

# Informational Leaflet 33

## ABUNDANCE, SIZE AND AGE OF RED SALMON SMOLTS FROM THE WOOD RIVER SYSTEM, 1962

By:

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July 31, 1963

STATE OF ALASKA  
WILLIAM A. EGAN - GOVERNOR

DEPARTMENT OF  
FISH AND GAME  
WALTER KIRKNESS - COMMISSIONER  
SUBPORT BUILDING, JUNEAU



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ALASKA DEPARTMENT OF FISH AND GAME

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BACKGROUND

Smolt enumeration and sampling at the outlet of Lake Aleknagik was begun by the Fisheries Research Institute in 1951 and continued by them through 1960. The Alaska Department of Fish and Game continued the program in 1961.

Results obtained by the Department are comparable with past records, since methods developed and used by the Fisheries Research Institute have been continued.

METHODS

Field operations began on June 1, but ice conditions hindered operations for several days. The first smolts were caught on June 4. A single fyke net was fished each night from 9:00 P.M. to 11:00 P.M. the previously established index hours. Operations continued through July 25.

Smolts in the catch were counted when there were few and weighed when there were many. When catches were weighed, one-pound sample counts were made in order to convert total weight into numbers of fish. Samples of fish were anesthetized and measured throughout the season. Fish were released at the fyke net site except when specimens were needed for parasite or scale studies.

Size composition was determined from length measurements of 5,485 smolts contained in 65 one-pound samples. Age determination was based on readings of 194 scales contained in 10 scale samples, one taken in each five-day period. In addition, one condition index sample was taken.

INDEX OF ABUNDANCE

The total catch during the index hours for the 1962 season was 301,892 smolts (Table 1). This is equivalent to 177.55 index points, using 1952 as the base year with the assigned value of 100.

The 1962 index is somewhat lower than the average index value of 231, obtained over a twelve-year period. A heavier migration was expected from the abundance of fry in the lakes during the previous season.

The relative abundance of smolts for the past twelve years is shown by the following index figures:

1951 - 10	1955 - 222	1959 - 61
1952 - 100	1956 - 327	1960 - 223
1953 - 296	1957 - 165	1961 - 519
1954 - 439	1958 - 231	1962 - 178

Table 1. Mosquito Point smolt catches, 1962, by hour and day (index hours 2100 - 2300).

<u>Date</u>	<u>2100-2200</u>	<u>2200-2300</u>	<u>Daily Total</u>	<u>Cumulative Total</u>	<u>Cumulative In Points</u>
June 3	0	0	0	0	.00
4	26	115	141	141	0.08
5	2,991	3,519	6,510	6,651	3.91
6	451	3,268	3,719	10,370	6.10
7	0	4	4	10,374	6.10
8	3	0	3	10,377	6.10
9	486	63	549	10,926	6.43
10					
10	0	512	512	11,438	6.73
11	0	122	122	11,560	6.80
12	0	326	326	11,886	6.99
13	3,451	18,018	21,469	33,355	19.62
14	558	3,406	3,964	37,319	21.95
15	5,680	38,585	44,265	81,584	47.98
16	2,088	2,114	4,202	85,786	50.45
17	0	8,040	8,040	93,826	55.18
18	54	3,478	3,532	97,358	57.26
19	1,587	14,075	15,662	113,020	66.47
20	1,558	25,919	27,477	140,497	82.63
21	8,825	17,983	26,808	167,305	98.40
22	6,493	1,694	8,187	175,492	103.21
23	3,942	11,234	15,176	190,668	112.14
24	3,069	8,392	11,461	202,129	118.88
25	34	75	109	202,238	118.94
26	0	84	84	202,322	118.99
27	348	2,682	3,030	205,352	120.77
28	250	232	482	205,834	121.05
29	0	4,690	4,690	210,524	123.81
30	1,030	4,022	5,052	215,576	126.78
July 1	403	29,920	30,323	245,899	144.62
2	8,548	3,230	11,778	257,677	151.54
3	166	803	969	258,646	152.11
4	3,711	1,677	5,388	264,034	155.28

-Continued-

Table 1. Mosquito Point smolt catches, 1962, by hour and day (index hours 2100 - 2300) - continued.

<u>Date</u>	<u>2100-2200</u>	<u>2200-2300</u>	<u>Daily Total</u>	<u>Cumulative Total</u>	<u>Cumulative In Points</u>
July 5	7,475	4,195	11,670	275,704	162.15
6	22	15	37	275,741	162.17
7	6	0	6	275,747	162.17
8	0	365	365	276,112	162.39
9	27	55	82	276,194	162.43
10	2,745	497	3,242	279,436	164.34
11	4,289	135	4,424	283,860	166.94
12	11,404	2,596	14,000	297,860	175.18
13	300	347	647	298,507	175.56
14	213	428	641	299,148	175.93
15	116	20	136	299,284	176.01
16	144	533	677	299,961	176.41
17	8	1,005	1,013	300,974	177.01
18	53	180	233	301,207	177.15
19	0	7	7	301,214	177.15
20	1	60	61	301,275	177.19
21	4	57	61	301,336	177.22
22	60	220	280	301,616	177.39
23	19	220	239	301,855	177.53
24	26	8	34	301,889	177.55
25	3	0	3	301,892	177.55
TOTAL	82,667	219,225	301,892	301,892	177.55
Percent	27.38%	72.62%			

1700.34= 1 index point

## TIMING OF THE MIGRATION

Catches during the index hours followed the usual pattern. Migration was lightest during the first hour (27.4%), and increased in the second year (72.6%). Catches were larger in the first hour on a few occasions, but this seldom occurred during a heavy migration.

Spurts of heavy migration occurred throughout the season from June 5 to July 12 (Figure 1). The period June 15 to June 25 may be called the peak of the season, since slightly more than 50% of the total run was accounted for during that time. Late season peaks in 1962 account for over 30% of the migration and are probably due to the later arriving smolts from the upper lakes.

## SIZE AND AGE COMPOSITION

Length frequency and age data were grouped in five-day periods. The first and last periods are exceptions to this, since each contains six days because of the small number of smolts involved. Altogether there are ten periods. The number of smolts caught in each period, number of samples taken, number of fish measured, and number of scales read are shown in Table 2.

Combined length frequencies for each period are shown in Figure 2, with the dividing line between Age I and II, as determined by scale readings, indicated by vertical dashes. This line indicates that the number of Age II fish to the left equals that of Age I fish to the right of the line. These frequencies were calculated in percentages.

Age I fish dominated the run throughout the season. Progression in size of the smolts is particularly evident during the latter half of the season.

The percentage and mean length of each age group were calculated for each period and for the entire season (Table 3). Age I smolts were small in size, even smaller than those which comprised the heavy migration of 1961. Reduced growth is usually associated with large population, and in this respect is inconsistent with the relatively low index of 1978. Despite their small size, condition measurements, as well as their appearance, indicated that they were healthy and in good condition.

Age II smolts were also small in size, as was to be expected from their small size during the previous year. Fourteen percent is a relatively high percentage of the total run for this age group in the Wood River system. This is consistent with 1961 observations, which indicated that a larger than usual number of fingerlings has remained in the lakes instead of migrating to sea as Age I fish.

Fluctuations in mean length, particularly evident in Age II smolts, do not indicate lack of growth during the season. This is due to the presence of different populations of smolts, since scale readings showed that growth had taken place.

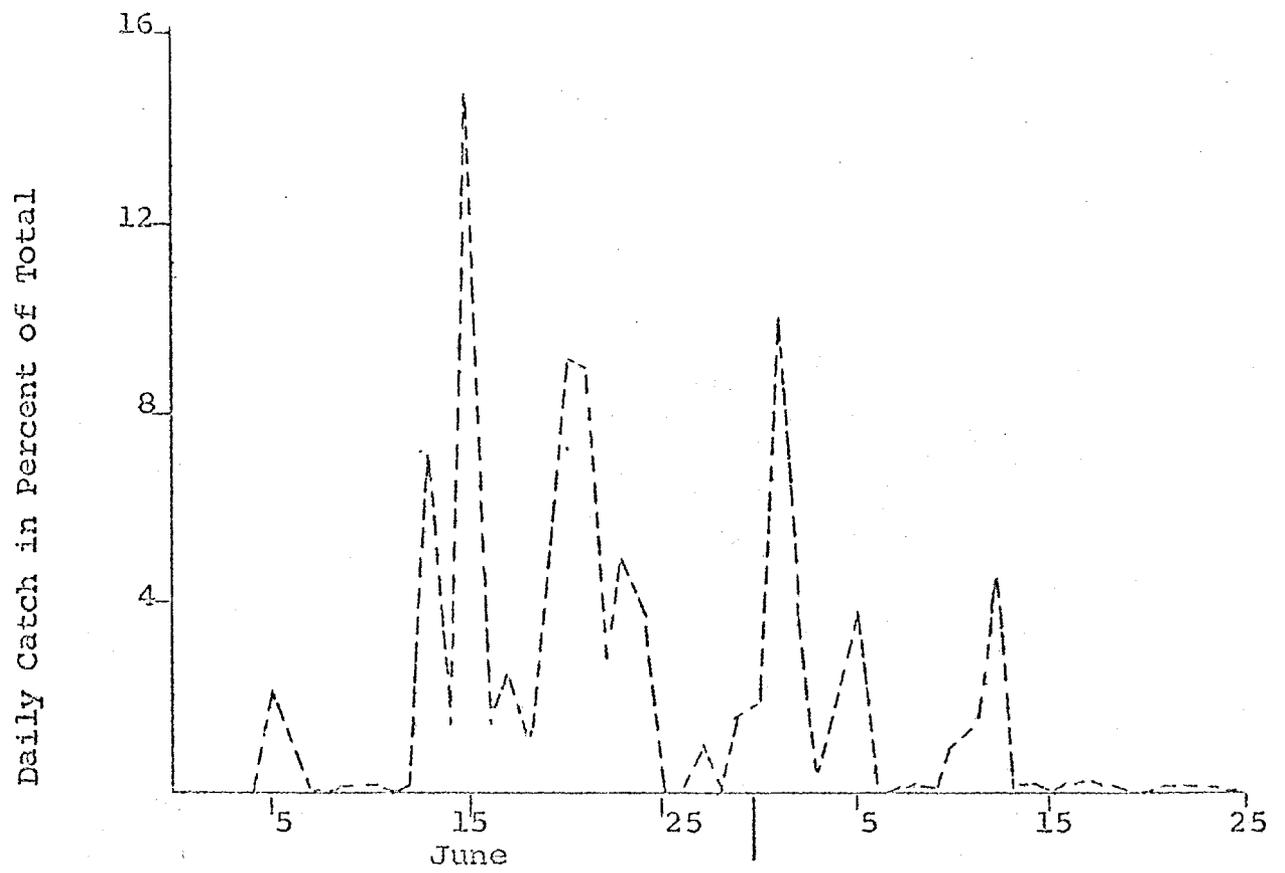


Figure 1. Daily catches of red salmon smolts from the Wood River system, 1962.

Table 2. Smolt sampling data, 1962 - Wood River smolt.

<u>Period No.</u>	<u>Date</u>	<u>No. of Smolts</u>	<u>Pct. of Seasons Total</u>	<u>No. of 1# Samples Measured</u>	<u>No. of Fish Measured</u>	<u>No. of Scales Read</u>
1	June 4 - 9	10,926	3.62	5	519	37
2	June 10 - 14	26,393	8.74	7	618	40
3	June 15 - 19	75,701	25.08	8	806	10
4	June 20 - 24	89,109	29.52	10	1,002	9
5	June 25 - 29	8,395	2.78	5	460	27
6	June 30-July 4	53,510	17.73	10	745	17
7	July 5 - 9	12,160	4.03	3	230	11
8	July 10 - 14	22,954	7.60	10	657	17
9	July 15 - 19	2,066	0.68	5	337	14
10	July 20 - 25	<u>678</u>	<u>0.22</u>	<u>2</u>	<u>111</u>	<u>12</u>
TOTAL		301,892	100.00	65	5,485	194

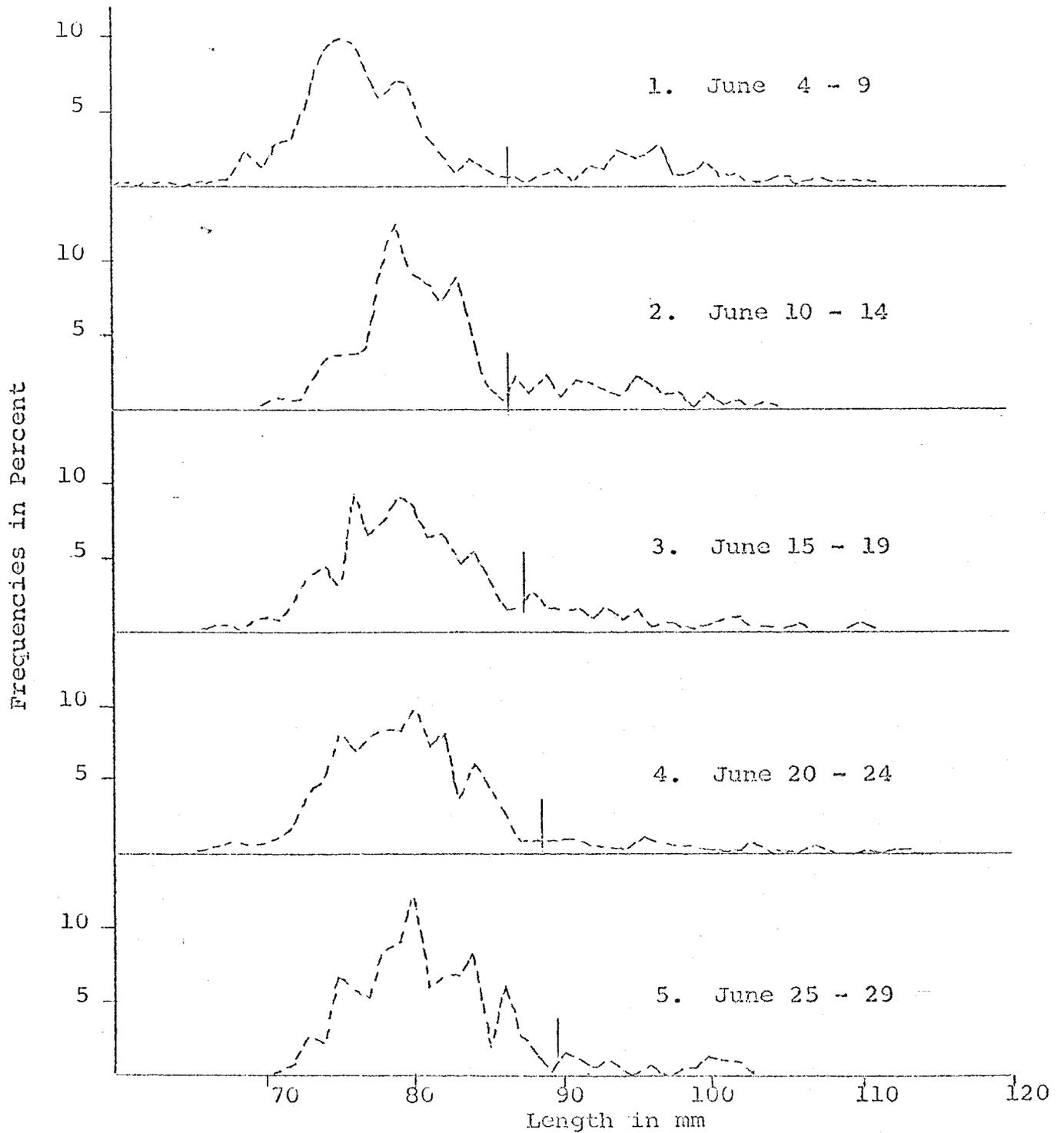


Figure 2. Length frequencies of red salmon smolts from the Wood River system, 1962. (Vertical dash lines divided Age I and Age II) - continued.

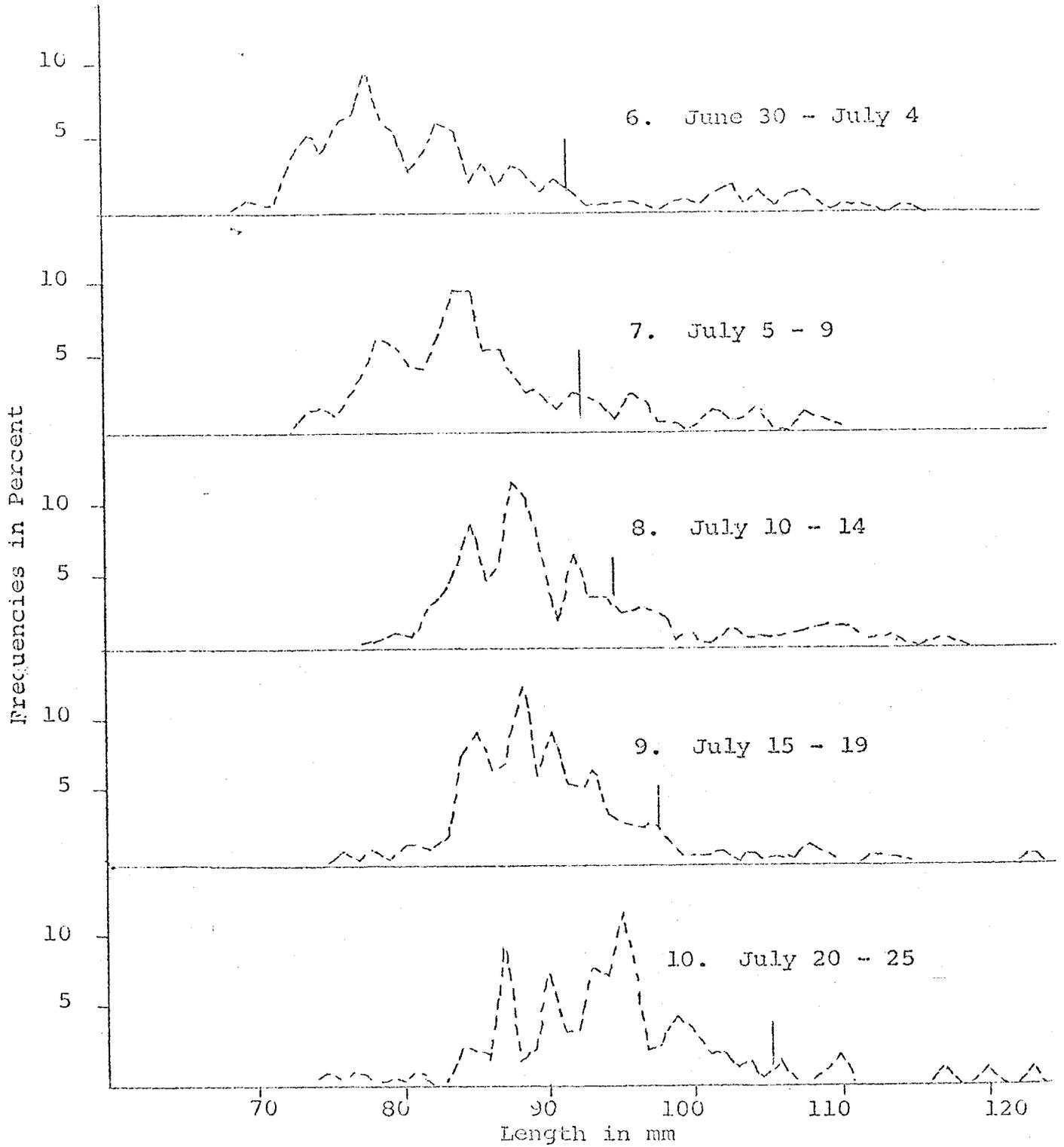


Figure 2. Length frequencies of red salmon smolts from the Wood River system, 1962. (Vertical dash lines divided Age I and Age II) - continued.

Table 3. Length and age of red salmon smolts from the Wood River system, 1962.

Period No.	Date	Line Dividing Age I & Age II	Mean Length of Age Group		Percentage of Age Group	
			I	II	I	II
1	June 4 - 9	86.5	76.3	95.8	82.17	17.83
2	June 10-14	86.5	79.7	93.2	78.69	21.31
3	June 15-19	87.5	79.0	93.1	85.43	14.57
4	June 20-24	88.5	79.0	96.0	93.58	6.42
5	June 25-29	89.5	80.2	95.4	91.80	8.20
6	June 30-July 4	91.5	80.4	102.8	83.03	16.97
7	July 5 - 9	92.5	83.4	99.7	80.40	19.60
8	July 10-14	94.5	87.7	103.6	75.34	24.66
9	July 15-19	97.5	88.5	105.8	91.96	8.04
10	July 20-25	105.5	<u>93.1</u>	<u>113.1</u>	<u>92.08</u>	<u>7.92</u>
Weighted Season's Total			80.1	97.6	85.97	14.03

The total weighted length frequency for the season is shown in Figure 3, in which the small size, as well as the dominance of the Age I group is apparent.

#### SUMMARY

1962 was the twelfth consecutive year for smolt enumeration and sampling at the outlet of Lake Aleknagik, and the second year that the studies have been conducted by the Alaska Department of Fish and Game.

The index of abundance was obtained by a single fyke net fished from 9:00 P.M. to 11:00 P.M. each night from June 4 to July 25. Measurements were obtained from live fish, anesthetized and later released at the site.

The red salmon smolt index obtained in 1962 was 178. This is below the twelve year average and smaller than was expected.

Both Age I and Age II fish were small in size. Average length of Age I fish was 80.1 mm, and average length of Age II fish was 97.6 mm. Both size groups showed good growth during the season.

Age I fish predominated and comprised 85.97% of the migration. Although small in size, the smolts were found to be in good condition.

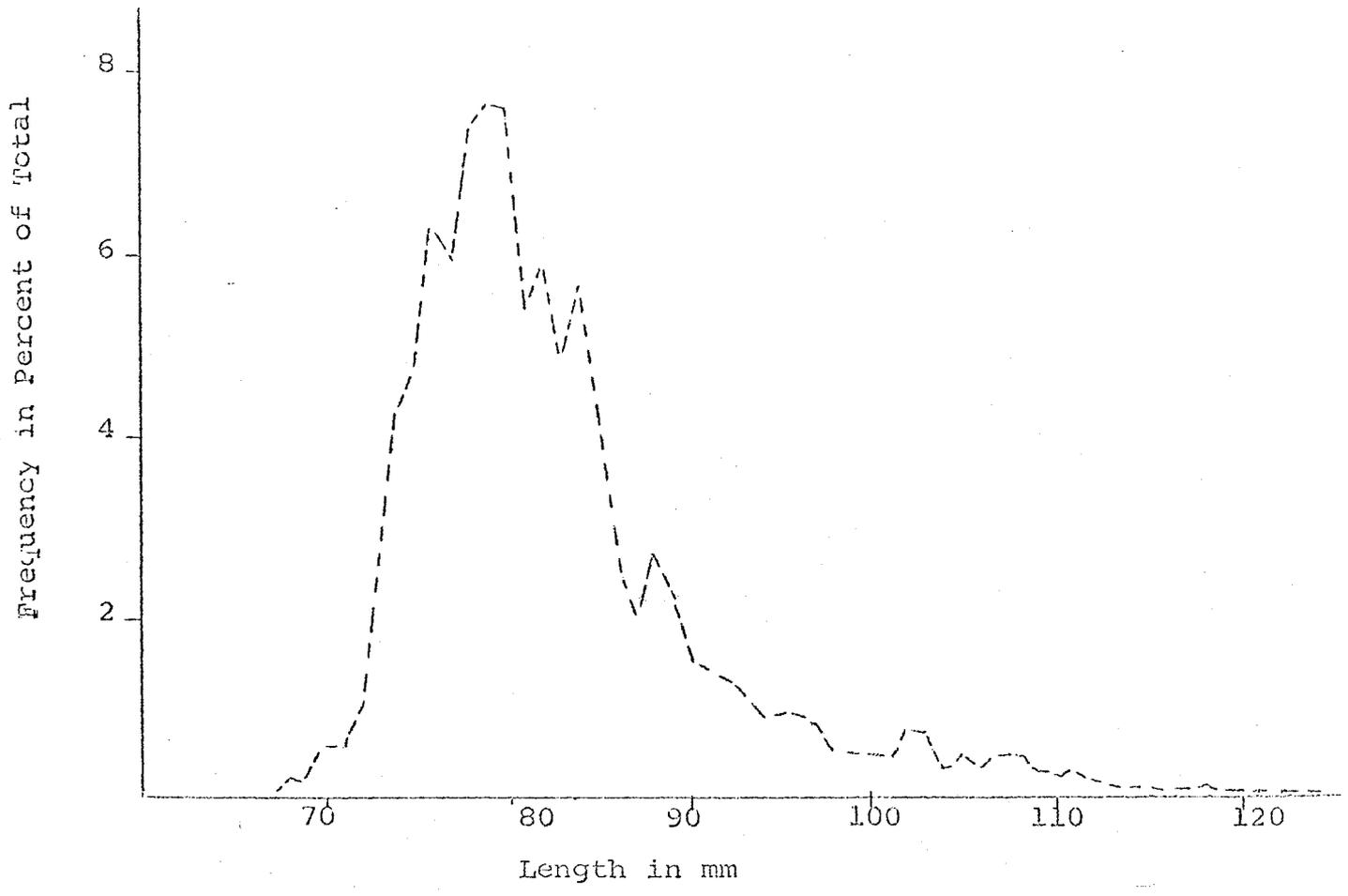


Figure 3. Season's weighted length frequency of red salmon smolts from the Wood River system, 1962.

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