

Informational Leaflet 32

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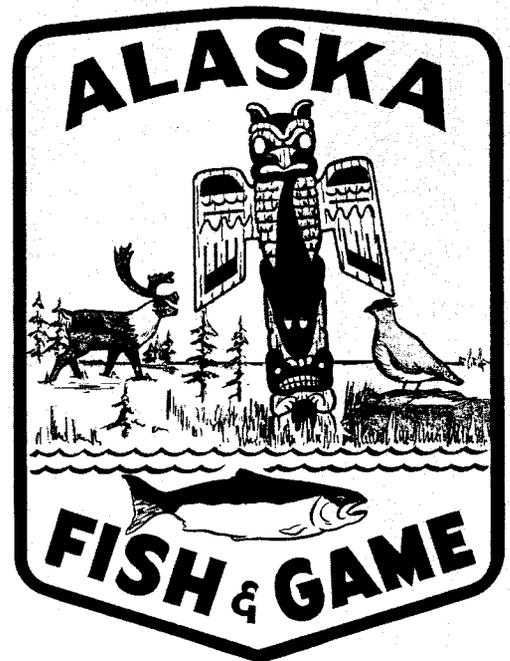
By:

Wilbur Church
Division of Commercial Fisheries
Dillingham, Alaska

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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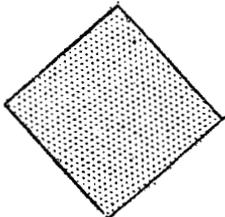
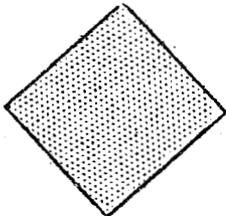
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32

RED SALMON SMOLTS

FROM THE

WOOD RIVER SYSTEM-1961



July 31, 1963

by

WILBUR CHURCH
Divison of Commercial Fisheries

ABUNDANCE, SIZE, AND AGE OF RED SALMON SMOLTS FROM THE
WOOD RIVER SYSTEM, 1961

INTRODUCTION

In 1961 the Alaska Department of Fish and Game conducted smolt enumeration and sampling at Mosquito Point, Lake Aleknagik. This was the eleventh consecutive year for these studies, although the first for the Department. The Fisheries Research Institute began the program in 1951 and continued through 1960.

Results were kept comparable with past records through continuation of methods developed and used by the Fisheries Research Institute.

METHODS

Field operations were started on May 31 and continued through July 20. Fishing was conducted from 9:00 P.M. to 11:00 P.M. each night, the previously established index hours.

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

Size composition was determined from length measurements of 7,101 smolts contained in 75 one-pound samples. Age determination was based on readings of 252 scales contained in 8 scale samples, one taken in each five-day period. In addition, one condition index measurement was taken.

INDEX OF ABUNDANCE

The total catch during the index hours for the 1961 season was 881,911 smolts (Table 1). This is equivalent to 518.67 index points, using 1952 as the base year with the assigned value of 100.

The 1961 index is the highest value obtained in the history of the Wood River smolt enumeration (Figure 1). The peak of migration occurred on June 18. The index value for that day alone was 51.6, only 8.9 index points less than that of the 1959 season's total.

TIMING OF THE MIGRATION

Catches during the index hours followed the usual pattern. Migration was

Table 1. Mosquito Point smolt catches, 1961, by hour and day (index hours 2100 - 2300).

Date	2100-2200	2200-2300	Daily Total	Cumulative Total	Cum. Index Points
5/31	98	298	396	396	.23
6/ 1	488	8,004	8,492	8,888	5.23
2	12,064	7,100	19,164	28,052	16.50
3	1,555	2,875	4,430	32,482	19.10
4	1,532	6,503	8,035	40,517	23.83
5	8,332	48,877	57,209	97,726	57.47
6	834	23,734	24,568	122,294	71.92
7	7,083	2,794	9,877	132,171	77.73
8	45,445	24,076	69,521	201,692	118.62
9	29,680	33,514	63,194	264,886	155.78
10	422	1,553	1,975	266,861	156.95
11	1,425	3,462	4,888	271,749	159.82
12	4,201	604	4,805	276,554	162.65
13	37,679	44,214	81,893	358,447	210.81
14	9,889	21,364	31,253	389,700	229.19
15	23,403	41,070	64,473	454,173	267.11
16	83	3,600	3,683	457,856	269.27
17	817	175	992	458,848	269.86
18	41,434	46,305	87,739	546,587	321.46
19	20,534	27,522	48,056	594,643	349.72
20	17,856	22,647	40,503	635,146	373.54
21	252	3,939	4,191	639,337	376.00
22	0	943	943	640,260	376.56
23	1,935	2,400	4,335	644,615	379.11
24	2,179	4,485	6,664	651,279	383.03
25	4,564	5,792	10,356	661,635	389.11
26	19,485	22,873	42,358	703,993	414.03
27	10,403	43,910	54,313	758,306	445.93
28	344	10,182	10,526	768,832	452.16
29	7,985	10,168	18,153	786,985	462.84
30	14	12	26	787,011	462.86
7/ 1	7	0	7	787,018	462.86
2	10,934	35,503	46,437	833,455	490.17
3	2,019	8,068	10,087	843,542	496.10
4	28	120	148	843,690	496.14
5	3,430	1,543	4,973	848,663	499.11
6	1,546	2,126	3,672	852,335	501.27
7	1,030	15,797	16,827	869,162	511.17
8	770	6,414	7,184	876,346	515.39
9	1	68	69	876,415	515.43
10	0	0	0	876,415	515.43

-Continued-

Table 1. Mosquito Point smolt catches, 1961, by hour and day (index hours 2100 - 2300) - continued.

Date	2100-2200	2200-2300	Daily Total	Cumulative Total	Cum. Index Points
7/11	35	2,700	2,735	879,150	517.04
12	895	1,113	2,008	881,158	518.22
13	7	270	277	881,435	518.38
14	37	14	51	881,486	518.42
15	1	9	10	881,496	518.42
16	0	0	0	881,496	518.42
17	52	116	168	881,664	518.52
18	34	198	232	881,896	518.66
19	0	1	1	881,897	518.66
20	0	14	14	881,911	518.67
	332,841	549,070	881,911	881,911	

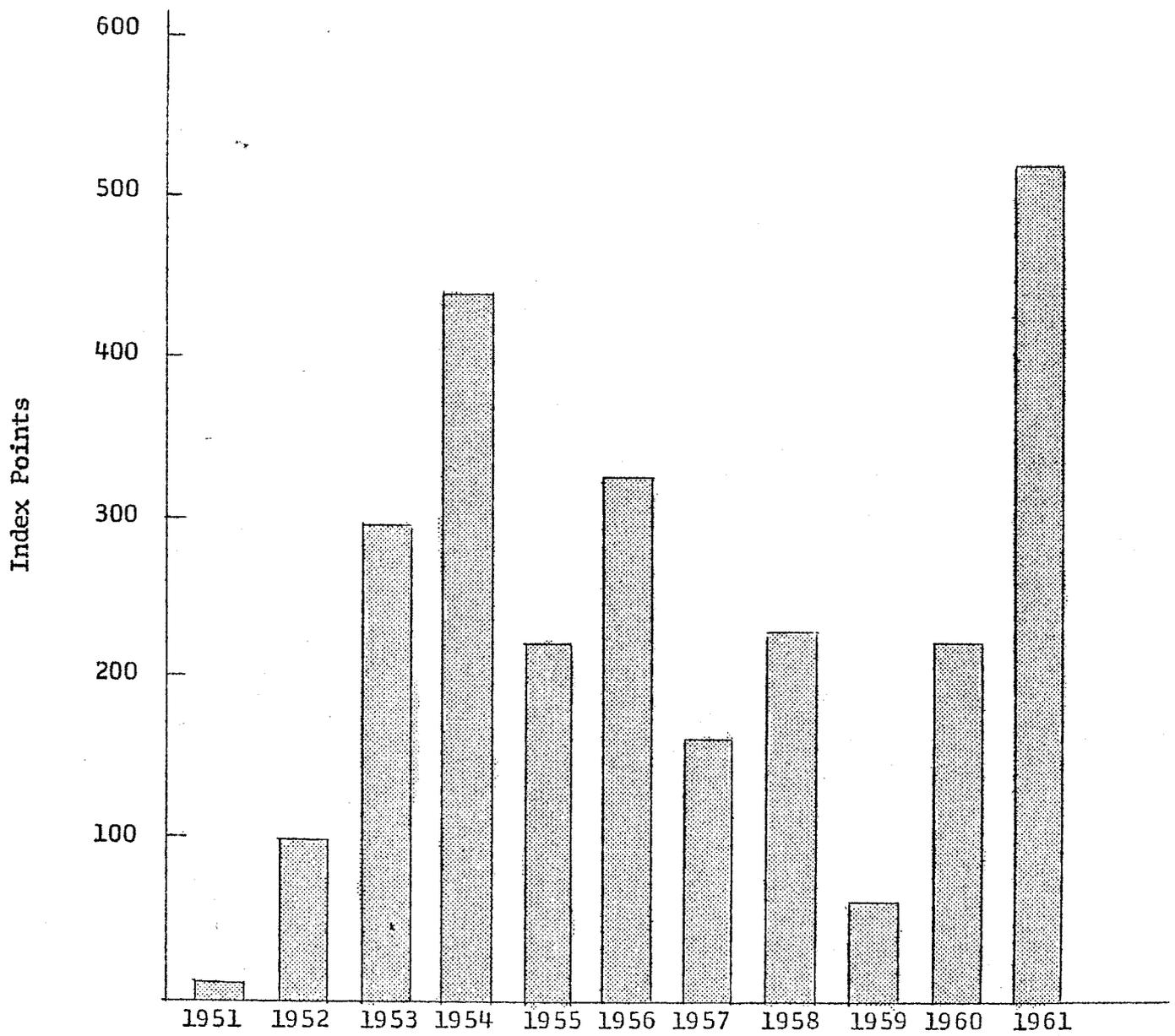


Figure 1. Red salmon smolt index from the Wood River system, 1951-1961.

lightest during the first hour (37.7%), and increased in the second hour (62.3%). On a few nights, catches were larger in the first hour, but this invariably occurred on nights of light migration.

The migration pattern in 1961 is best described as a series of peaks. The first peak occurred on June 2, with increasing peaks from then until June 18, followed by decreasing peaks until the last minor one on July 11. This is shown in Figure 2.

SIZE AND AGE COMPOSITION

Length frequency and age data were grouped in five-day periods, except the first period which is six days. The last three periods which include July 6 to 20 were combined as one period, because of the small number of smolts involved. Altogether there are eight 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 3, 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. There is little evidence of progression in size of either age groups during the season, except during the last three periods. Dominance of Age I fish is evident throughout the season.

The percentage and mean length of each age group and of the weighted season's total were calculated (Table 3). Age I smolts comprised 93.0% of the total run and averaged 81.7 mm in length; Age II smolts were 7.0% of the total and averaged 102.1 mm. Although the small size and slow growth of Age I fish is apparent, the lack of increase in mean length of both size groups in mid season is probably due to the presence of different populations of smolts.

The total weighted length frequency is shown in Figure 4, in which the small size, as well as the dominance, of the Age I group is apparent.

CONDITION INDEX

Condition index of smolts was calculated on the basis of weight per fish of a given length. Fish were measured in millimeters and collected in 5 mm groupings. Each group of ten fish was weighed in grams and weight per fish was calculated.

The 1961 condition index was obtained from the run of June 18, the night of the largest run of the season. Table 4 shows the weight per fish as compared with the mean weight of previous years. Although the 1961 smolts were smaller than usual, the condition index is similar to that of the mean of previous years.

Table 2. Smolt sampling data, 1961.

Period No.	Date	No. of Smolts	Pct. of Season's Total	No. of l# Samples Measured	No. of Fish Measured	No. of Scales Read
1	5/31-6/5	97,726	11.08	11	1,222	11
2	6/6-6/10	169,135	19.18	10	989	21
3	6/11-6/15	187,312	21.24	10	1,003	26
4	6/16-6/20	180,973	20.52	10	1,010	19
5	6/21-6/25	26,489	3.00	9	942	8
6	6/26-6/30	125,376	14.22	8	644	43
7	7/1-7/5	61,652	6.99	6	499	22
8	7/6-7/20	33,248	3.77	11	792	50
TOTAL		881,911	100.00	75	7,101	200

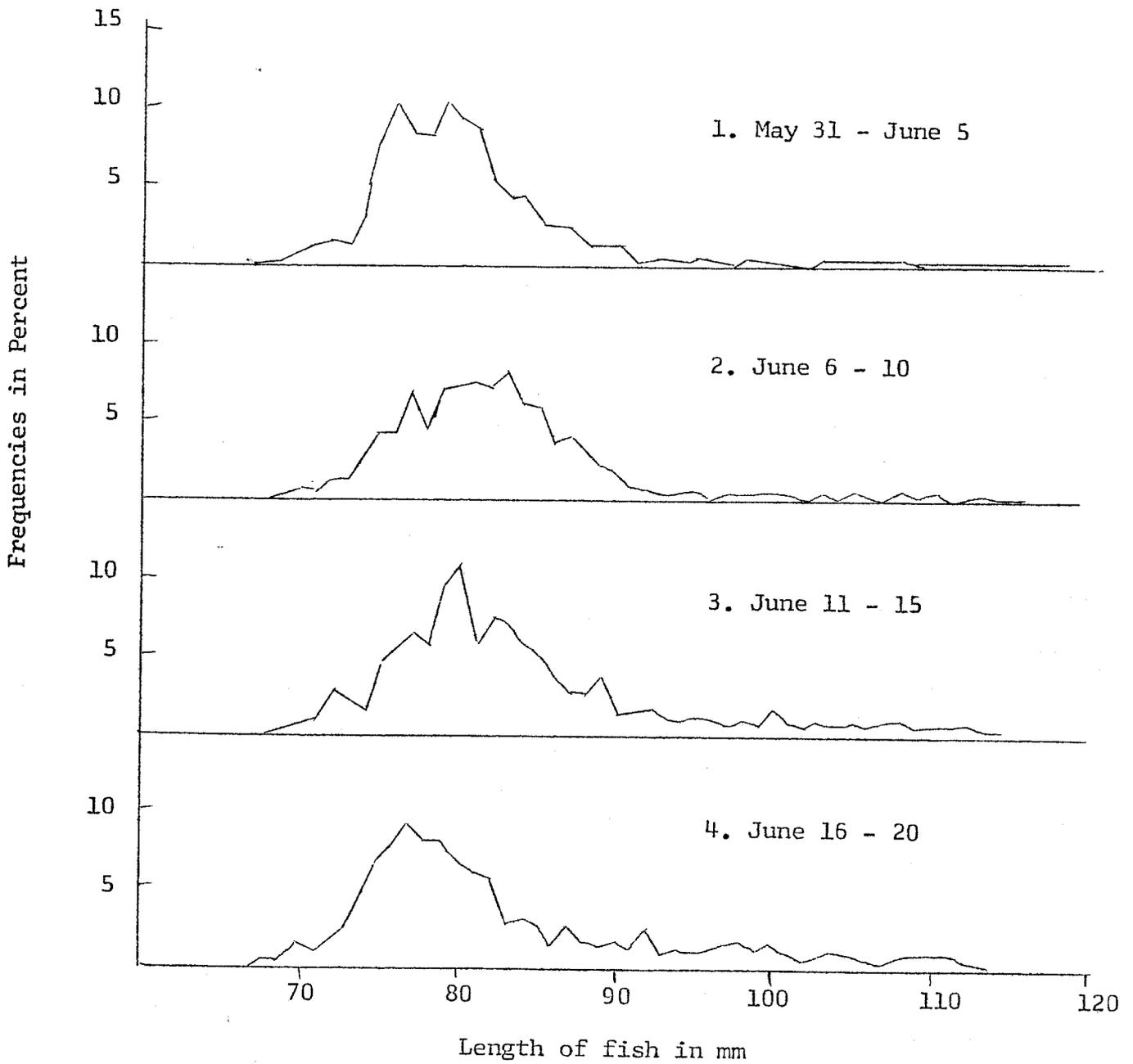


Figure 3. Length frequencies of red salmon smolts from the Wood River system, 1961 (continued).

(Vertical dash lines divided Age I and Age II)

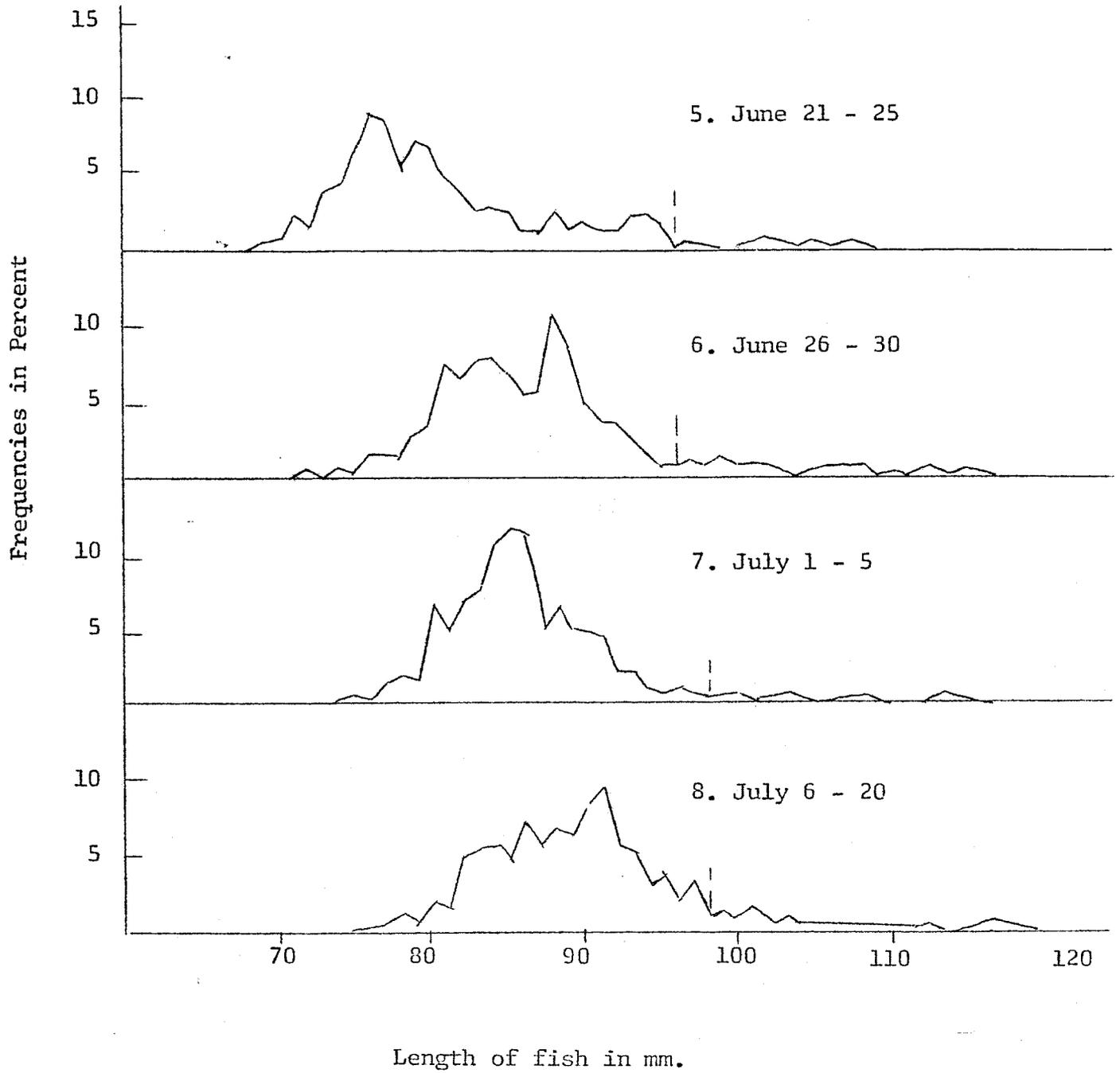


Figure 3. Length frequencies of red salmon smolt from the Wood River system, 1961 (continued).

Table 3. Length and age of red salmon smolts from the Wood River system, 1961.

Period No.	Date	Line Dividing Age I & Age II	Mean Length of Age Group		Percentage of Age Group	
			I	II	I	II
1	5/31-6/5	91	79.3	97.5	97.5	2.5
2	6/6-6/10	93	81.0	103.2	94.2	5.8
3	6/11-6/15	94	80.9	100.2	94.2	5.8
4	6/16-6/20	94	79.6	102.4	87.5	12.5
5	6/21-6/25	96	80.4	102.2	92.8	7.2
6	6/26-6/30	96	85.4	102.5	92.2	7.8
7	7/1-7/5	98	85.3	105.8	96.2	3.8
8	7/6-7/20	98	88.3	104.0	93.2	6.8
WEIGHTED SEASON'S TOTAL			81.7	102.1	93.0	7.0

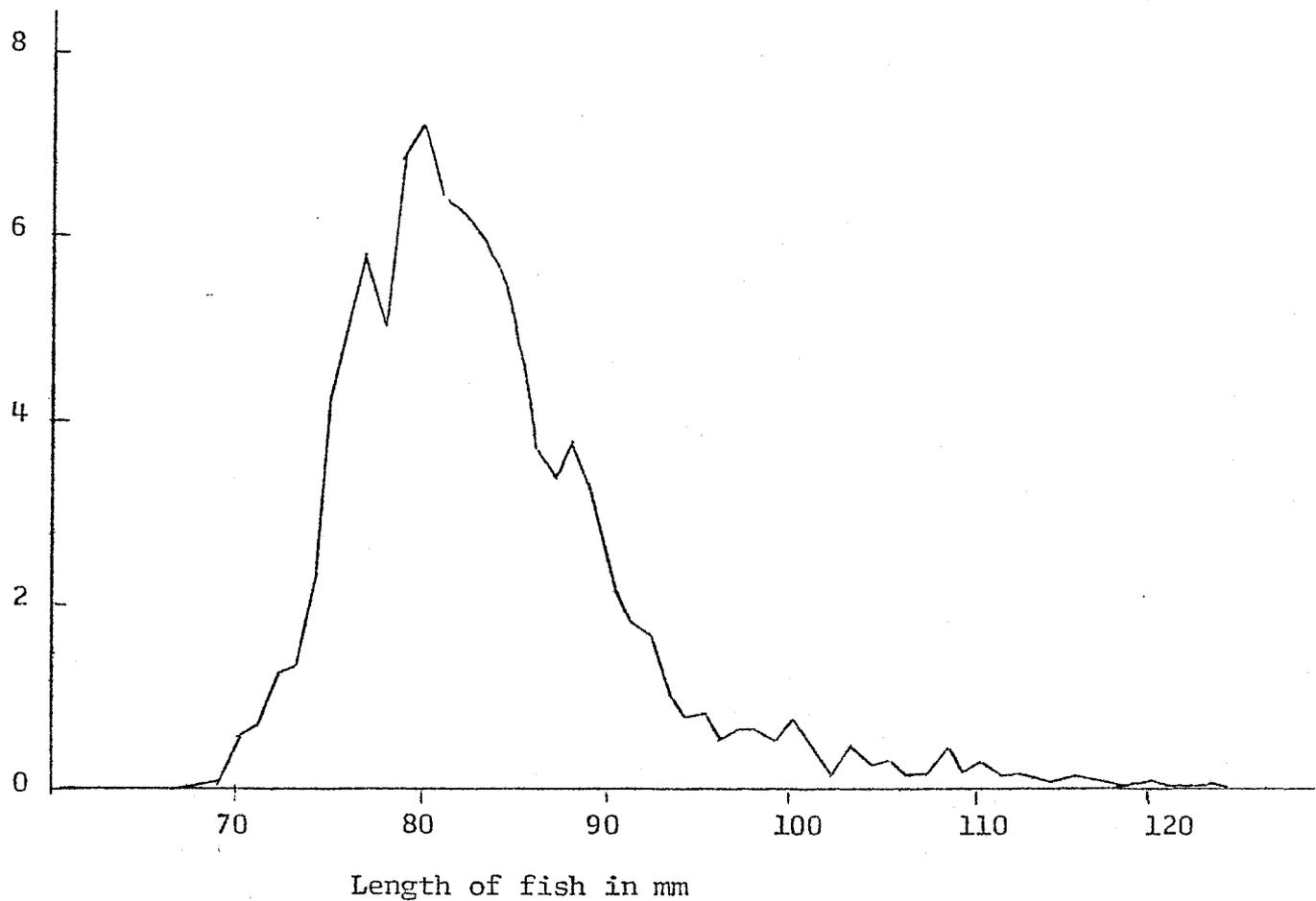


Figure 4. Season's weighted length frequency of red salmon smolts from the Wood River system, 1961.

Table 4. Condition index of red salmon smolts from the Wood River system, 1961.

Midpoint of 5 mm group	Gms. Per Fish Previous Mean	Gms. Per Fish 1961	Deviation From Mean
70	-----	3.02	-----
75	3.44	3.45	+.01
80	4.07	4.09	+.02
85	4.98	4.79	-.19
90	5.79	5.71	-.08
95	6.85	6.56	-.29
100	7.84	8.19	+.35
105	9.09	9.37	+.28
110	10.43	10.55	+.12

SUMMARY

The red salmon smolt index of 519 for 1961 in the Wood River system is the largest recorded. Most of the migrants, 93.0%, came from the 1959 year class, which was the largest escapement into the Wood River Lakes since 1946.

Age I fish were small in size, probably indicating increased competition for food during their fresh water life. Average length was 81.7 mm. Age II fish averaged 102.7 mm. Neither size group showed much increase in size during the season.

Although Age I fish differed in size from one period to another, they were not divided into two distinct modes as has been the case in some previous years.

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