weights and catch for sockeye salmon by selected periods, 1993.

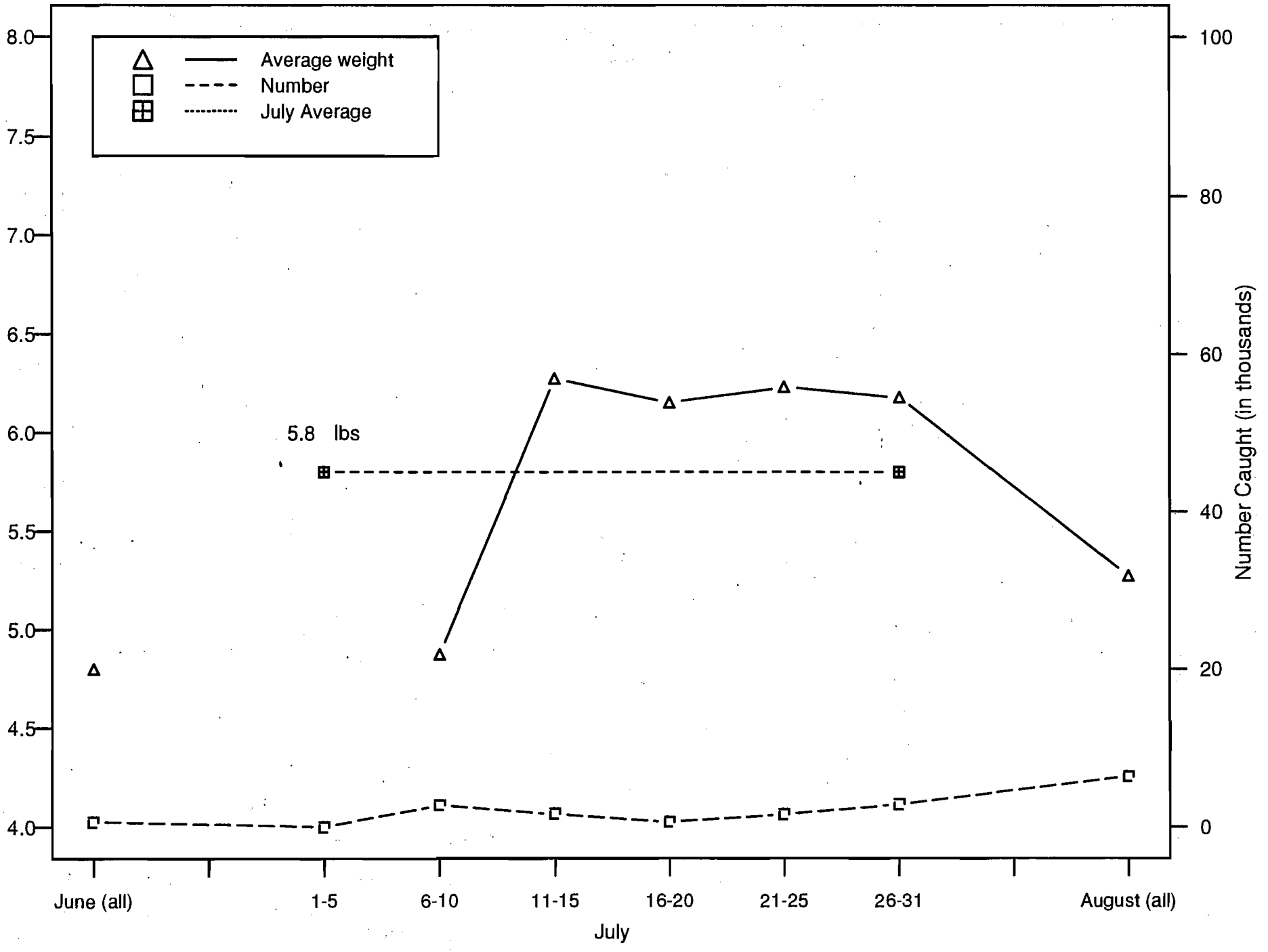

Figure 18. Central Section (254*), average weights and catch for sockeye salmon by selected periods, 1983.

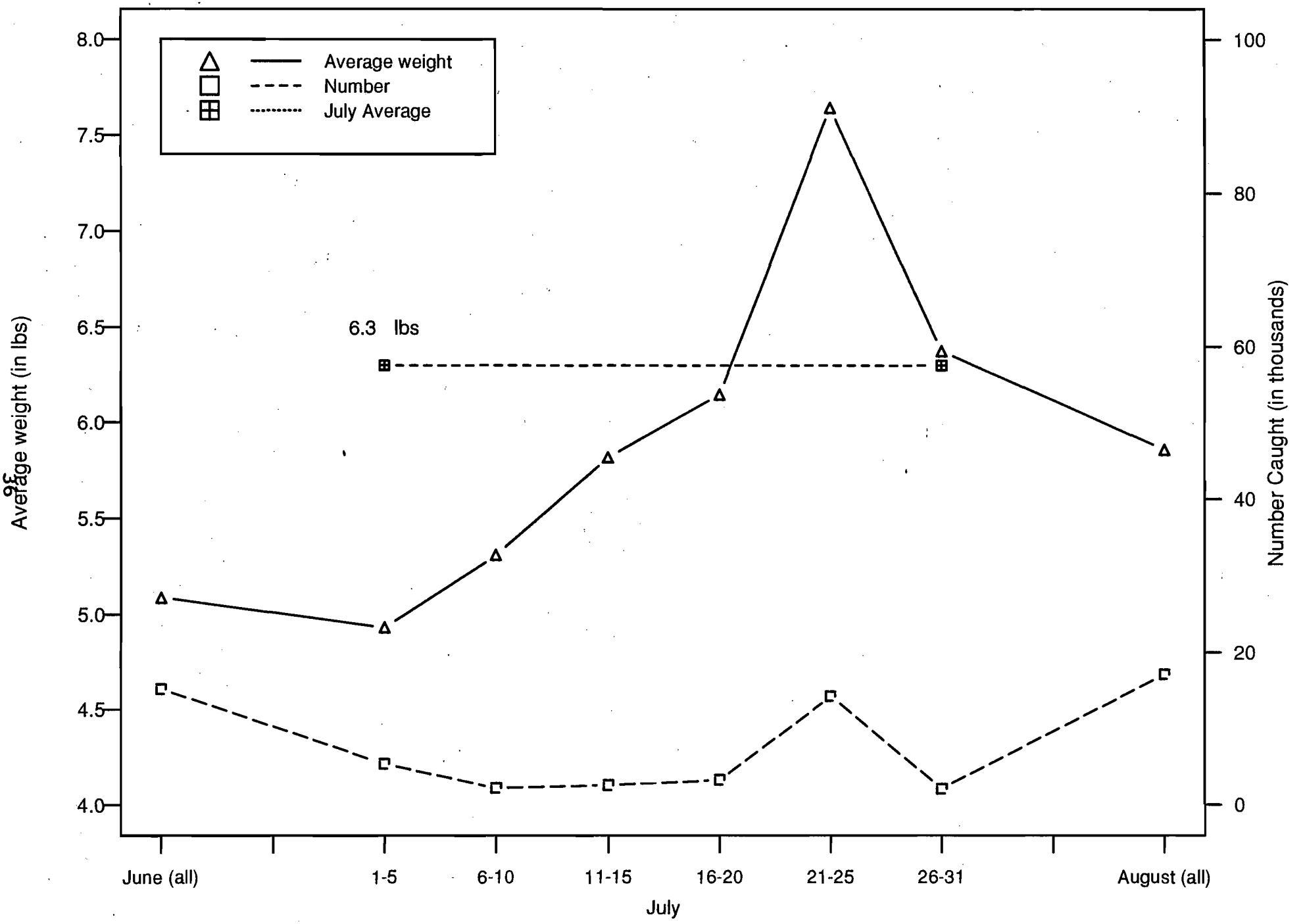

Figure 19. Central Section (254*), average weights and catch for sockeye salmon by selected periods, 1987.

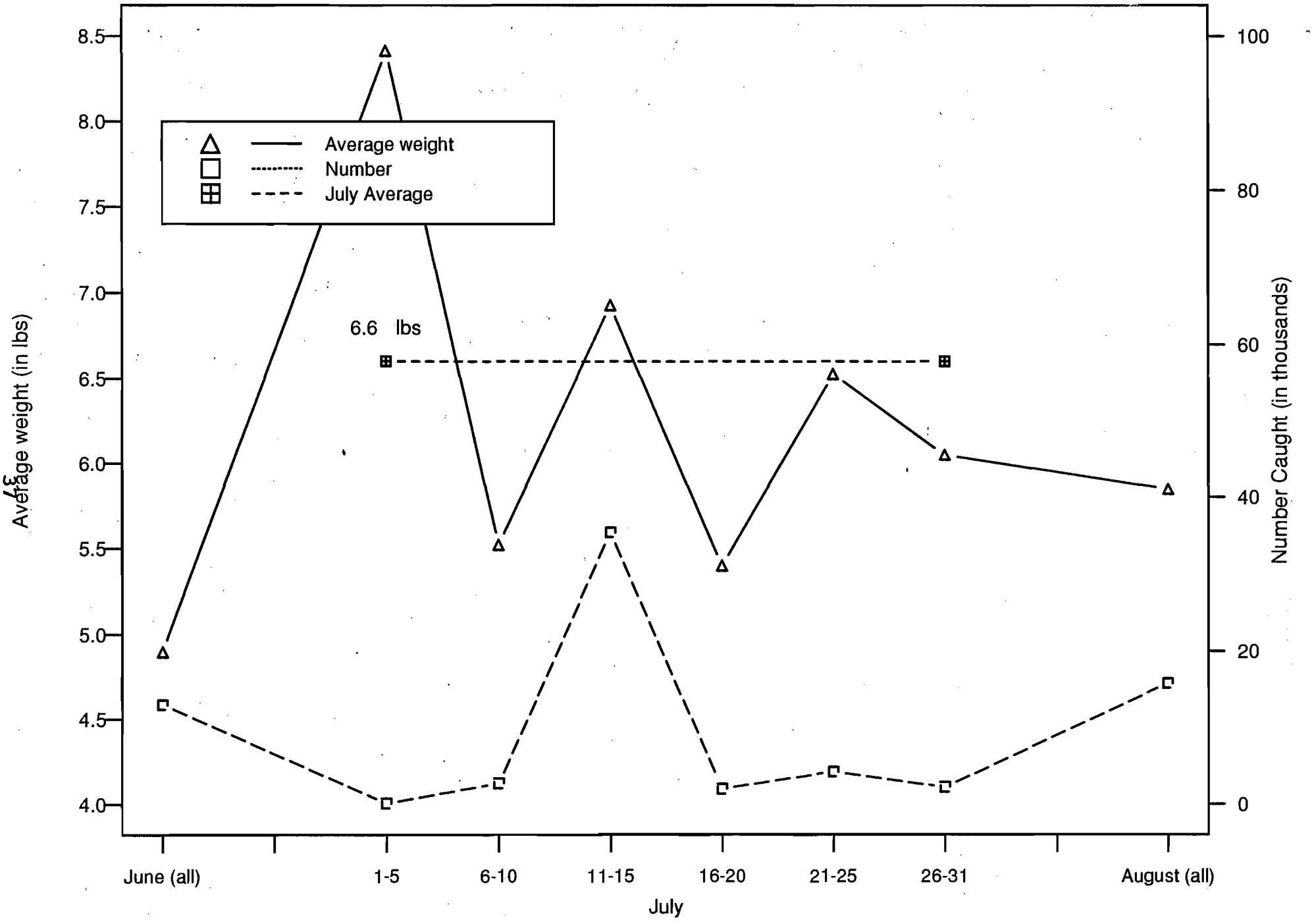

Figure 20. Central Section (254*), average weights and catch for sockeye salmon by selected periods, 1988.

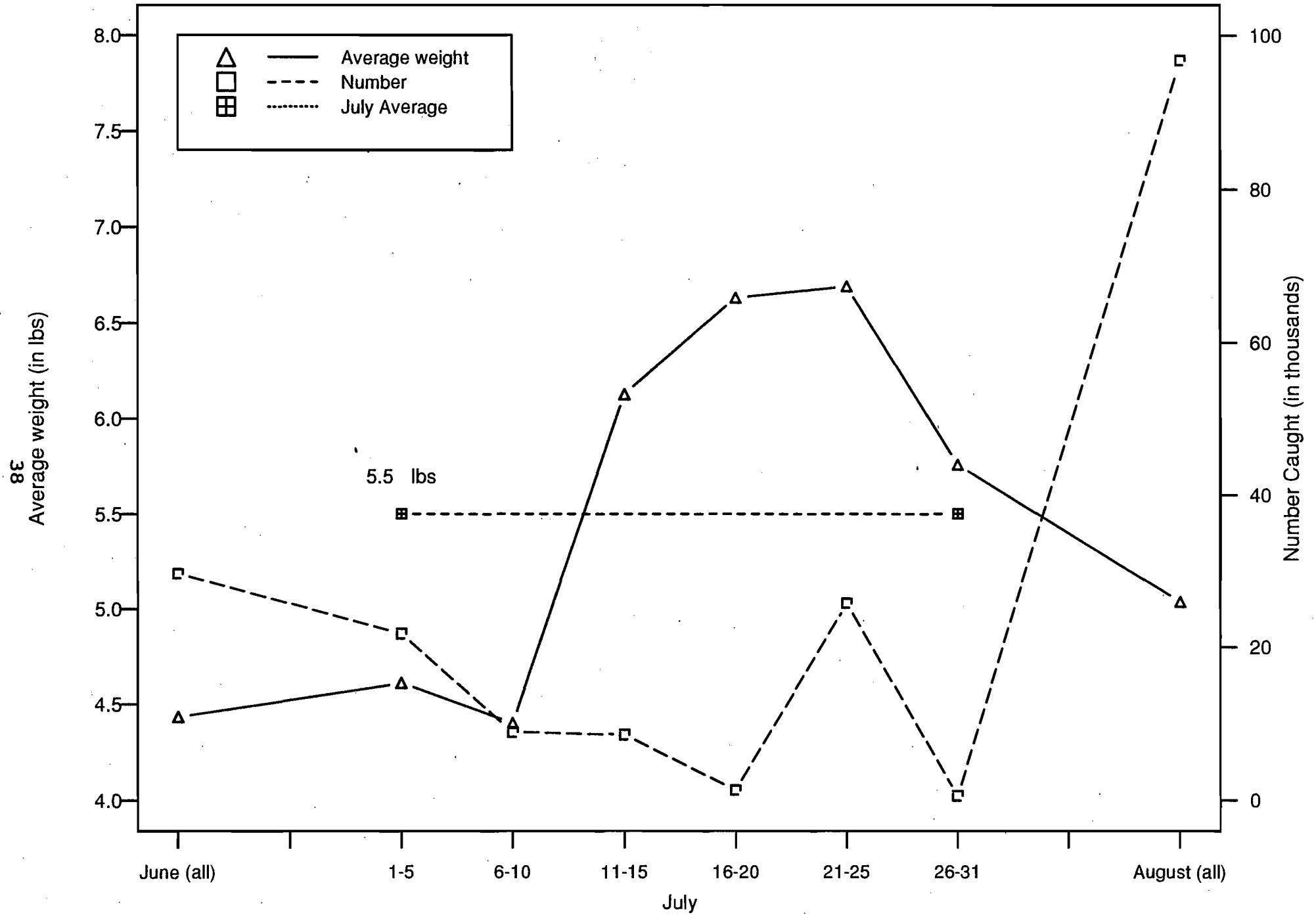

Figure 21. Central Section (254*), average weights and catch for sockeye salmon by selected periods, 1992.

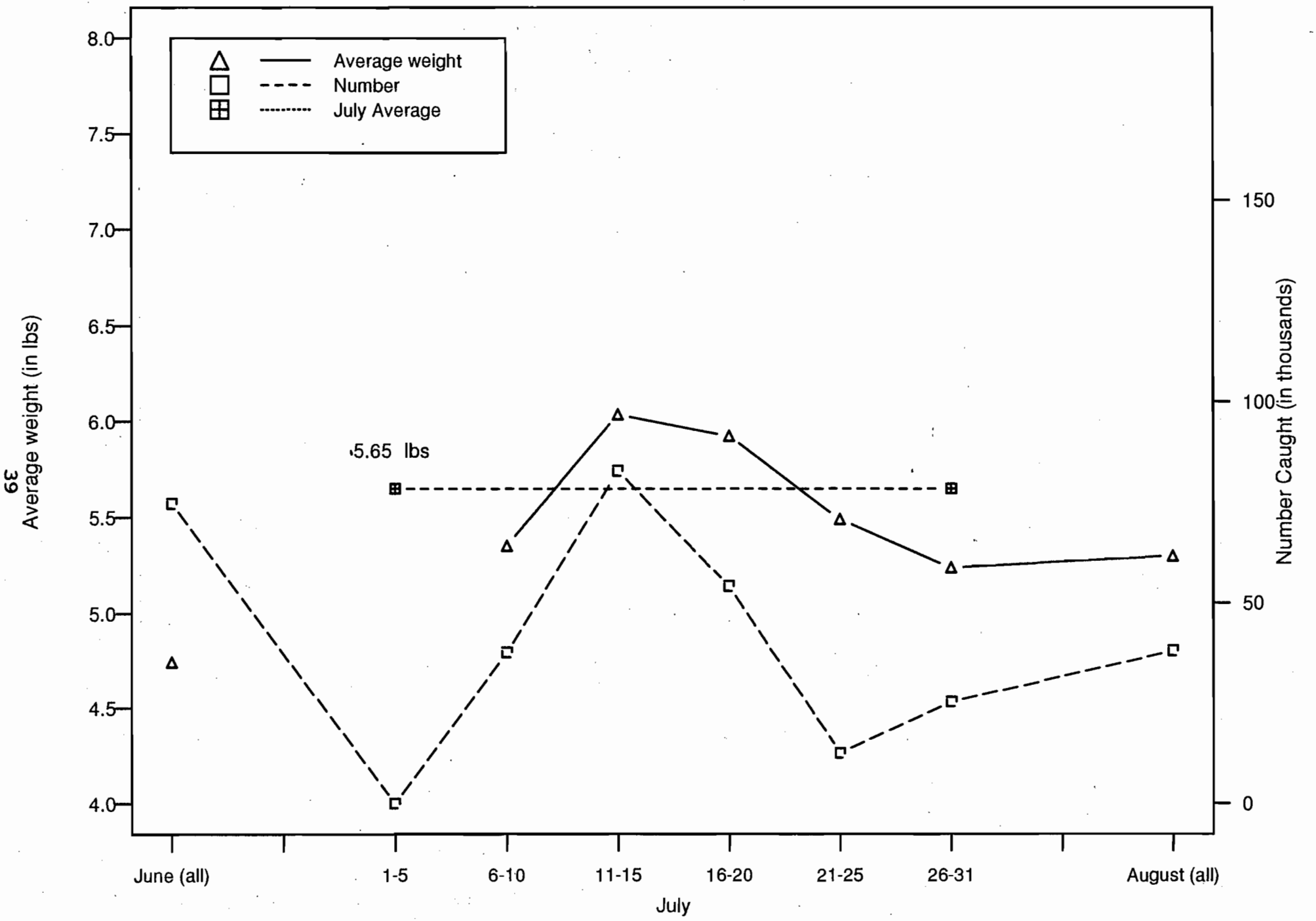

Figure 22. Halibut Bay Section average weights and catch for sockeye salmon by selected periods, 1988.

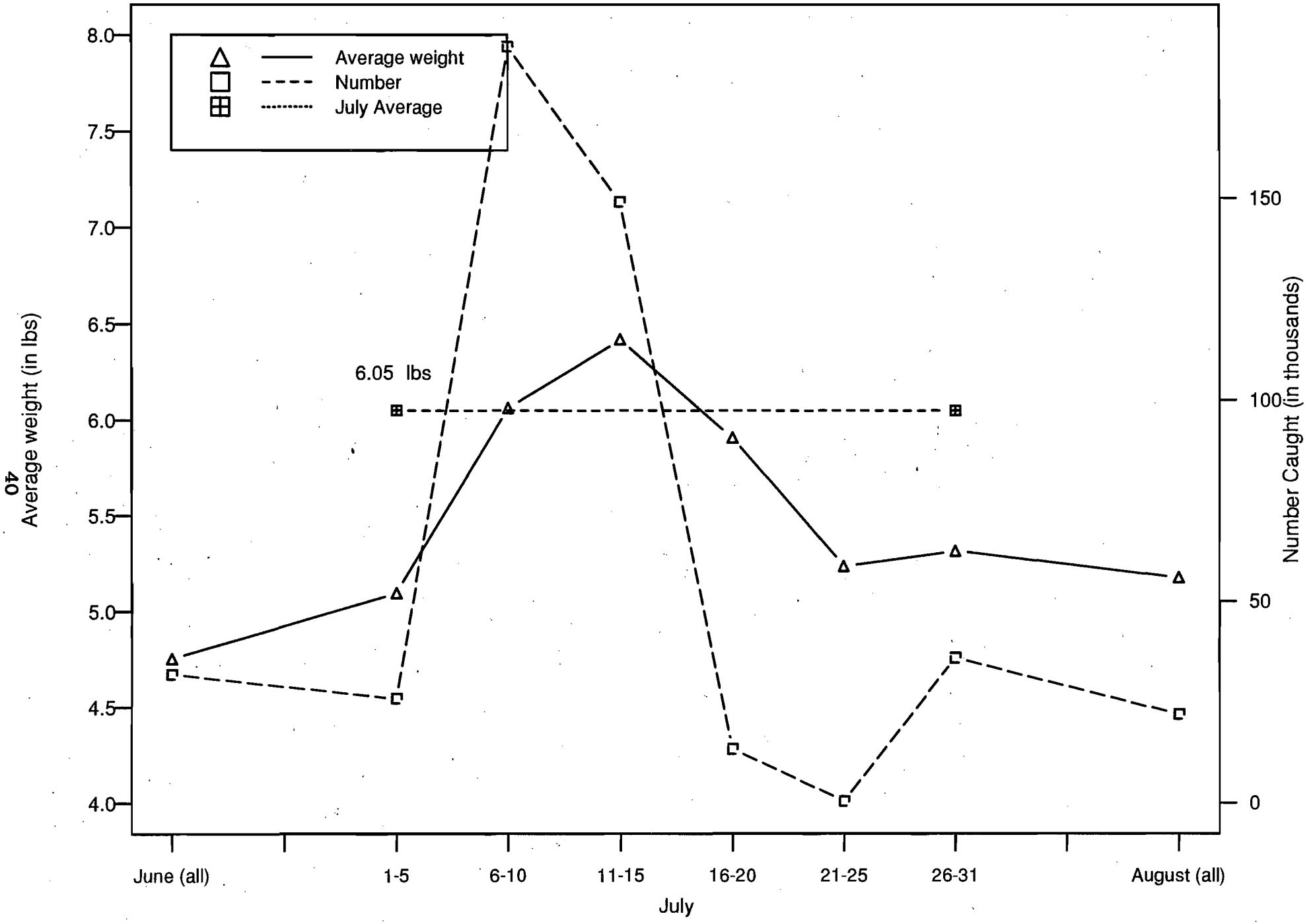

Figure 23. Halibut Bay Section average weights and catch for sockeye salmon by selected periods, 1992.

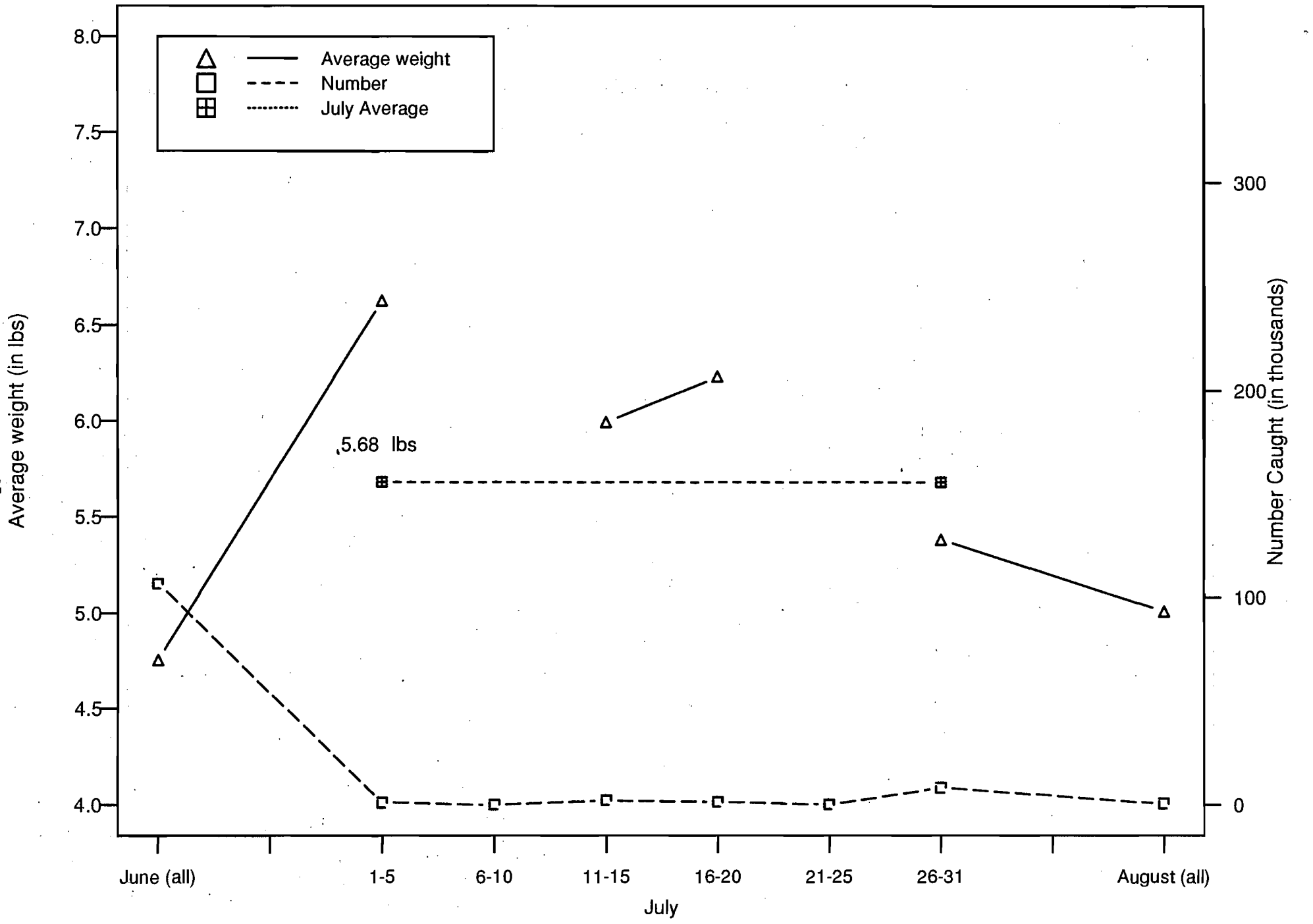

Figure 24. Ayakulik Section average weights and catch for sockeye salmon by selected periods, 1988.

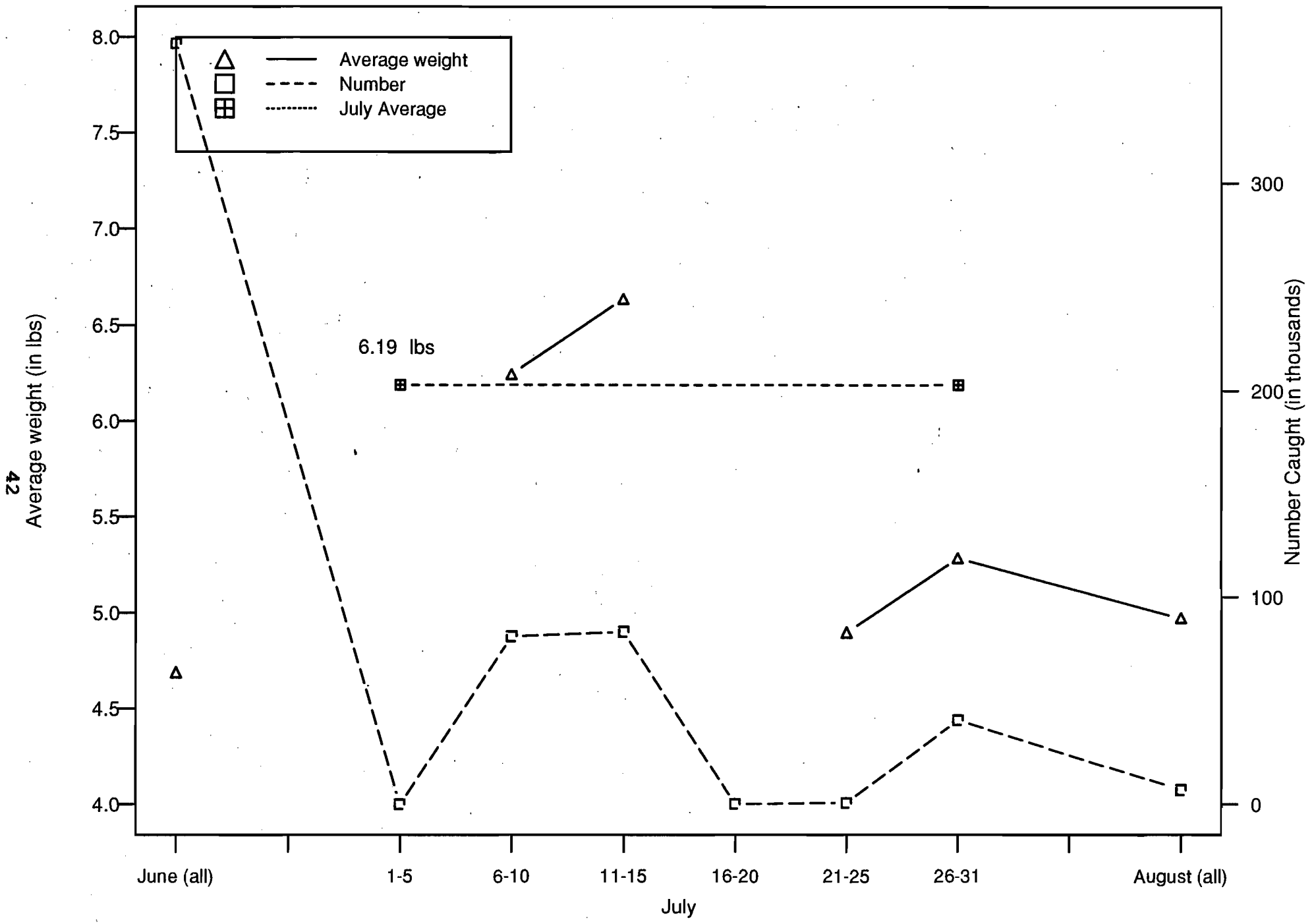

Figure 25. Ayakulik Section average weights and catch for sockeye salmon by selected periods, 1992.

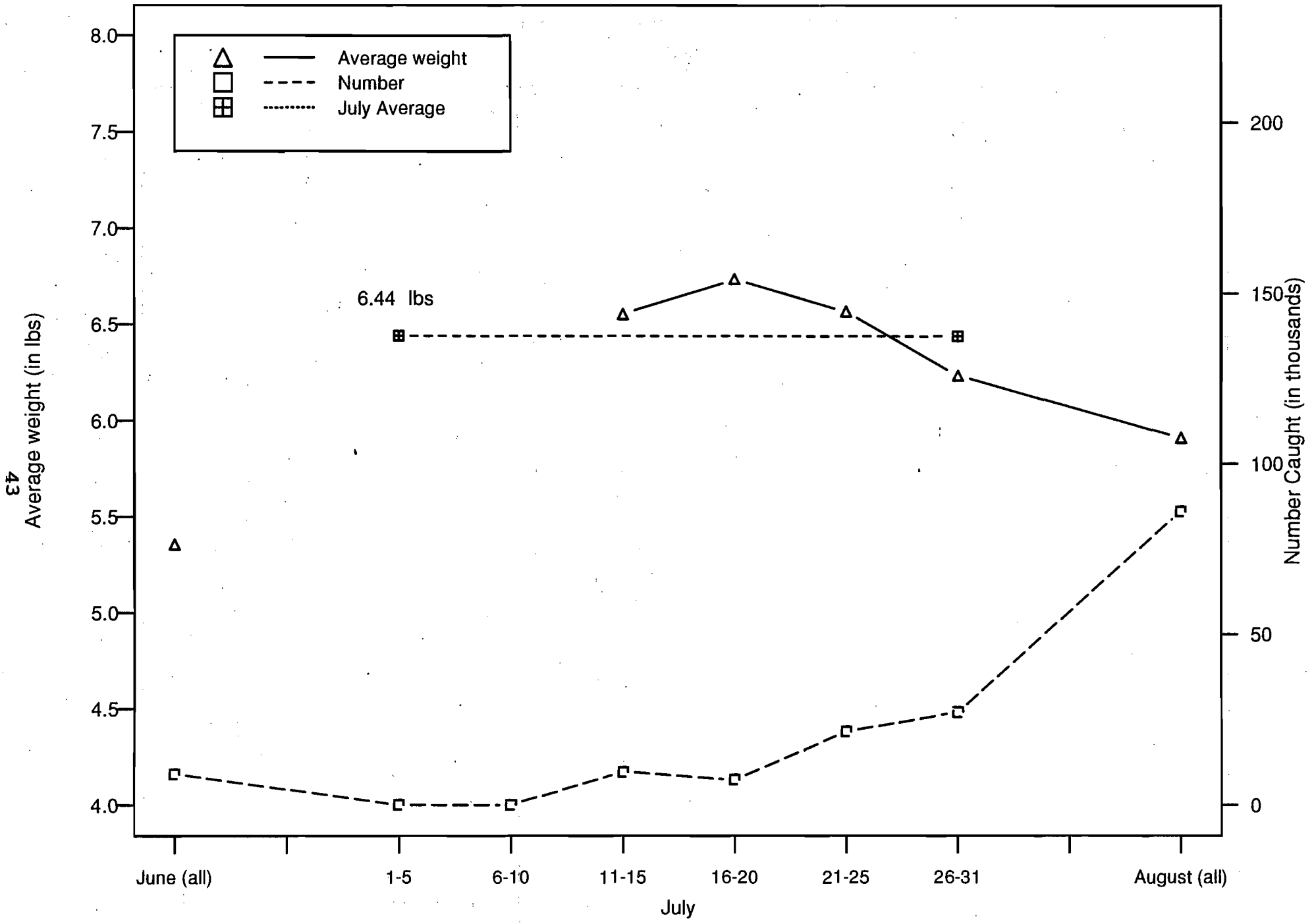

Figure 26. Cape Alitak Section average weights and catch for sockeye salmon by selected periods, 1987.

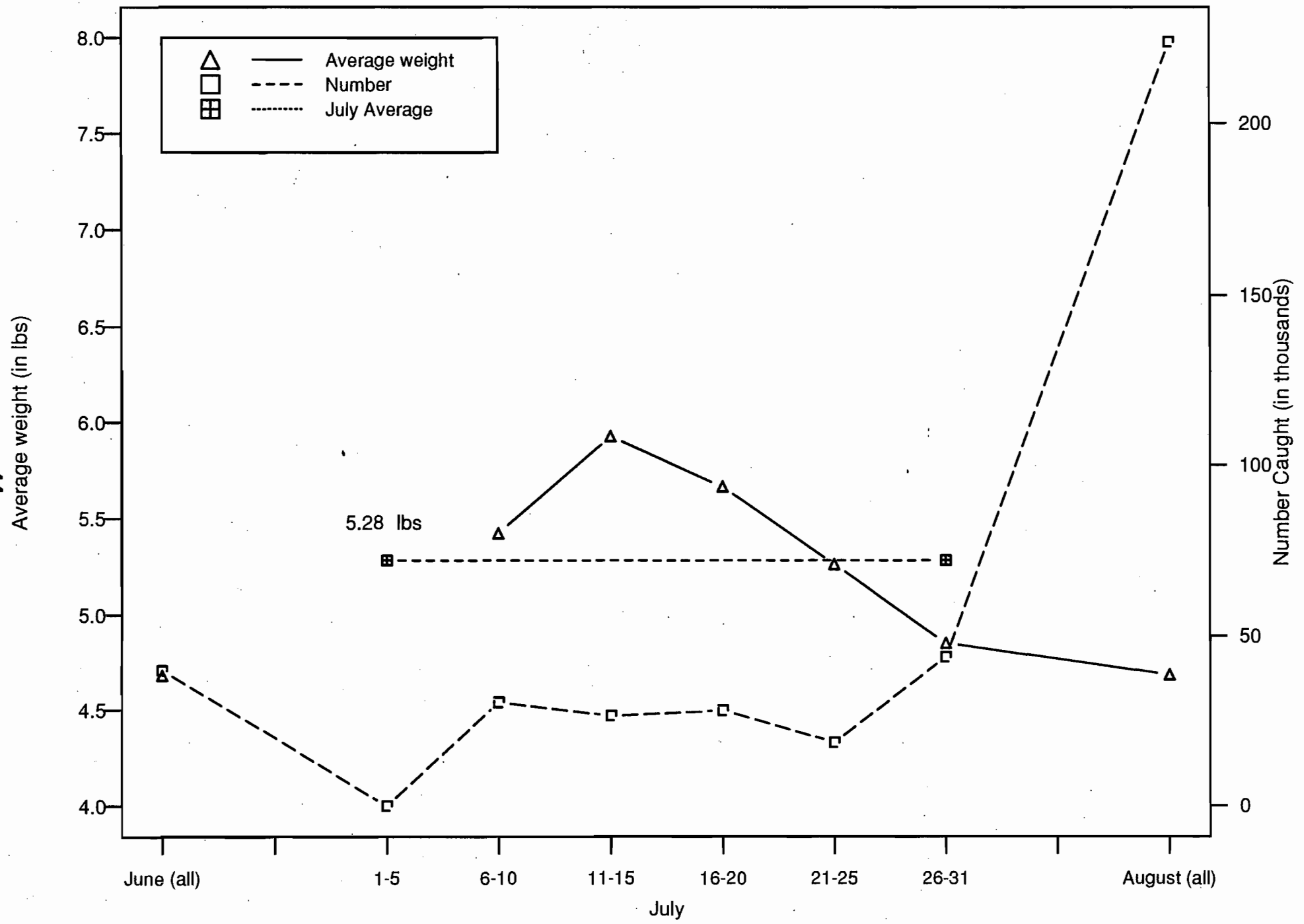

Figure 27. Cape Alitak Section average weights and catch for sockeye salmon by selected periods, 1988.

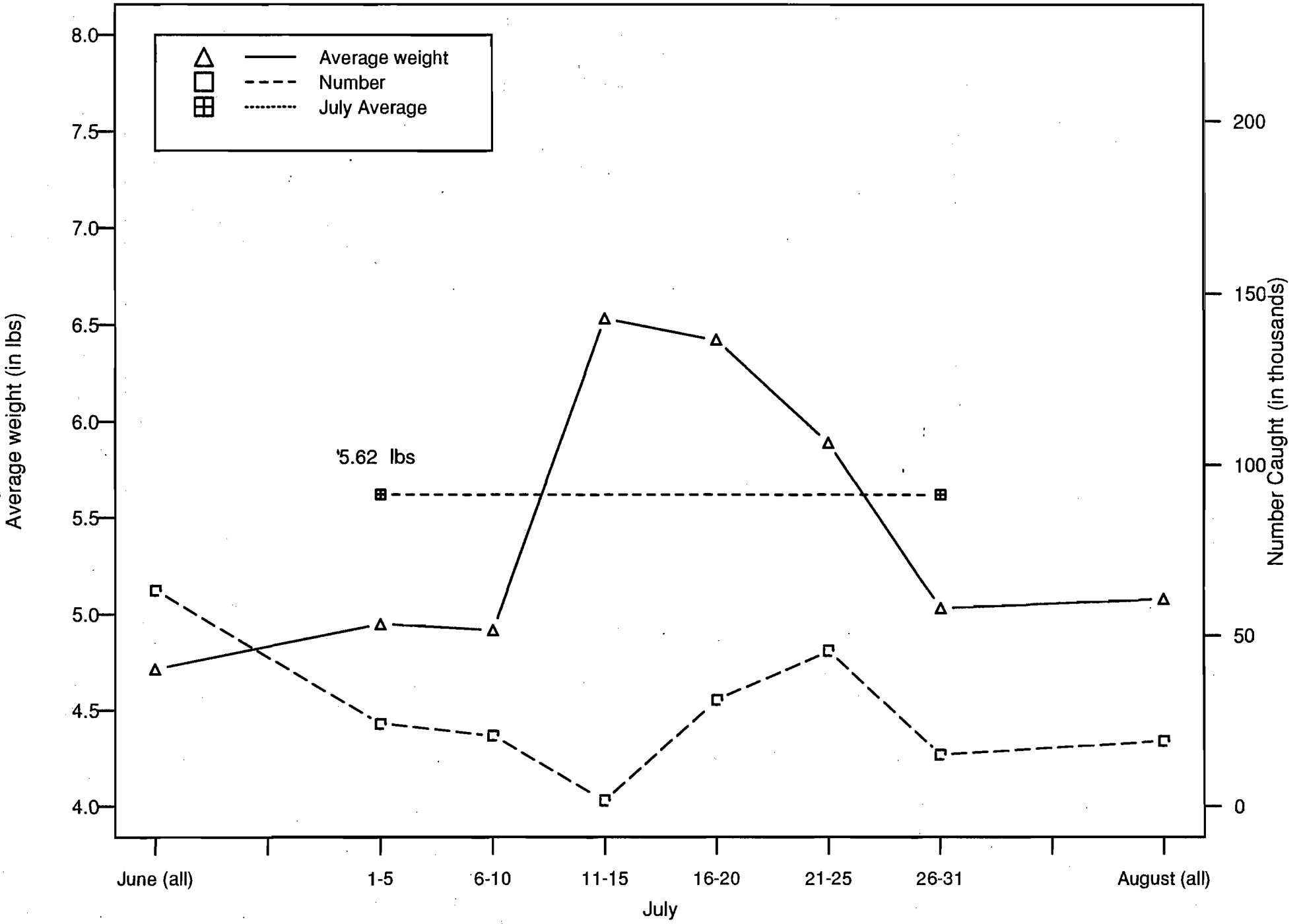

Figure 28. Cape Alitak Section average weights and catch for sockeye salmon by selected periods, 1992.

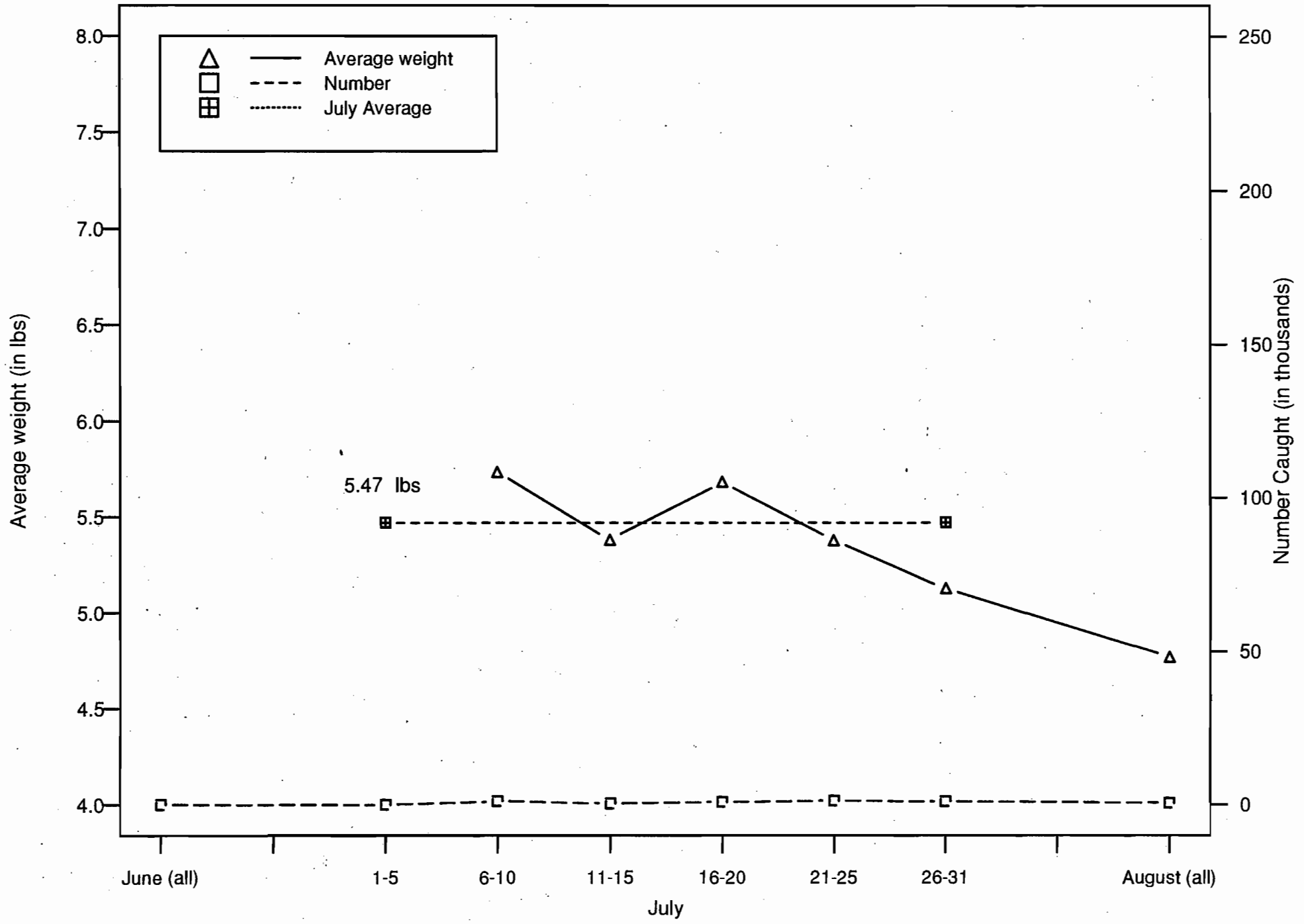

Figure 29. Sitkalidak Section average weights and catch for sockeye salmon by selected periods, 1983.

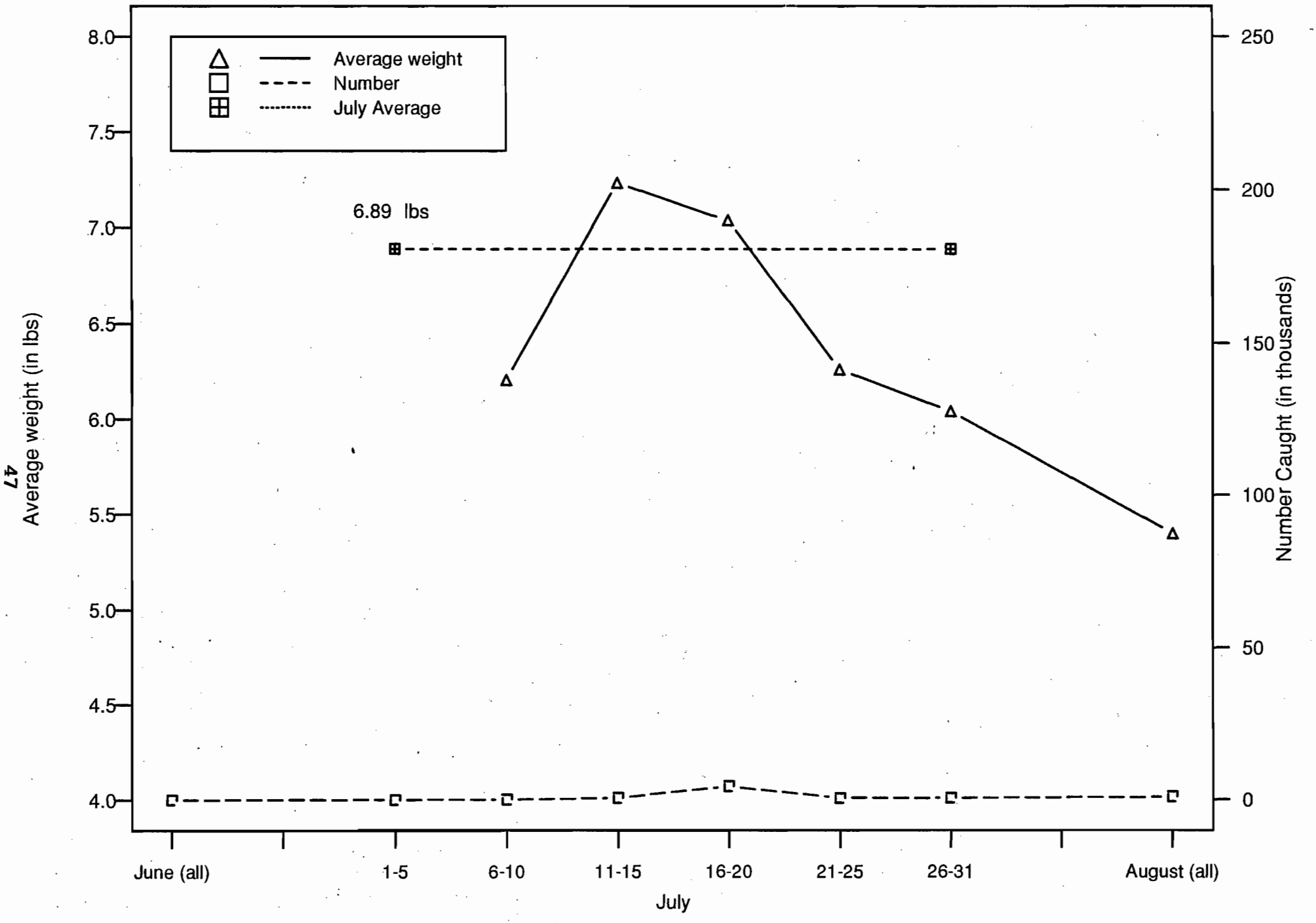

Figure 30. Sitkalidak Section average weights and catch for sockeye salmon by selected periods, 1987.

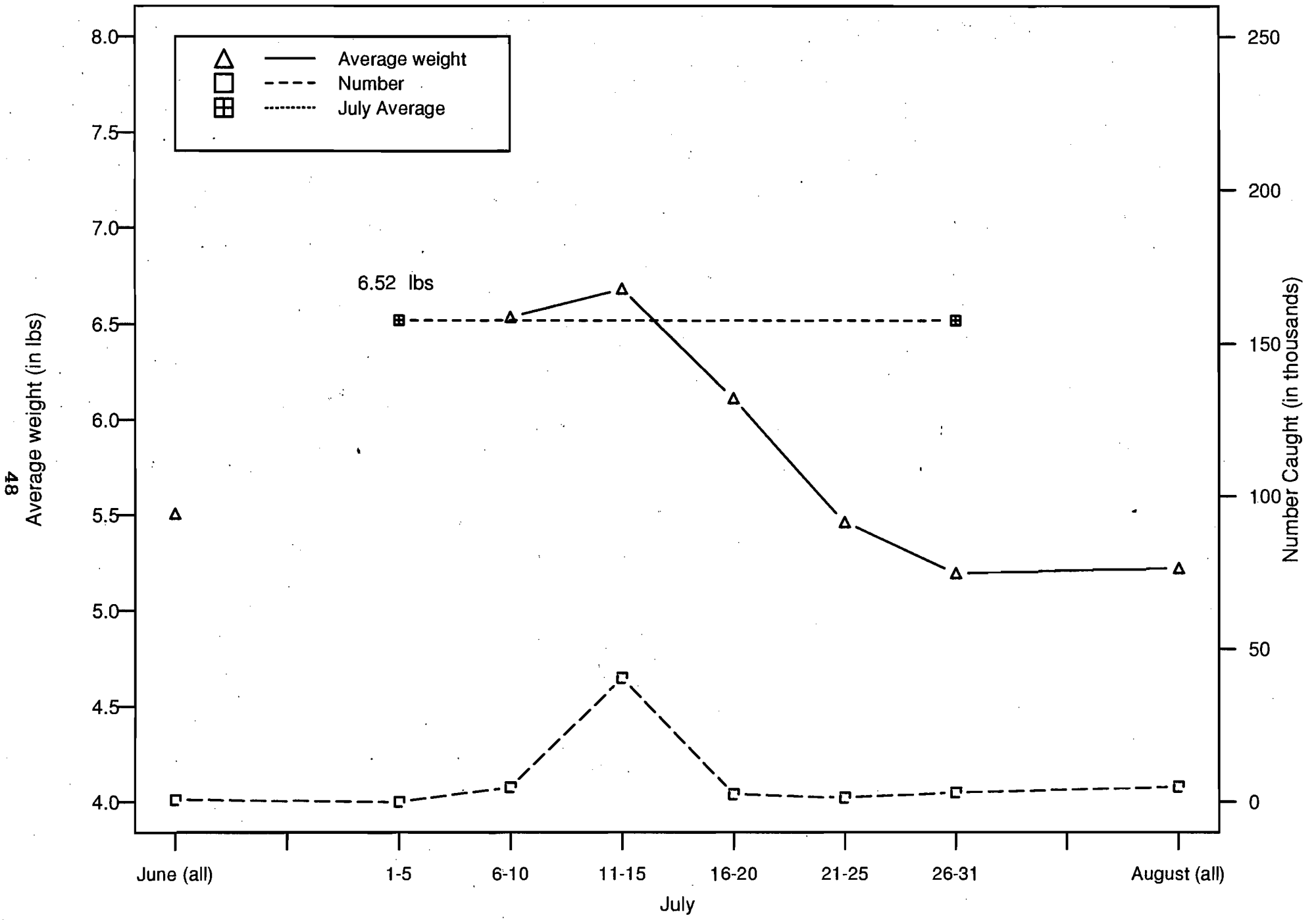

Figure 31. Sitkalidak Section average weights and catch for sockeye salmon by selected periods, 1988.

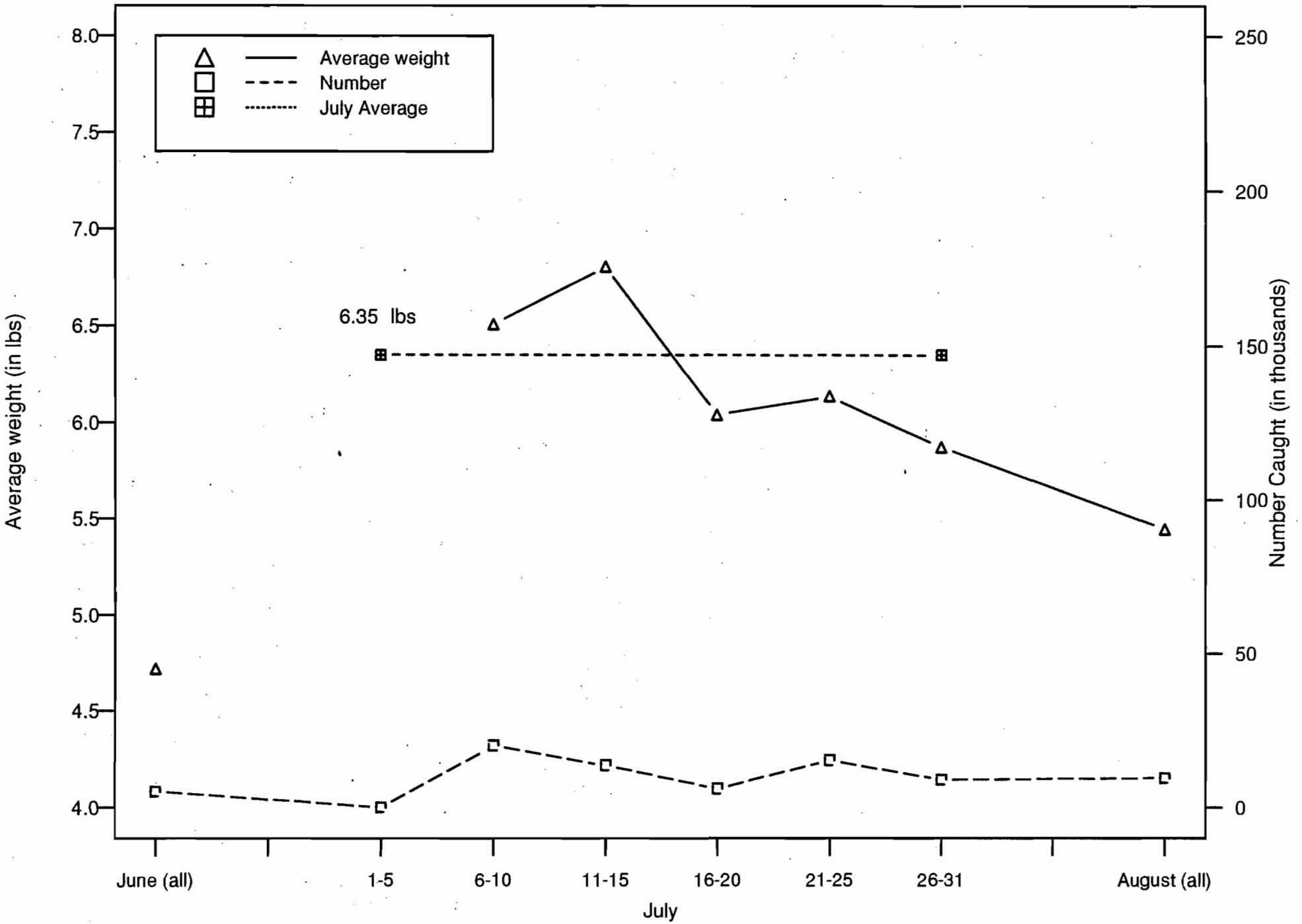

Figure 32. Sitkalidak Section average weights and catch for sockeye salmon by selected periods, 1990.

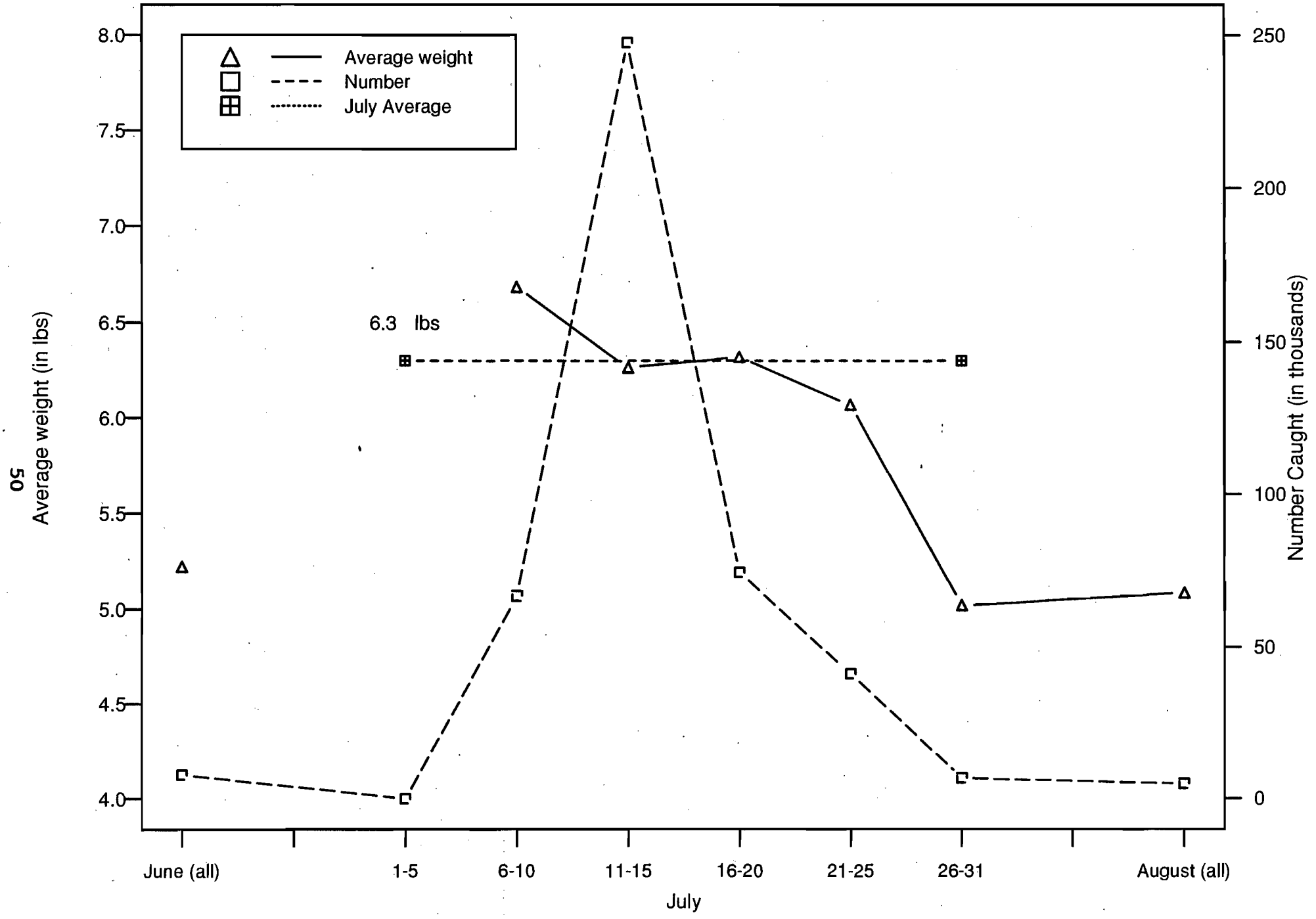

Figure 33. Sitkalidak Section average weights and catch for sockeye salmon by selected periods, 1992.

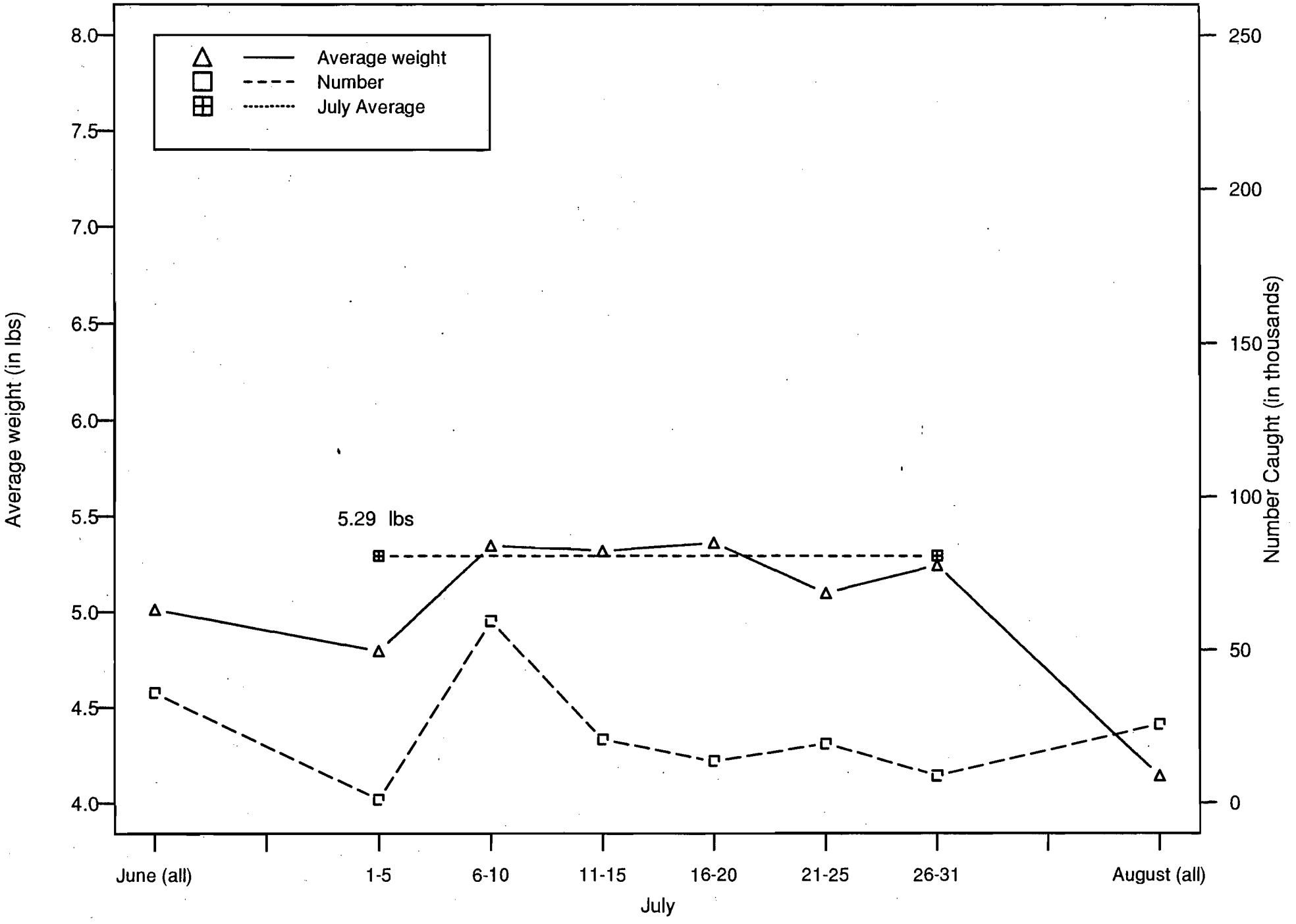

Figure 34. Sitkalidak Section average weights and catch for sockeye salmon by selected periods, 1993.

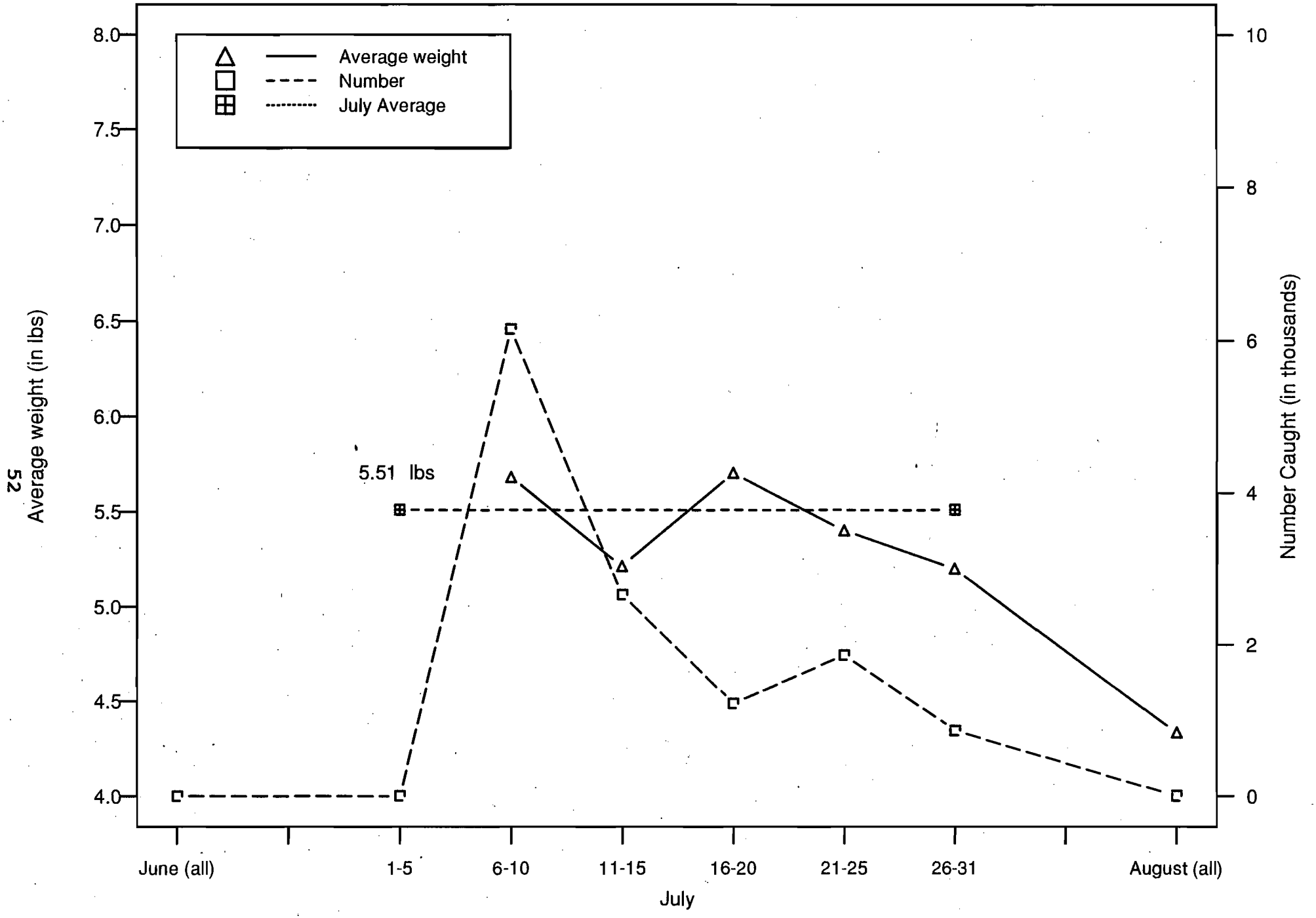

Figure 35. Ugak Bay Section average weights and catch for sockeye salmon by selected periods, 1990.

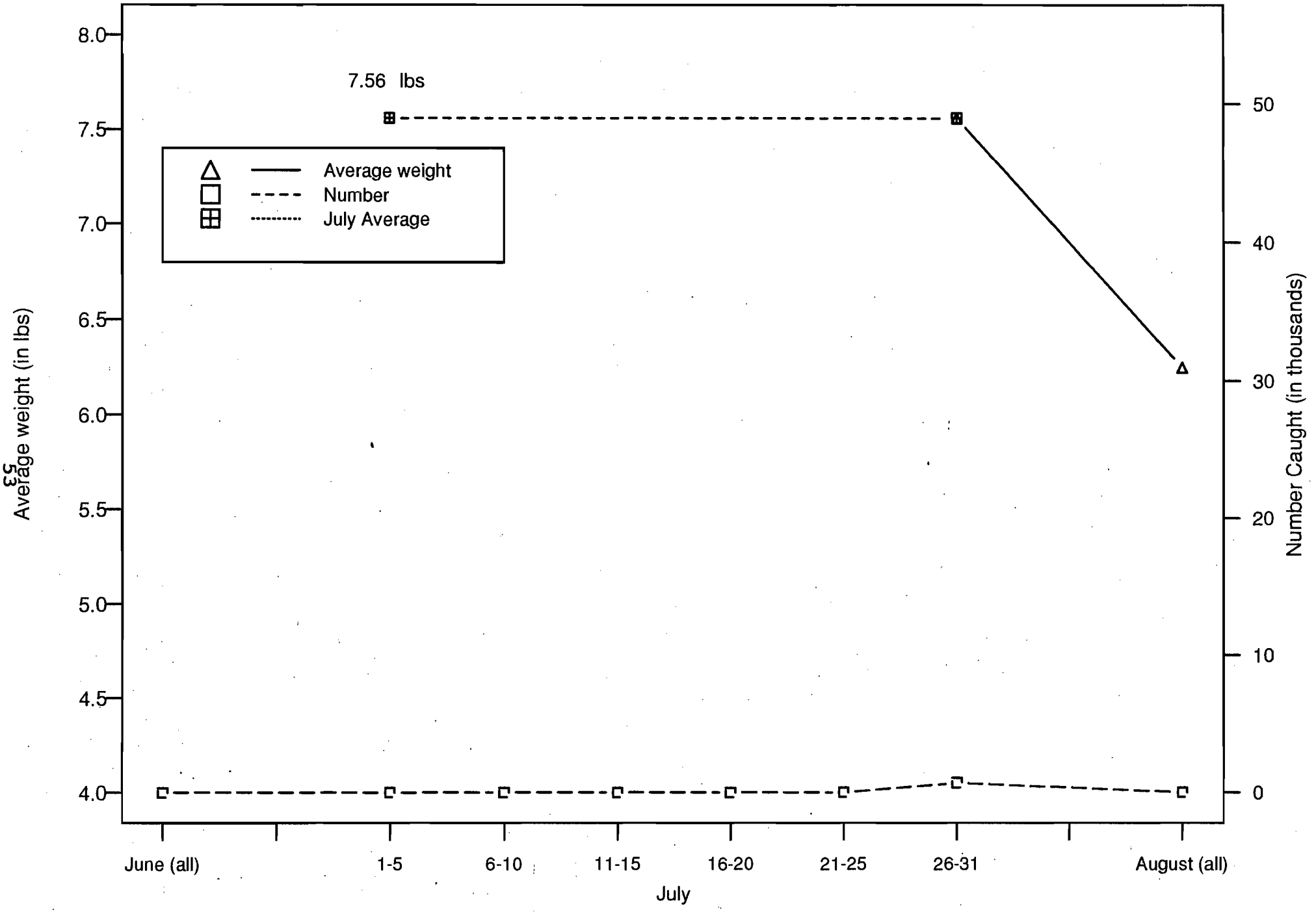

Figure 36. Katmai and Alinchak Sections average weights and catch for sockeye salmon by selected periods, 1983.

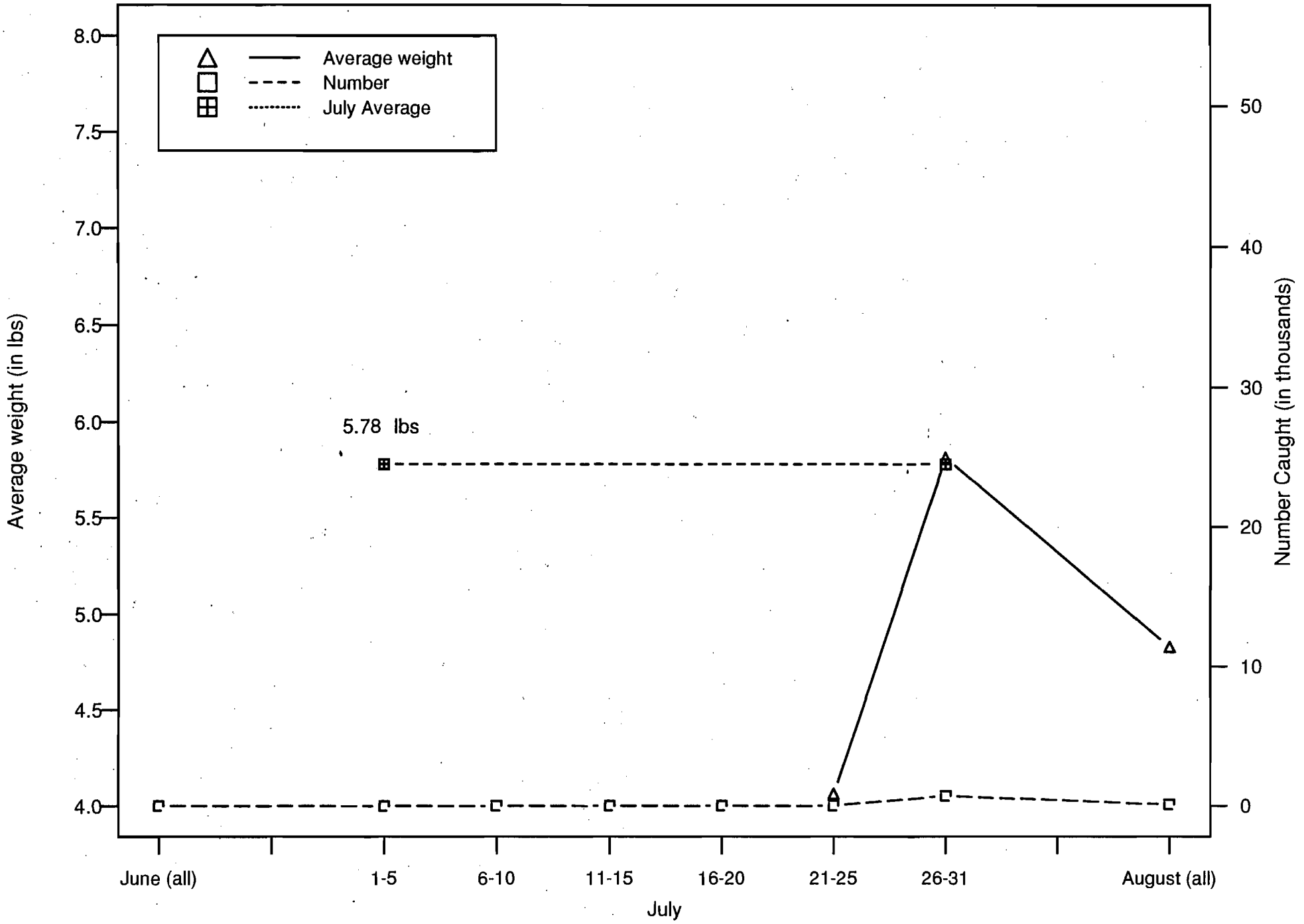

Figure 37. Katmai and Alinchak Sections average weights and catch for sockeye salmon by selected periods, 1985.

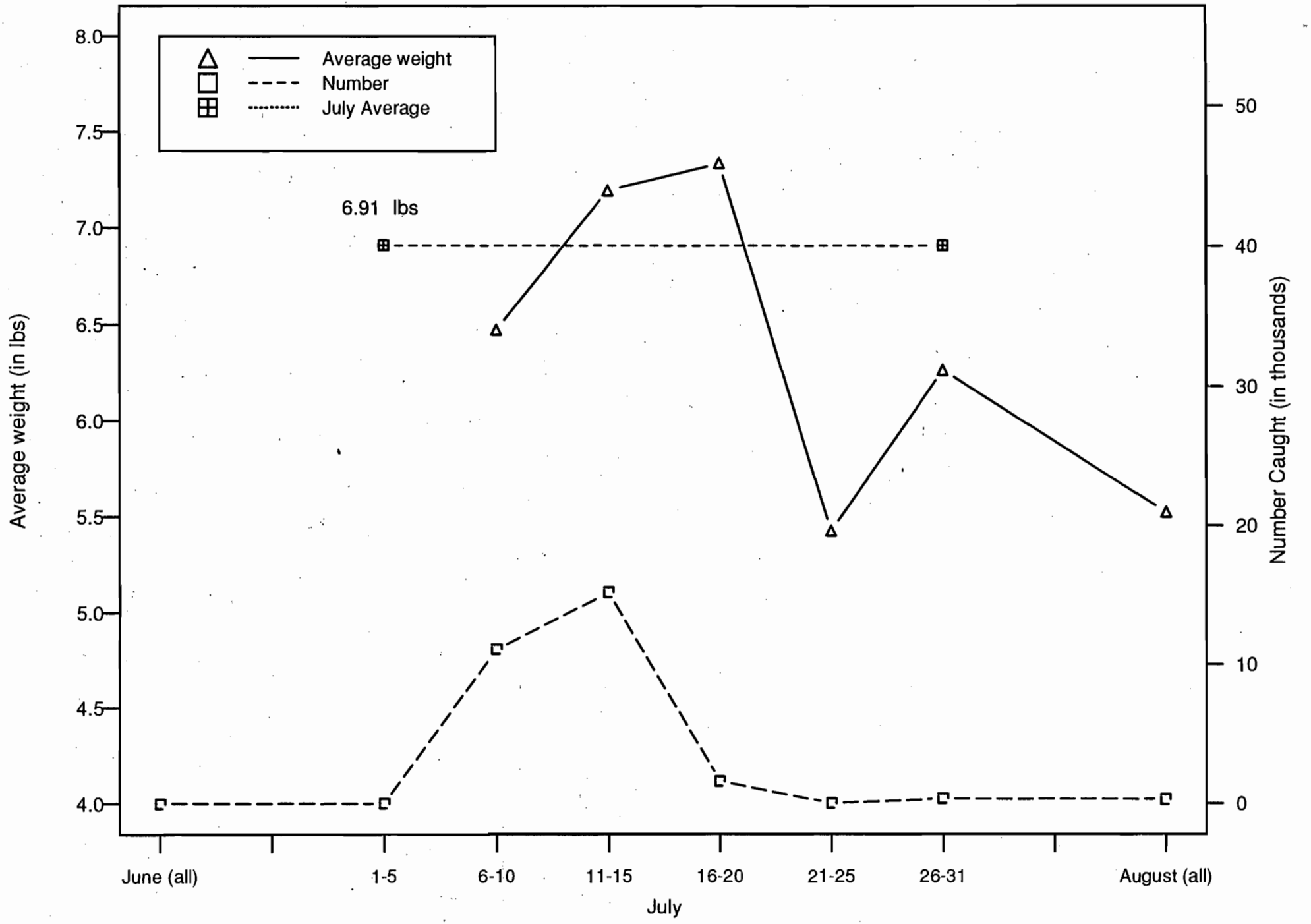

Figure 38. Katmai and Alinchak Sections average weights and catch for sockeye salmon by selected periods, 1988.

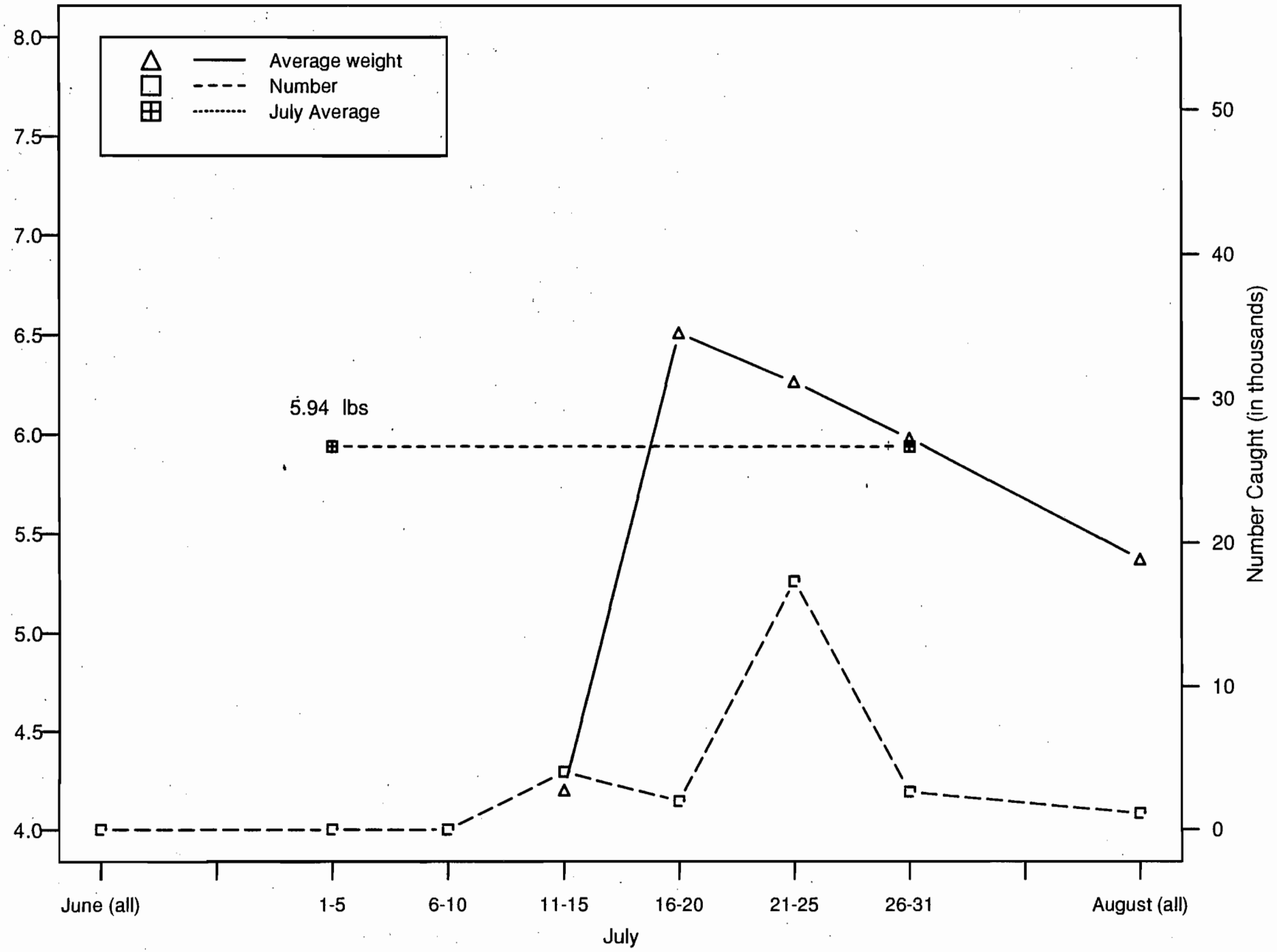

Figure 39. Katmai and Alinchak Sections average weights and catch for sockeye salmon by selected periods, 1990.

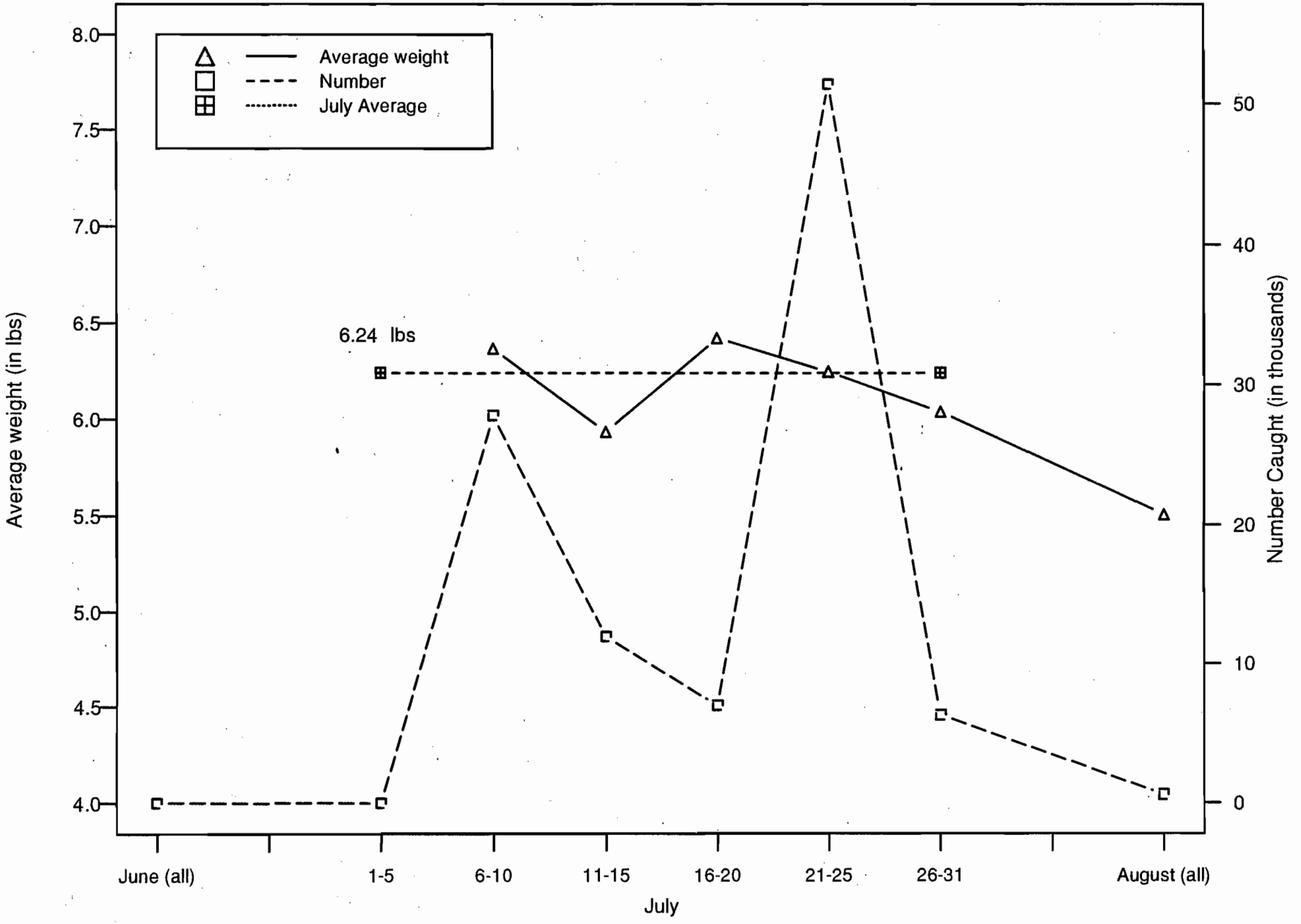

Figure 40. Katmai and Alinchak Sections average weights and catch for sockeye salmon by selected periods, 1992.

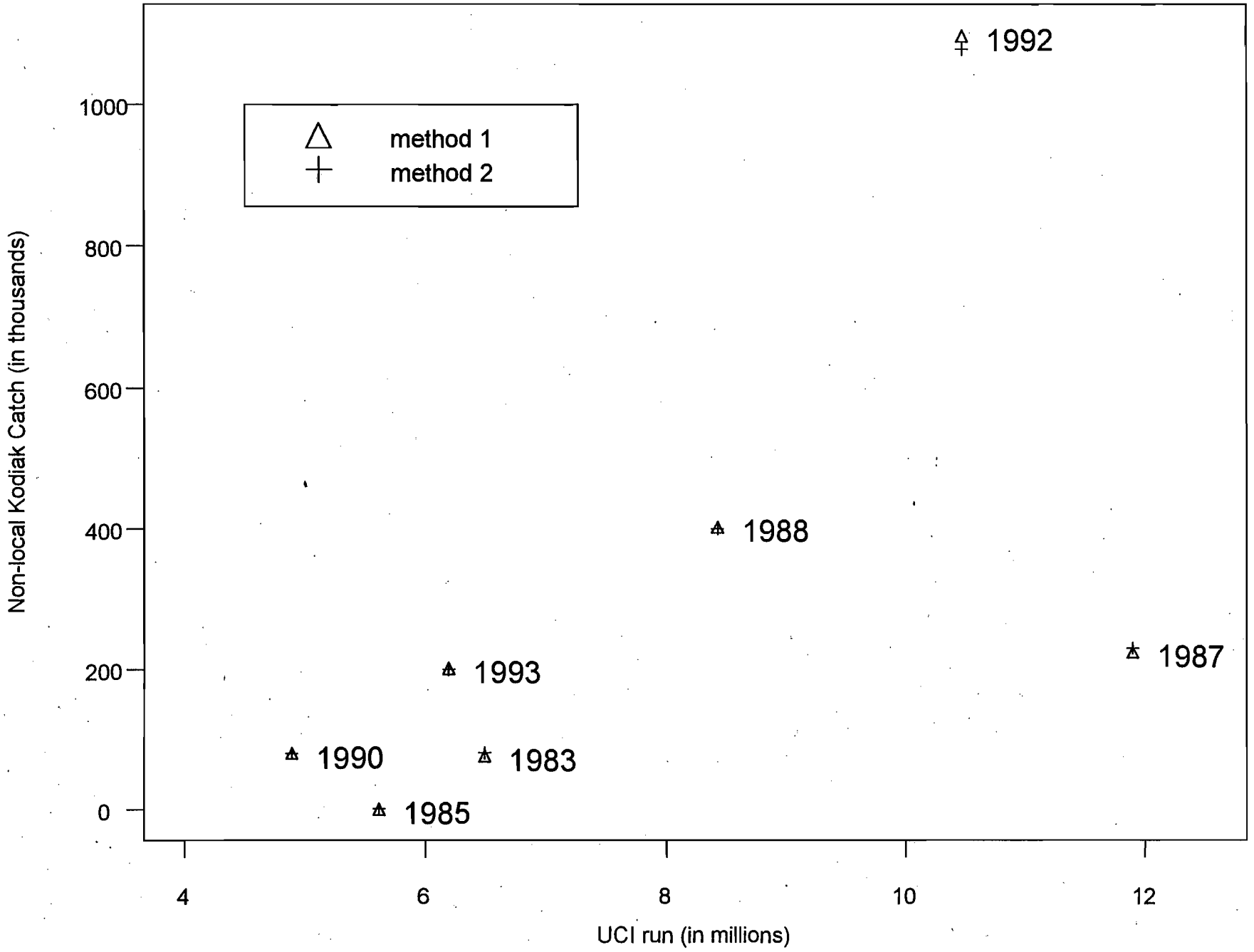

Figure 41. Upper Cook Inlet run versus estimated non-local Kodiak sockeye catch, from selected areas (Central (253*), Central (254*), Halibut Bay, Ayakulik, Cape Alitak, Sitkalidak, Ugak, and Katmai/Alinchak) of the KMA by year and method.

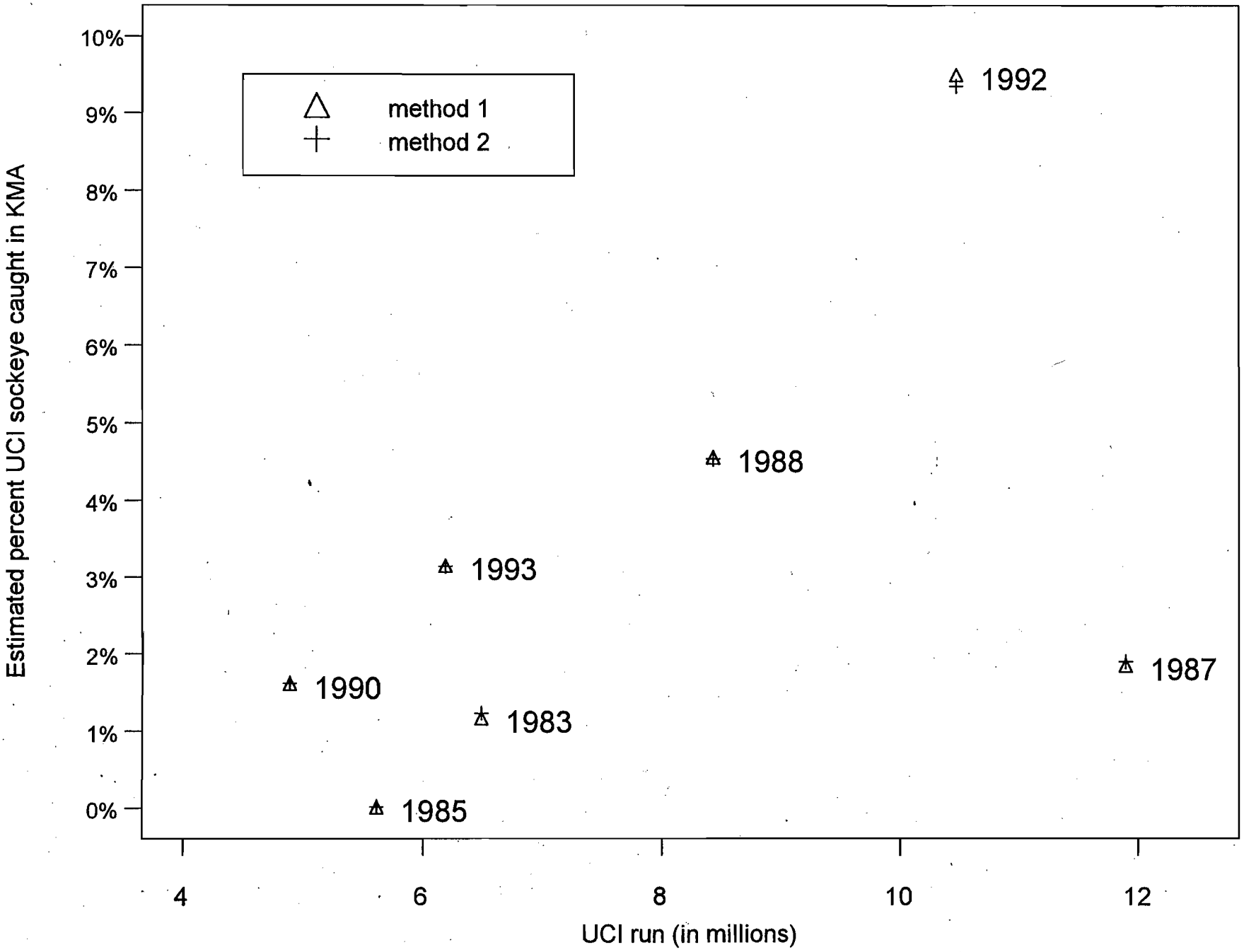

Figure 42. Estimated percent of the UCI sockeye salmon run harvested within the studied areas (Central(253*), Central (254*), Halibut Bay, Ayakulik, Cape Alitak, Sitkalidak, Ugak, and Katmai/Alinchak) of the KMA by year and method.

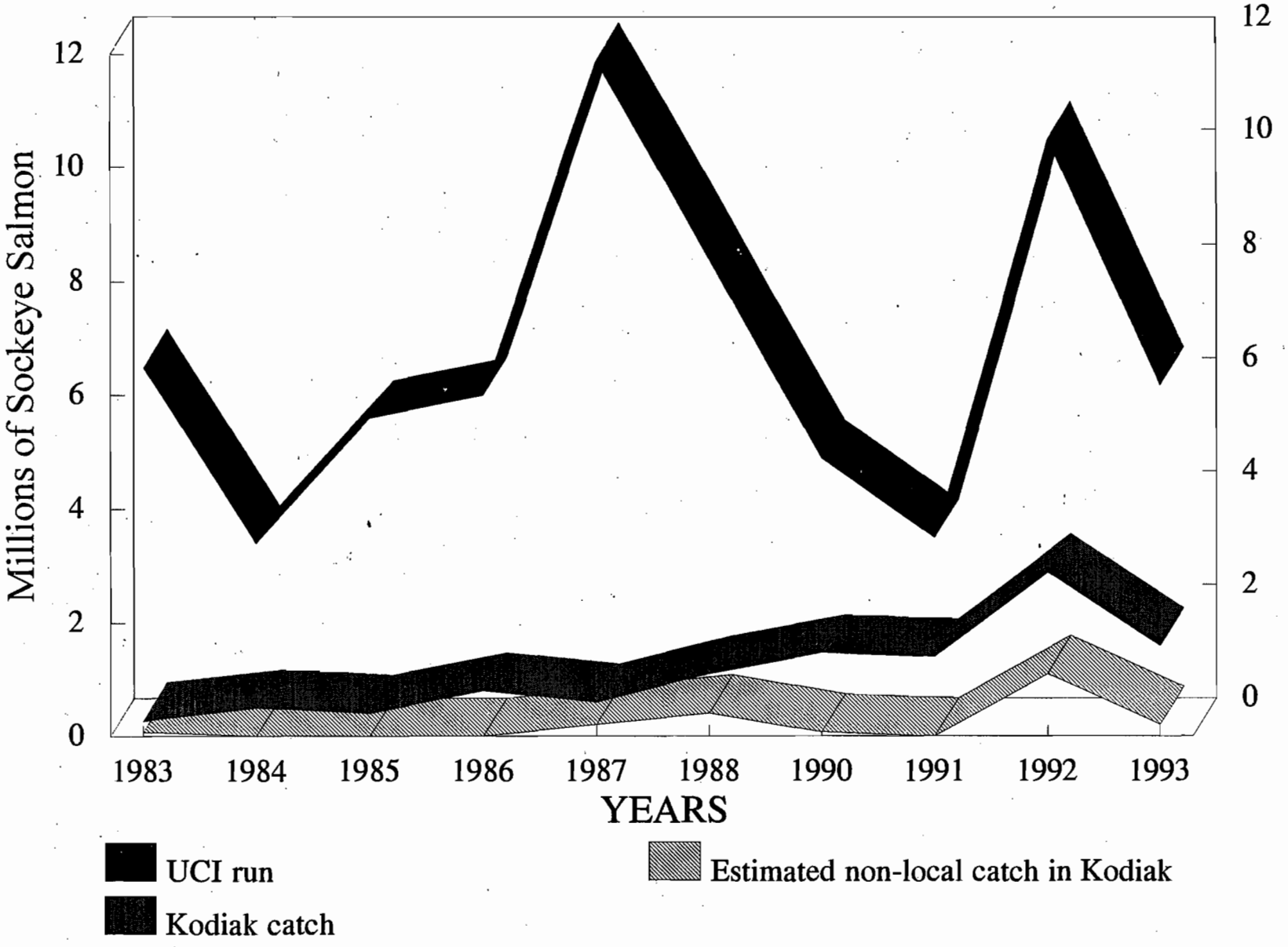

Figure 43. Upper Cook Inlet run, along with Kodiak total and non-local catch estimates for selected areas (Central(253*), Central(254*), Halibut Bay, Ayakulik, Cape Alitak, Sitkalidak, Ugak and Katmai/Alinchak)

APPENDIX

Appendix A. 1. Proportion of the Central Section (253*) seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1987, 1988, 1992 and 1993, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.5447	0.5472	2.05×10^{-4}	1.48×10^{-4}	0.5166	0.5728	0.5234	0.5710
1987	1.4253	1.4317	6.60×10^{-5}	7.16×10^{-5}	1.4075	1.4393	1.4137	1.4469
1988	1.0646	1.0643	1.36×10^{-6}	1.21×10^{-6}	1.0624	1.0669	1.0622	1.0665
1992	0.7566	0.7584	1.56×10^{-6}	1.34×10^{-6}	0.7542	0.7591	0.7561	0.7606
1993	0.7269	0.7011	4.19×10^{-6}	6.25×10^{-6}	0.7248	0.7289	0.6986	0.7036

Appendix A. 2. Proportion of the Central Section (253*) seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, 1987, 1988, 1992 and 1993, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.5286	0.5312	2.07×10^{-4}	1.49×10^{-4}	0.5004	0.5568	0.5072	0.5551
1987	1.2475	1.2508	1.75×10^{-5}	1.89×10^{-5}	1.2393	1.2558	1.2423	1.2593
1988	0.9860	0.9860	4.67×10^{-7}	4.58×10^{-7}	0.9846	0.9873	0.9847	0.9873
1992	0.7314	0.7332	1.79×10^{-6}	1.55×10^{-6}	0.7287	0.7340	0.7308	0.7357
1993	0.6456	0.6163	5.35×10^{-6}	7.74×10^{-6}	0.6433	0.6479	0.6135	0.6190

Appendix A. 3. Proportion of the Central Section (254*) seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1987, 1988, and 1992 also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.4524	0.5323	1.18×10^{-4}	2.02×10^{-4}	0.4311	0.4736	0.5044	0.5601
1987	0.6099	0.6453	1.57×10^{-5}	1.28×10^{-5}	0.6021	0.6176	0.6383	0.6523
1988	0.9650	0.9661	1.17×10^{-7}	3.92×10^{-7}	0.9644	0.9657	0.9649	0.9674
1992	0.3455	0.4163	5.08×10^{-6}	4.80×10^{-6}	0.3410	0.3499	0.4120	0.4206

Appendix A. 4. Proportion of the Central Section (254*) seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, 1987, 1988, and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.4418	0.5216	1.17×10^{-4}	2.03×10^{-4}	0.4206	0.4630	0.4937	0.5495
1987	0.5483	0.5855	1.70×10^{-5}	1.43×10^{-5}	0.5402	0.5564	0.5781	0.5929
1988	0.8961	0.8991	9.76×10^{-7}	9.72×10^{-7}	0.8941	0.8980	0.8972	0.9010
1992	0.3344	0.4044	4.93×10^{-6}	4.72×10^{-6}	0.3301	0.3388	0.4002	0.4087

Appendix A. 5. Proportion of the Halibut Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	0.4080	0.3922	1.55×10^{-6}	1.76×10^{-6}	0.4056	0.4105	0.3896	0.3948
1992	0.6723	0.6376	1.50×10^{-6}	2.14×10^{-6}	0.6699	0.6747	0.6347	0.6404

Appendix A. 6. Proportion of the Halibut Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	0.3869	0.3714	1.50×10^{-6}	1.69×10^{-6}	0.3845	0.3893	0.3688	0.3739
1992	0.6509	0.6152	1.61×10^{-6}	2.26×10^{-6}	0.6484	0.6534	0.6122	0.6181

Appendix A. 7. Proportion of the Ayakulik Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	0.4908	a	1.42×10^{-6}	a	0.4884	0.4931	a	a
1992	0.7842	0.7560	1.75×10^{-7}	1.02×10^{-6}	0.7834	0.7850	0.7541	0.7580

[a] There were no sockeye caught during August, for this year and area.

Appendix A. 8. Proportion of the Ayakulik Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	0.4680	a	1.42×10^{-6}	a	0.4657	0.4703	a	a
1992	0.7620	0.7319	2.15×10^{-7}	1.16×10^{-6}	0.7611	0.7629	0.7298	0.7340

[a] There were no sockeye caught during August for this year and area.

Appendix A. 9. Proportion of the Cape Alitak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1987, 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1987	0.6639	0.7288	4.80×10^{-6}	5.83×10^{-6}	0.6596	0.6682	0.7241	0.7335
1988	0.3067	0.3131	1.66×10^{-6}	3.30×10^{-6}	0.3042	0.3093	0.3095	0.3166
1992	0.4567	0.4235	3.38×10^{-6}	5.74×10^{-6}	0.4531	0.4603	0.4188	0.4282

Appendix A. 10. Proportion of the Cape Alitak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1987, 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1987	0.5816	0.6541	5.63×10^{-6}	7.58×10^{-6}	0.5770	0.5863	0.6487	0.6595
1988	0.2931	0.2993	1.58×10^{-6}	3.14×10^{-6}	0.2906	0.2956	0.2958	0.3027
1992	0.4431	0.4101	3.35×10^{-6}	5.64×10^{-6}	0.4395	0.4466	0.4055	0.4148

Appendix A. 11. Proportion of the Sitkalidak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1987, 1988, 1990, 1992 and 1993, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.4082	a	9.02×10^{-4}	a	0.3494	0.4671	a	a
1987	1.1097	a	1.54×10^{-5}	a	1.1018	1.1172	a	a
1988	0.9172	a	3.01×10^{-6}	a	0.9138	0.9205	a	a
1990	0.9289	0.9346	1.21×10^{-6}	9.96×10^{-7}	0.9267	0.9310	0.9326	0.9365
1992	0.7901	0.7932	4.01×10^{-6}	4.10×10^{-6}	0.7861	0.7940	0.7893	0.7972
1993	0.5185	0.5506	1.02×10^{-5}	8.04×10^{-6}	0.5153	0.5217	0.5478	0.5535

[a] There were no sockeye caught during June, for this year and area.

Appendix A. 12. Proportion of the Sitkalidak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, 1987, 1988, 1990, 1992 and 1993, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.4013	a	8.92×10^{-4}	a	0.3427	0.4598	a	a
1987	1.0137	a	3.96×10^{-7}	a	1.0125	1.0149	a	a
1988	0.8631	a	7.01×10^{-6}	a	0.8579	0.8683	a	a
1990	0.8665	0.8765	2.46×10^{-6}	2.03×10^{-6}	0.8635	0.8696	0.8738	0.8793
1992	0.7606	0.7641	4.84×10^{-6}	4.96×10^{-6}	0.7563	0.7649	0.7597	0.7685
1993	0.4679	0.5001	1.01×10^{-6}	8.17×10^{-6}	0.4647	0.4711	0.4973	0.5030

[a] There were no sockeye caught during June, for this year and area.

Appendix A. 13. Proportion of the Ugak Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1990, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1990	0.5601	a	5.95×10^{-2}	a	0.0821	1.0380	a	a

[a] There were no sockeye caught during June, for this year and area.

Appendix A. 14. Proportion of the Ugak Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1990, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1990	0.5372	a	6.05×10^{-2}	a	0.0549	1.0195	a	a

[a] There were no sockeye caught during June, for this year and area.

Appendix A. 15. Proportion of the Katmai and Alinchak Sections seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1985, 1988, 1990 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest.		Estimated variance of the estimated proportion of sockeye taken in the July harvest.		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	5.7573	a	2.32×10^{2}	a	-23.5291	35.0438	a	a
1985	1.1420	a	7.02×10^{-4}	a	1.0901	1.1940	a	a
1988	1.2352	a	5.19×10^{-4}	a	1.1906	1.2798	a	a
1990	0.5297	a	4.76×10^{-4}	a	0.4869	0.5725	a	a
1992	0.6714	a	6.52×10^{-4}	a	0.6213	0.7214	a	a

[a] There were no sockeye caught during June, for this year and area.

Appendix A. 16. Proportion of the Katmai and Alinchak Sections seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift net weight) for 1983, 1985, 1988, 1990 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	5.0940	a	1.29×10^{2}	a	-17.2053	27.3933	a	a
1985	0.8717	a	3.34×10^{-4}	a	0.8359	0.9076	a	a
1988	1.1416	a	1.61×10^{-4}	a	1.1167	1.1664	a	a
1990	0.4887	a	4.79×10^{-4}	a	0.4458	0.5316	a	a
1992	0.6389	a	7.13×10^{-4}	a	0.5865	0.6912	a	a

[a] There were no sockeye caught during June, for this year and area.

Appendix A. 17. Proportion of the Central Section (253*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	0.6586	0.6663	1.99×10^{-5}	1.54×10^{-5}	0.6499	0.6674	0.6586	0.6740
1992	0.3832	0.3774	5.04×10^{-6}	4.56×10^{-6}	0.3788	0.3876	0.3732	0.3815

Appendix A. 18. Proportion of the Central Section (253*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	0.5961	0.6044	2.27×10^{-5}	1.77×10^{-5}	0.5868	0.6055	0.5961	0.6126
1992	0.3691	0.3633	4.91×10^{-6}	4.43×10^{-6}	0.3648	0.3734	0.3592	0.3674

Appendix A. 19. Proportion of the Central Section (254*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.6725	0.7216	1.84×10^{-5}	1.35×10^{-5}	0.6641	0.6809	0.7144	0.7288

Appendix A. 20. Proportion of the Central Section (254*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, also variance and confidence intervals.

	Estimated proportion of non-local sockeye taken in July harvest		Estimated variance of the estimated proportion of sockeye taken in the July harvest		95% confidence interval (method 1)		95% confidence interval (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.6495	0.7005	1.98×10^{-5}	1.48×10^{-5}	0.6408	0.6583	0.6930	0.7081

Appendix B. 1. Number of sockeye salmon of the Central Section (253*), seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1987, 1988, 1992 and 1993, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	24.9	25.0	430.1	309.2	23.6	26.2	24.0	26.1
1987	149.3[a]	149.3[a]	1,470.3	1,596.8	149.3[a]	149.3[a]	149.3[a]	149.3[a]
1988	83.9[a]	83.9[a]	9.5	8.5	83.9[a]	83.9[a]	83.9[a]	83.9[a]
1992	112.9	113.1	34.7	29.9	112.5	113.2	112.8	113.7
1993	136.9	132.1	148.7	221.9	136.6	137.3	131.6	132.6

[a] The proportion was greater than one, so the estimated number was rounded to the total catch.

Appendix B. 2. Number of sockeye salmon of the Central Section (253*), seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, 1987, 1988, 1992 and 1993, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	24.2	24.3	434.4	312.5	22.9	25.5	23.2	25.4
1987	149.3[a]	149.3[a]	390.7	420.7	149.3[a]	149.3[a]	149.3[a]	149.3[a]
1988	82.7	82.7	3.3	3.2	82.6	82.8	82.6	82.8
1992	109.1	109.4	39.9	34.4	108.7	109.5	109.0	109.7
1993	121.6	116.1	190.0	274.6	121.2	122.1	115.6	116.6

[a] The proportion was greater than one, so the estimated number was rounded to the total catch.

Appendix B. 3. Number of sockeye salmon of the Central Section (254*), seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1987, 1988 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	4.3	5.1	10.8	18.5	4.1	4.5	4.8	5.4
1987	21.9	23.2	20.4	16.5	21.7	22.2	23.0	23.5
1988	48.2	48.3	0.3	1.0	48.2	48.3	48.2	48.3
1992	26.4	31.8	29.6	28.0	26.0	26.7	31.5	32.1

Appendix B. 4. Number of sockeye salmon of the Central Section (254*), seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, 1987, 1988 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	4.2	50.0	10.7	18.6	4.0	44.3	4.7	5.3
1987	19.7	21.1	22.0	18.5	19.4	20.0	20.8	21.3
1988	44.8	44.9	2.4	2.4	44.7	44.9	44.8	45.0
1992	25.5	30.9	28.8	27.5	25.2	25.9	30.6	31.2

Appendix B. 5. Number of sockeye salmon of the Halibut Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	97.7	93.9	88.9	101.1	97.2	98.3	93.3	94.6
1992	280.7	266.1	261.0	372.4	279.7	281.7	265.0	267.3

Appendix B. 6. Number of sockeye salmon of the Halibut Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	92.7	89.0	86.0	97.2	92.1	93.3	88.3	89.6
1992	271.7	256.8	280.7	394.2	270.7	272.8	255.6	258.0

Appendix B. 7. Number of sockeye salmon of the Ayakulik Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	6.2	[a]	.2	[a]	62.0	62.6	[a]	[a]
1992	163.7	157.8	7.6	44.5	163.5	163.9	157.4	158.3

[a] There were no sockeye caught during August, for this year and area.

Appendix B. 8. Number of sockeye salmon of the Ayakulik Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1988 and 1992, also variance and confidence intervals.

Year	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	5.9	a	.2	a	5.9	6.0	a	a
1992	159.1	152.8	9.4	50.8	158.9	159.3	152.4	153.2

[a] There were no sockeye caught during August, for this year and area.

Appendix B. 9. Number of sockeye salmon of the Cape Alitak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1987, 1988 and 1992, also variance and confidence intervals.

Year	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1987	46.4	51.0	23.5	28.5	46.1	46.7	50.6	51.3
1988	52.9	54.0	49.3	98.0	52.5	53.3	53.4	54.6
1992	63.2	58.6	64.7	109.8	62.7	63.7	57.9	59.2

Appendix B. 10. Number of sockeye salmon of the Cape Alitak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1987, 1988 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1987	40.7	45.7	27.5	37.0	40.3	41.0	45.4	46.1
1988	50.5	51.6	46.8	93.3	50.1	51.0	51.0	52.2
1992	61.3	56.7	64.1	108.0	60.8	61.8	56.1	57.4

Appendix B. 11. Number of sockeye salmon of the Sitkalidak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1987, 1988, 1990, 1992 and 1993, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	1.9	b	19.2	b	1.6	2.2	b	b
1987	6.3[a]	b	.6	b	6.3[a]	6.3[a]	b	b
1988	48.4	b	8.4	b	48.2	48.6	b	b
1990	59.3	59.6	4.9	4.1	59.1	59.4	59.5	59.7
1992	344.9	346.3	764.3	781.2	343.2	346.6	344.6	348.0
1993	64.6	68.6	157.9	124.7	64.2	65.0	68.2	68.9

[a] The proportion was greater than one, so the estimated number was rounded to the total catch.
[b] There were no sockeye caught during June, for this year and area.

Appendix B. 12. Number of sockeye salmon of the Sitkalidak Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, 1987, 1988, 1990, 1992 and 1993, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	18.5	b	19.0	b	1.6	2.1	b	b
1987	6.3[a]	b	.1	b	6.3[a]	6.3[a]	b	b
1988	45.5	b	19.5	b	45.3	45.8	b	b
1990	55.3	55.9	10.0	8.3	55.1	55.5	55.7	56.1
1992	332.1	333.6	923.1	945.5	330.2	333.9	331.7	335.5
1993	58.3	62.3	156.4	126.8	57.9	58.7	61.9	62.6

[a] The proportion was greater than one, so the estimated number was rounded to the total catch.
[b] There were no sockeye caught during June, for this year and area.

Appendix B. 13. Number of sockeye salmon of the Ugak Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1990, also variance and confidence intervals.

Year	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1990	7.1	[a]	9,647.2	[a]	1.0	13.2[b]	[a]	[a]

[a] There were no sockeye caught during June, for this year and area.
[b] The proportion was greater than one, so the estimated number was rounded to the total catch.

Appendix B. 14. Number of sockeye salmon of the Ugak Bay Section seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1990, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1990	6.8	[a]	9,822.4	[a]	0.7	13.0[b]	[a]	[a]

[a] There were no sockeye caught during June, for this year and area.
[b] The proportion was greater than one, so the estimated number was rounded to the total catch.

Appendix B. 15. Number of sockeye salmon of the Katmai and Alinchak Sections seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, 1985, 1988, 1990 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	0.7[a]	b	105,681.3	b	0.0[c]	0.7[a]	b	b
1985	0.7[a]	b	0.4	b	0.7[a]	0.7[a]	b	b
1988	28.3[a]	b	414.9	b	28.3[a]	28.3[a]	b	b
1990	13.7	b	318.7	b	12.6	14.8	b	b
1992	70.0	b	7,094.1	b	64.8	75.3	b	b

[a] The proportion was greater than one, so the estimated number was rounded to the total catch.
[b] There were no sockeye caught during June, for this year and area.
[c] The proportion was less than zero, so the estimated number was rounded to zero.

Appendix B. 16. Number of sockeye salmon of the Katmai and Alinchak Sections seine catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, 1985, 1988, 1990 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	.7[a]	b	61,269.8	b	0.0[c]	.7[a]	b	b
1985	.6	b	.1	b	0.6	.7	b	b
1988	28.3[a]	b	128.8	b	28.3[a]	28.3[a]	b	b
1990	12.6	b	320.6	b	11.5	13.8	b	b
1992	66.6	b	7,757.0	b	61.2	72.1	b	b

[a] The proportion was greater than one, so the estimated number was rounded to the total catch.
[b] There were no sockeye caught during June, for this year and area.
[c] The proportion was less than zero, so the estimated number was rounded to zero.

Appendix B. 17. Number of sockeye salmon of the Central Section (253*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1988 and 1992, also variance and confidence intervals.

	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
Year	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	36.8	37.2	62.1	47.9	36.3	37.3	36.8	37.7
1992	36.7	36.1	46.2	41.8	36.3	37.1	35.7	36.5

Appendix B. 18. Number of sockeye salmon of the Central Section (253*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1988 and 1992, also variance and confidence intervals.

Year	Estimated number (x1000) of non-local sockeye taken in July harvest		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1988	33.3	33.8	71.0	55.2	32.8	33.8	33.3	34.2
1992	35.3	34.8	45.0	40.6	34.9	35.7	34.4	35.2

Appendix B. 19. Number of sockeye salmon of the Central Section (254*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet combined weight) for 1983, also variance and confidence intervals.

Year	Estimated number (x1000) of non-local sockeye taken in July harvest.		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest.		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	44.6	47.9	80.8	59.3	44.1	45.2	47.4	48.4

Appendix B. 20. Number of sockeye salmon of the Central Section (254*), set gillnet catch estimated to be non-local sockeye salmon (using Upper Cook Inlet drift gillnet weight) for 1983, also variance and confidence intervals.

Year	Estimated number (x1000) of non-local sockeye taken in July harvest.		Estimated variance of the estimated number (x1000) of sockeye taken in the July harvest.		95% confidence interval, x1000 (method 1)		95% confidence interval, x1000 (method 2)	
	Method 1	Method 2	Method 1	Method 2	Lower Bound	Upper Bound	Lower Bound	Upper Bound
1983	43.1	46.5	87.0	65.2	42.5	43.7	46.0	47.0