

Salmon Troll Investigation

September, October, November, and December, 1949

General.

A poor trolling season became progressively poorer as the season advanced. A few fish were landed during September, but by October they were becoming very scarce, and by the end of the season, practically no boats were fishing. Some tagging was done during September and October and considerable time was devoted to sampling the catch, although the small landings made this difficult. November and December have been spent working up the summer's sampling data, which are summarized here. About a week was spent surveying some of the tributaries of the Nehalem River, and several days of assistance was given to the shellfish investigation.

A meeting of the salmon committee of the Pacific Marine Fisheries Commission on November 21 and 22 in Seattle was attended and also a Tri-state meeting on December 12 in Portland.

Chinook Salmon Sampling.

For the first time a good sample of the spring troll catch was obtained. Numbers of chinooks were found off the Columbia during April, May, and June which were sampled. Very few landings were made along the coast during that time, so the Astoria samples may be considered fairly representative of the state. During July, August, and September fish began to appear along the coast and samples were then taken of them. The August run of salmon off the Columbia was a disappointment and relatively few large salmon were landed.

Average Weights of Chinook Salmon

Table 1 gives the average weights taken in 1949 and Figure 1 shows a comparison of 1947, 1948, and 1949. The line for 1947 is much higher early in the season than is the line for 1948 and 1949, which probably

reflects a change in the age composition of the fish. Since the large maturing fall chinooks are available during the early season, large numbers of them and smaller numbers of small chinooks would bring the average weight up, and conversely if the maturing chinooks were scarce and the small ones abundant it would bring the average weight down. The low average weight this year is at least partly due to a poor run of salmon into the rivers, which might be correlated with the higher average weight and larger run of 1947. Each year since sampling began, the chinooks have been averaging smaller; in 1947 they averaged 13.0 pounds, 12.1 pounds in 1948, and 11.3 pounds in 1949.

Figure 2 shows the average weight by area. The Astoria area has a very low average weight until the large mature chinooks appear in August, while the Newport area has a high average weight early in the season but drops off in August. Coos Bay has a trend similar to Newport, but at a much lower level. This has been interpreted as showing that large maturing fish are available off the coast (especially Newport) during the early season and move up to the Columbia during August, leaving smaller immature fish along the coast. A great deal more tagging of chinook salmon along the coast is needed to show to what extent they do migrate North to the Columbia River.

Length-frequencies of Chinook Salmon

An examination of the length-frequencies for 1947, 1948, and 1949 indicates a considerable change in the length (and therefore age) composition of the catch. Figure 3 shows a comparison of the three years. In 1948 there was a large mode of fish just above the legal size of 27 inches total length (64 cm. fork length). In 1949 this mode had apparently moved up to around 72 centimeters. The reduction of the size limit to 26 inches

apparently had little effect upon the size of the fish landed this year, since there were few small fish present. The 1947 data suggest three age groups, whose modes correspond roughly to the other two years. The small graph in the corner of Figure 3 shows the percent of fish at each centimeter of length, and illustrates a little more clearly the change in the length composition of the catch between 1948 and 1949.

Figure 4 shows the length-frequencies on a monthly basis for 1949. During most of the months, three modes can be discerned at roughly 70, 80, and 90 centimeters. During September another mode appears at 62 centimeters, possibly another age group entering the fishery, and the 90 centimeter group largely disappears.

Mark Recovery of Chinook Salmon

Sampling of fish for clipped fins continued as before. There were 7,173 chinooks examined and Table 2 summarizes the markings and recoveries. Since the 2 $\frac{1}{2}$ and 3 $\frac{1}{2}$ age groups (brood years of 1945 and 1946) comprise about 85 percent of the troll catch, the numbers of fish marked during those two years is included. About 328,000 marks were theoretically available, 302,000 of the 1945 brood year and 26,000 of the 1946 brood year. It is seen that all three recoveries were from the Lewis River releases of 10,000 fish. Why none of the 1945 brood year were not recovered is a mystery since they involved so many more fish.

Little can be ascertained about migrations from these meager data. It appears that larger samples must be obtained if anything is to be learned about migrations from a marking program.

In addition the following single fin clips were observed in the sample:

LP. - 2
LV. - 3
RV. - 1
Ad. - 3

Silver Salmon Sampling.

This fishery has been practically a failure this year. The fish were very scarce during June and early July, but around the middle of July a large run of large fish appeared off Newport. They reached a peak around the first of August and then rapidly dropped off in numbers, and fishing again became poor. There seemed to be some indication this season of an inshore movement, and the possible presence of inshore and offshore groups of silvers. Although the data do not indicate the change too clearly, it was evident from observation of the fishery through the season that something was radically different from last year. This will be discussed later.

Average Weights of Silver Salmon

Figure 5 shows a graph of the average weights for the past three years by week. It is at once evident that the average weights this year have a different trend. The fish were smaller at first, but the line rises sharply and levels off at a slightly higher weight than the other two years. It was very noticeable during the field work that the silvers were much larger this year than last, although in fewer numbers, and the graph clearly shows this to be the case. A faster rate of growth is the logical reasoning, but it could also be caused by the movement inshore into the fishery of larger fish from some offshore feeding ground. The water may have been warmer offshore and the food more abundant, which would cause a faster growth and may account for the larger size this year.

Several factors combine to give one the impression that most of the silvers were offshore during the spring and early summer: silvers were almost entirely absent from the coastal waters during April and May and only during June did they appear, they suddenly appeared the latter part of July in large numbers, the fish which appeared in July were noticeably

larger than those which had been landed during June, silvers are primarily surface feeders and are not found in very deep water as chinooks sometimes are; tuna fisherman have reported seeing silvers occasionally hundreds of miles offshore.

Figure 6 is a comparison of the average weights taken at the three ports. Some similarity is noted between this graph and the graph of the average weights of chinooks by port, in that the fish along the coast were larger than the fish at the mouth of the Columbia early in the season, but the Columbia fish surpassed them during August. It has been proven by tagging that silvers migrate North along the coast to their home streams, and this lends credence to the hypothesis about chinook salmon migration. These data also suggest that Columbia River silver salmon may be slightly larger than those of the coastal streams.

Length-frequencies of Silver Salmon

Figure 7 shows the length-frequencies taken during the season. They indicate a rapid increase in size between June and July and a slower increase the remainder of the season.

Mark Recovery of Silver Salmon

Table 4 summarizes the markings and recoveries. There were 11,385 silvers examined and one mark was found. In addition the following single clips were noted in the sample:

RV. - 6
BV. - 4
RP. - 2
Ad. - 10
LP. - 1
LV. - 2

Tagging.

The poor fishing this year was reflected in the tagging, a great amount of effort and money was expended, but the results were very poor.

Approximately the same number of salmon were tagged this year as last year, but it required four times as much money and their have been only half as many recoveries.

Table 5 summarizes the season's tagging.

The silvers again showed a northerly migration, although not as clear out as last year. The silvers that were recovered to the south were taken by trollers, and may have been on a feeding migration and they would also possibly return to the North to spawn.

Not enough chinooks have been recovered to show any migration pattern. The chinook that migrated to a tributary of the San Joaquin River indicates that there are some Sacramento-San Joaquin chinooks taken off the Oregon coast.

Two chinooks and two silvers tagged in 1948 were recovered in 1949. The recovery of the silvers is interesting inasmuch as they were in their third year when tagged and their recovery in 1949 would make them four years of age. Perhaps more silvers mature at four years than is generally thought.

Observations were again made as to the condition of the fish when tagged and their subsequent recovery. Although the results are not significant, it was again found that several fish which were badly injured and floated away in poor condition were later recovered.

The recovery this year was 3.8 percent for silvers and 1.8 percent for chinooks, for a total of 3.2 percent.

In line with the request for consolidation of all tagging information, Table 6 is presented. This is a summary of all the tags put out by the troll salmon investigation.

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Aquatic Biologist

Table 1.

Average Weights of Troll Chinook Salmon in 1949

	April		May		June		July		August		September		October		Total	
	Number Weighed	Total Weight	No.	Wgt.	No.	Wgt.	No.	Wgt.	No.	Wgt.	No.	Wgt.	No.	Wgt.	No.	Wgt.
Astoria	325	3,094	193	1,747	407	3,539	377	4,058	509	7,366	172	1,955	15	172	1,998	21,928
	Av.	9.52	Av.	9.04	Av.	8.70	Av.	10.76	Av.	14.47	Av.	11.37	Av.	11.47	Av.	10.98
Newport					551	6,828	230	3,088	68	896	9	81			858	10,893
					Av.	12.39	Av.	13.43	Av.	13.18	Av.	9.00			Av.	12.70
Coos Bay					178	1,736	421	4,797	691	7,723	401	4,193			1,691	18,454
					Av.	9.75	Av.	11.39	Av.	11.18	Av.	10.46			Av.	10.91
Total	325	3,094	193	1,747	1,136	12,103	1,028	11,943	1,268	15,990	582	6,229	15	172	4,547	51,275
	Av.	9.52	Av.	9.04	Av.	10.65	Av.	11.63	Av.	12.63	Av.	10.70	Av.	11.47	Av.	11.28

Table 2.

Mark Recovery of Troll Chinook Salmon in 1949

Brood Year of 1945

Mark	Place Marked	Number Marked	No. Recovered	Place Recovered	Date	Age	Fork Length
Ad. RV.	Willapa	7,000	0				
Ad. LV.	Dungeness (P.S.)	4,000	0				
Ad. BV.	Wind R. (Col.)	21,000	0				
D. RV.	Sacramento	50,000	0				
	Greys Harbor	4,000	0				
D. LV.	Sacramento	41,000	0				
	Willapa	6,000	0				
D. Ad.	Iesaquah (P.S.)	8,000	0				
An. RV.	Sacramento	49,000	0				
	Lewis R.	10,000	0				
An. LV.	Sacramento	42,000	0				
	Columbia	10,000	0				
D. R. P.	White Salmon (Col.)	25,000	0				
D. L. P.	"	25,000	0				

Brood Year of 1946

Ad. RV.	Lewis River (Col.)	5,000	1	Mouth of Columbia	26 Aug.	2+	60 cm.
Ad. LV.	"	5,000	2	"	5 July	2+	61 cm.
				"	15 July	2+	59 cm.
Ad. BV.	Green R. (P.S.)	<u>16,000</u>	<u>0</u>				
		328,000	3				

Table 3.

Average Weights of Troll Silvers - 1949

	June		July		August		September		October		Total	
	Number Weighed	Total Weight	No.	Wgt.	No.	Wgt.	No.	Wgt.	No.	Wgt.	No.	Wgt.
Astoria	839	3,683	457	2,839	789	5,940	416	3,361	45	367	2,546	16,190
	Av.	4.39	Av.	6.21	Av.	7.53	Av.	8.08	Av.	8.16	Av.	6.36
Newport	40	262	108	800	101	744					249	1,806
	Av.	6.55	Av.	7.41	Av.	7.37					Av.	7.25
Coos Bay	198	1,042	894	6,022	1,319	9,941	564	4,395	33	293	3,008	21,693
	Av.	5.26	Av.	6.74	Av.	7.54	Av.	7.79	Av.	8.88	Av.	7.23
Total	1,087	4,987	1,459	9,661	2,209	16,625	980	7,756	78	660	5,803	39,689
	Av.	4.63	Av.	6.62	Av.	7.53	Av.	7.91	Av.	8.46	Av.	6.84

Table 4.

Mark Recovery of Troll Silver Salmon

Brood Year of 1946

<u>Mark</u>	<u>Place Marked</u>	<u>No. Marked</u>	<u>No. Recovered</u>	<u>Place Recovered</u>	<u>Date</u>	<u>Age</u>	<u>Fork Length</u>
Ad. LV.	Sand Creek Weir	1,177	1	Mouth of Columbia	4 Aug.	2+	64 cm.
D. RV.	Minter Creek (PS.)	6,716	0				
D. LV.	"	6,716	0				
	Total	<u>14,609</u>	<u>1</u>				

Table 5.

Troll Salmon Tagging
1949Tagged

	Chinooks	Silvers	Steelhead	Total
Astoria	54	32	1	87
Depoe Bay	8	193		201
Coos Bay	50	32		82
Total	112	257	1	370

Recovered

Tag No.	Date '49	<u>Tagged</u>		Condition	<u>Recovered</u>				
		Location			Date '49	Location	Days Out	Migration	Growth
					<u>Silvers</u>				
C-703	24 June	Mouth of Columbia		2	6 Sept.	Frazer River, B.C.	74	280 mi. N.	
738	13 July	"	"	1	17 Aug.	Whidbey Island	26	240 " N.	
762	22 "	"	"	3	1 Sept.	Off the Mouth of Columbia	50	0	5 cm.
98	4 Aug.	Depoe Bay		1	22 Sept.	Sooke, B.C.	49	270 " N.	
106	4 Aug.	"	"	1	1 Oct.	Kalama R. Wn.	57	160 " N.	
124	5 Aug.	"	"	1	28 Aug.	Off Umpqua R.	23	70 " S.	
136	6 Aug.	"	"	1	19 Aug.	Off Newport	13	20 " S.	
199	19 Aug.	"	"	1	10 Sept.	Lower Columbia R.	22	90 " N.	
246	28 Aug.	"	"	1	22 Sept.	Tillamook R.	26	55 " N.	
250	27 Aug.	"	"	2	18 Oct.	Naselle R. Wn.	52	130 " N.	
					<u>Chinooks</u>				
742	13 July	Tillamook Head		3	1 Dec.	Tuolumne R., Calif.	141	650 " S.	2 cm.
769	22 "	Mouth of Columbia		1	17 Sept.	Lewis R. Wn.	57	80 " E.	

Table 6.

Tags Put Out by the Troll Salmon Investigation

Series	Tag Numbers	Date	Area
Portland A	400 to 599	June 1948	Mouth of Columbia to Cape Lookout
"	630	June 1948	" " " " " "
"	638	" "	" " " " " "
Astoria C	1 to 50	June to August, 1948	Off Newport
Reedsport	12 to 31	June 1948	Off Coos Bay
"	100 to 109	" "	" " "
Astoria B	601 to 696	June to August, 1948	" " "
Astoria C	702 to 794	June to September, 1949	Mouth of Columbia to Cape Lookout.
"	74 to 279	July to September, 1949	Off Depoe Bay
Portland F	511 to 605	July to October, 1949	Off Coos Bay

Mostly silver and chinook salmon, a few steelhead, rock fish,
ling cod and sable fish.

Figure 1

Average Weights of Troll Chinook Salmon

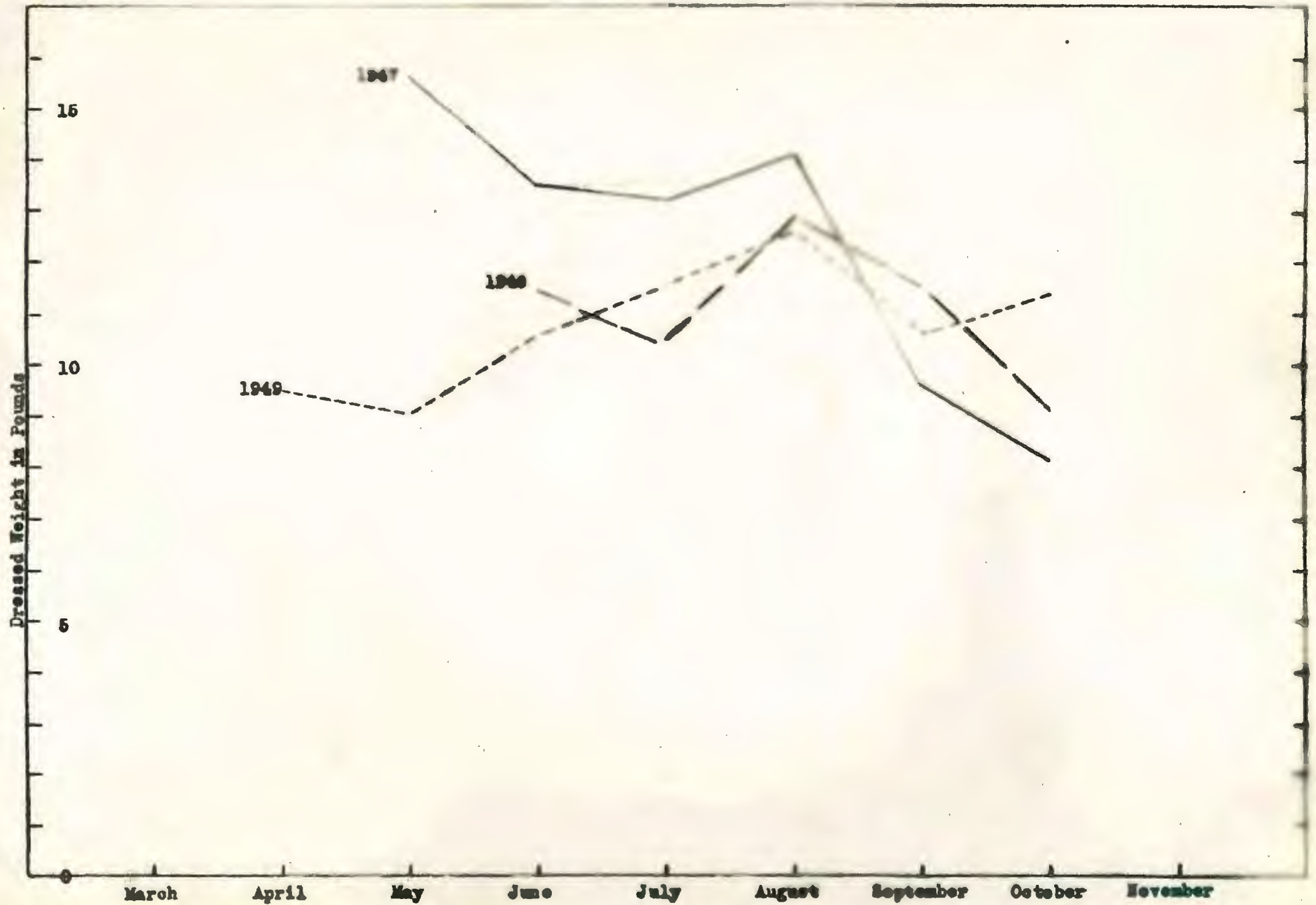


Figure 1.

Average Weights by Area of Total Chinook in 1900

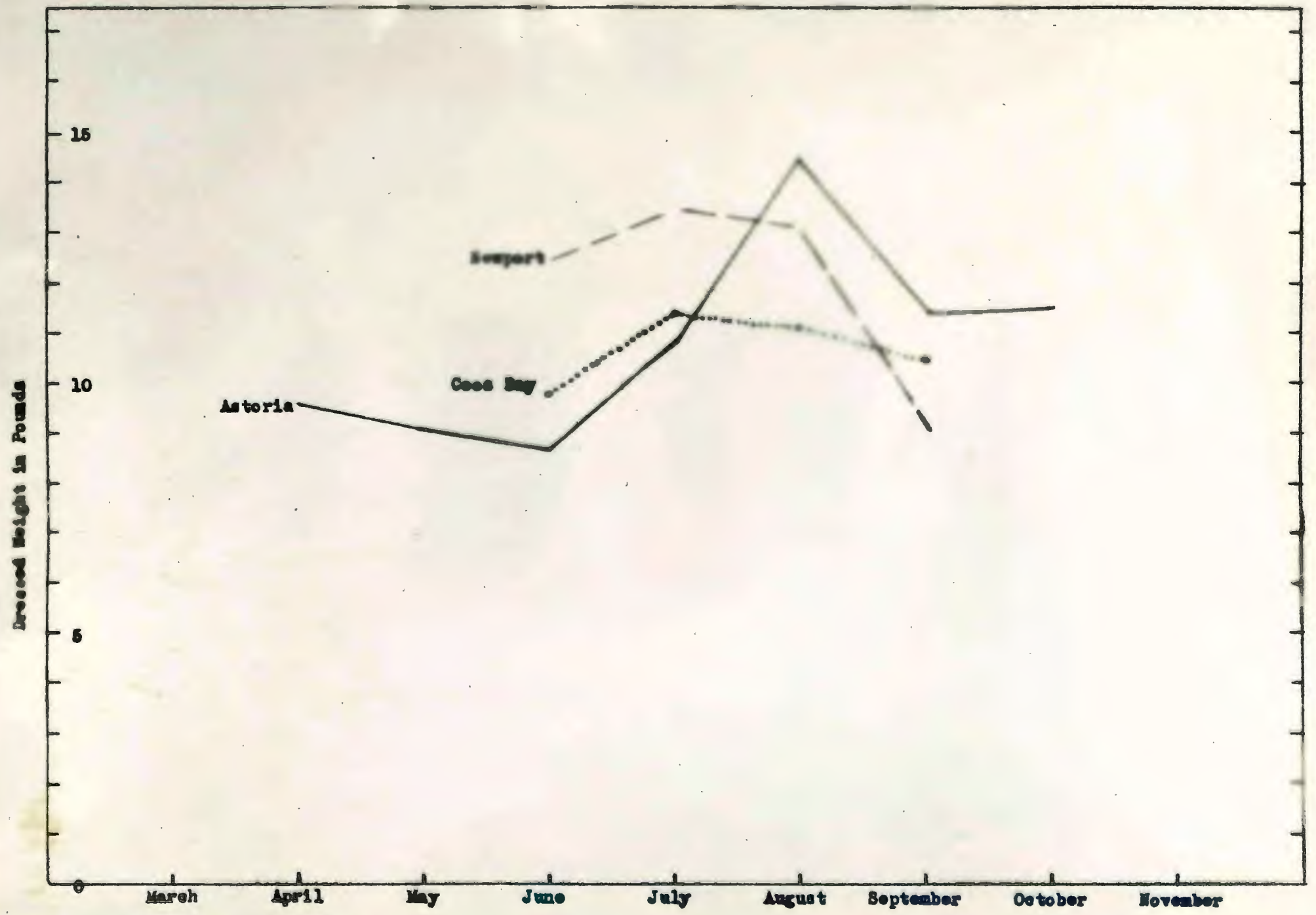
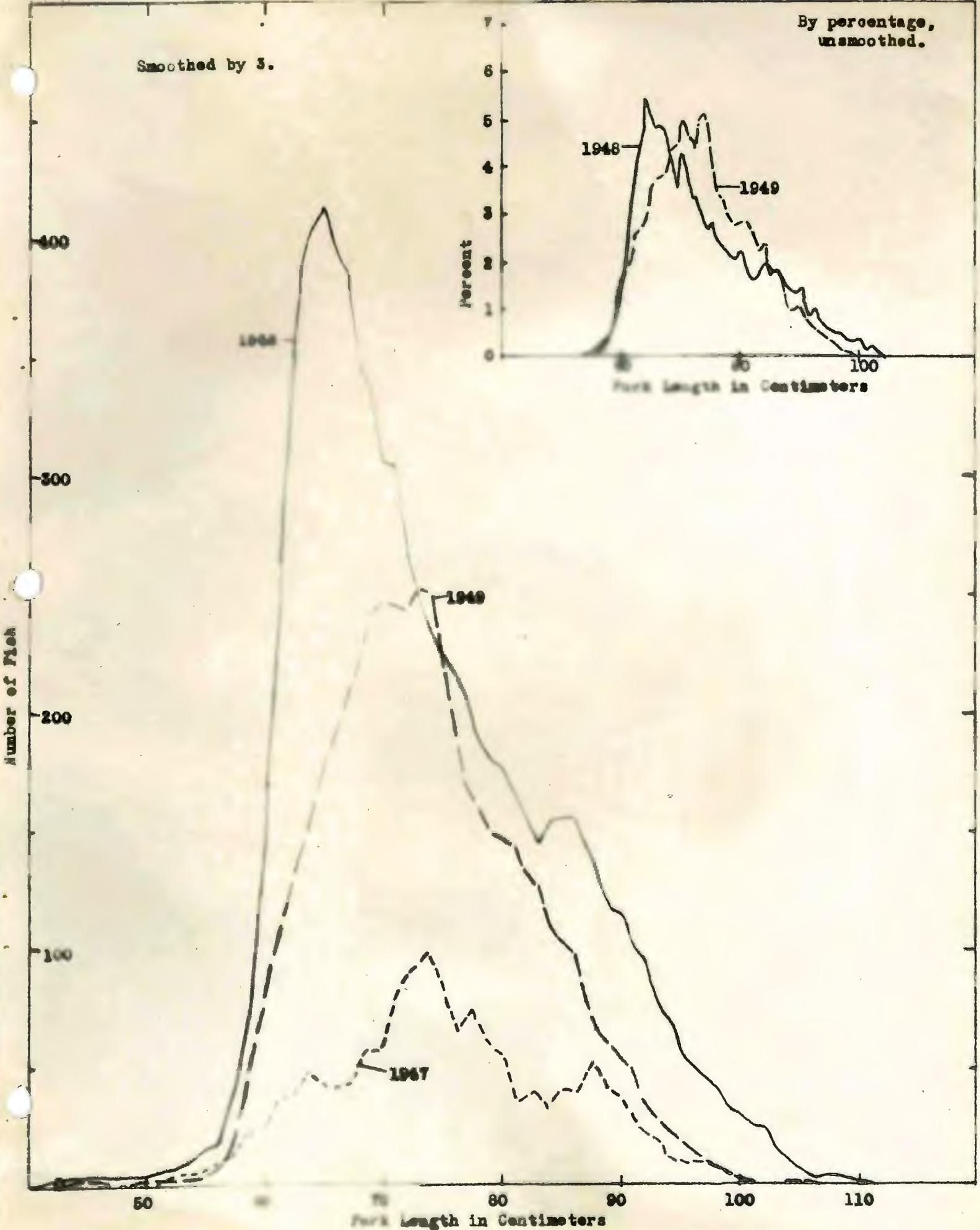


Figure 3.
Length - frequency of Troll Chinook Salmon



Smoothed by 3.

By percentage,
unsmoothed.

Percent

Fork Length in Centimeters

Number of Fish

50

Fork Length in Centimeters

100

110

1946

1949

1947

1948

1949

400

300

200

100

7

6

5

4

3

2

1

0

100

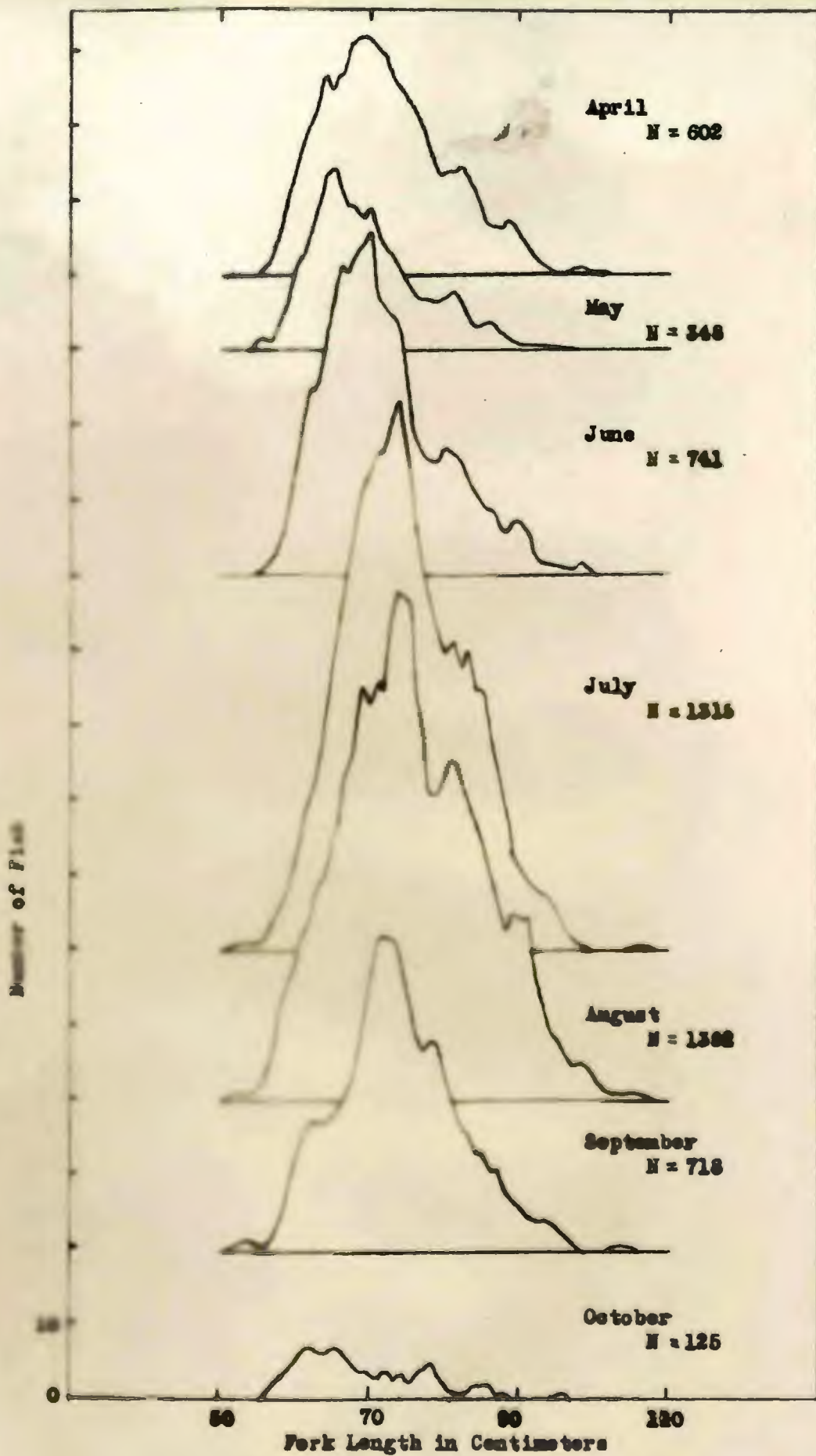
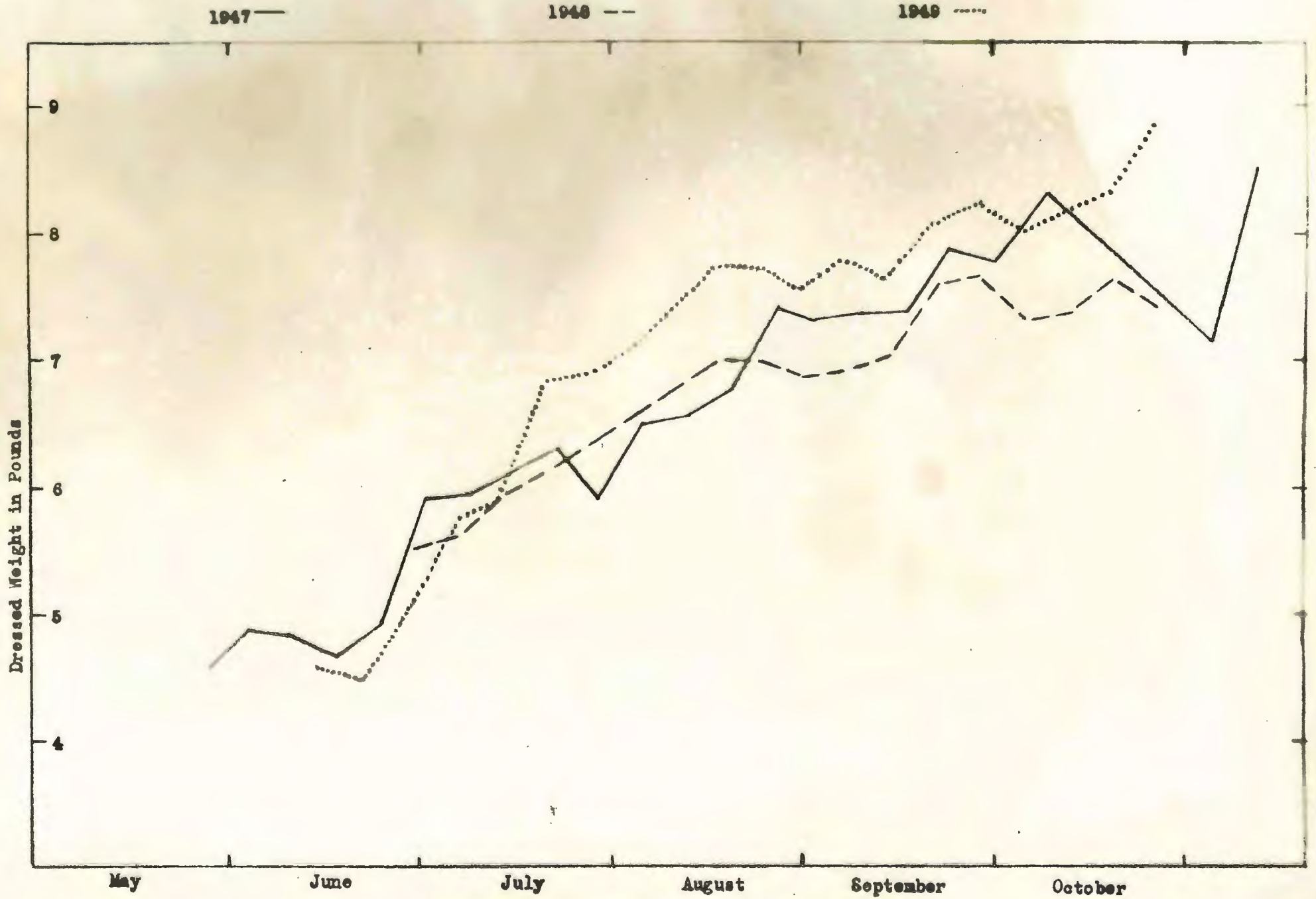


Figure 4.

Length - frequency of Troll Chinook Salmon by month in 1949.

Figure 5.

Average Weights of Troll Silver Salmon by Weeks in 1947, 1948 & 1949



Average Weights of Troll Silver Salmon by Area in 1949

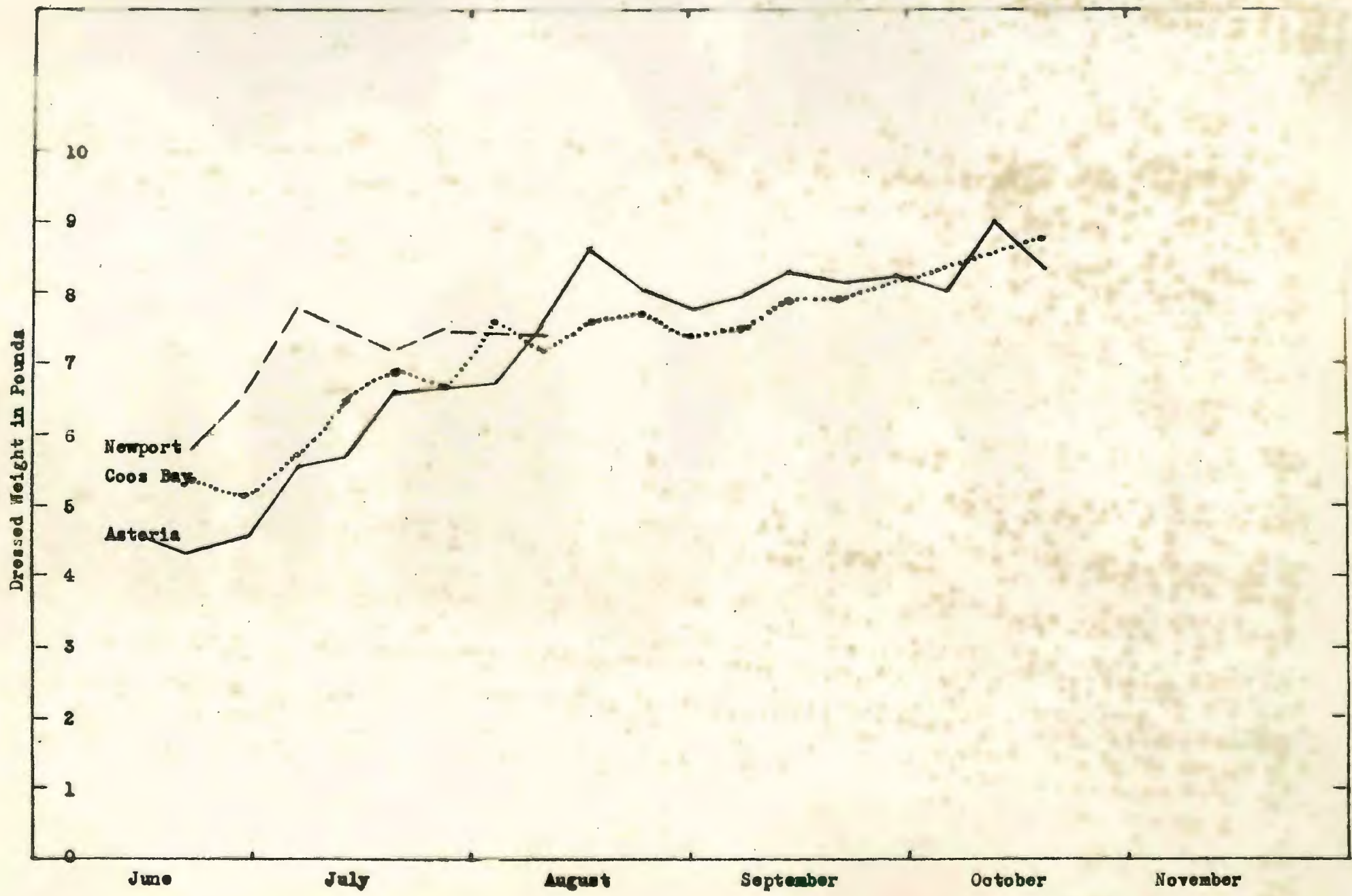


Figure 7.

Length - frequency of
Troll Silver Salmon in
1949

