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The Length, Weight and Age Composition of the Salmon Catch of the North Esk (Scotland) from 1967 to 1970 and the Estimated Number of Two-Sea-Winter Salmon occurring in the Catches from 1962-1970

by

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Details of the length, weight and age composition of the commercial salmon catches taken on the North Esk from 1962 to 1966 have been given in an earlier report (ICES/ICNAF Salmon Doc. 68/1). The present paper summarizes the corresponding data for the catches from 1967 to 1970, includes estimates of the number of two-sea-winter fish which were present in the commercial catch each year from 1962 to 1970 and discusses the value of these catch figures as a measure of the strength of the total stock.

The method of obtaining the sample, the analysis of the data and the presentation of the results has remained the same. The proportion of the annual salmon catch sampled each year, varied from 20% in 1969 to 36% in 1970. Table 1 gives the age composition for each year and the overall age composition averaged for the four-year period 1967-1970, and Table 2 summarizes the monthly distribution of the various age groups averaged over the same period.

The two major differences between these results and those for the period 1962-66 are the increase in the proportion of three- and four-sea-winter fish (17.0% compared with 8.8%), and the decrease in the proportion of fish belonging to the 3.2 age group (28.2% compared with 35.3%). These differences may not apply to the total stock because the proportion of each age group returning to fresh-water, caught by the nets may vary from year to year.

Tables 3 and 4 show the average lengths and average weights for each year and the averages for the four year period, and Tables 5 and 6 show four-year average figures for each month in each sea age group.

The results summarized in Tables 3, 4, 5 and 6 are markedly similar to the corresponding figures for the period 1962-66.

The estimated numbers of two-sea-winter fish caught each year by the net and coble fishery in the North Esk are shown in Fig. 1, and Fig. 2 shows the estimated number caught during the periods roughly corresponding to the spring fishery and to the summer fishery respectively. The two-sea-winter group was chosen because (a) fish belonging to this age group are caught each month throughout the netting season, (b) in most years it constitutes over 80% of the total North Esk salmon catch and, (c) all the fish caught migrated in the same year. Direct catch figures can be used because the fishing effort in the river has remained virtually constant during the period under review.

It should be noted that, during 1962, an extensive drift-net fishery operated off the east coast of Scotland and this may well have affected the net and coble fishery in the North Esk that year. Apart from this, there has been a decline in the total net and coble catch during recent years (Fig. 1). The decrease in the spring catch (Fig. 2a) has not been compensated by an increase in the summer catch (Fig. 2b), though the decrease in the latter catch has been less rapid than the former (Figs. 2a and 2b are plotted to the same scale).

Although net and coble catches are the only indicators, at present available, of the strength of the salmon runs entering the North Esk each year, there are a number of reasons why it would be unwise to assume that fluctuations in these

catches faithfully reflect fluctuations in stocks. These include:

- (a) the overall fishing period. It is estimated that, on the North Esk, nets are only fished for about 15% of the total time available each year. Though this period presumably covers that part of the year when most fish are available for catching, little is known of upstream movements at other times (e.g. during the close season) and there is, in fact, no check on the numbers of salmon moving upstream during the remaining 85% of the total time available.
- (b) variations in fishing efficiency, due to variations in river conditions, both within and without the netting season.
- (c) changes in the amount of netting elsewhere. In particular, there has been a decrease in the fixed engine fishing effort on the neighbouring coast during the spring in recent years and this could have affected the numbers of salmon available in the river.

These are some of the factors which could affect the catch-stock relationship in the North Esk but, from their nature, it would seem likely that similar factors would apply elsewhere.

Table 1                      Percentage Age Composition, Commercial Salmon Catch, North Esk 1967-1970

<u>Age Group</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>Average 1967-70</u>
1.2	2.03	0.75	1.51	1.21	1.46
1.3	0.04	0.19	0.00	0.17	0.10
2.2	49.82	42.63	44.24	61.94	49.43
2.3	10.56	10.83	24.33	7.09	11.92
2.4	0.37	0.81	0.00	0.35	0.43
3.2	27.10	36.40	22.82	23.10	28.19
3.3	4.92	4.42	4.31	3.20	4.37
3.4	0.00	0.12	0.12	0.09	0.07
4.2	2.03	2.05	1.86	2.34	2.07
4.3	0.04	0.12	0.00	0.17	0.08
5.2	0.00	0.06	0.00	0.00	0.02
Previous spawners	3.09	1.62	0.81	0.35	1.86

Table 2                      Average Monthly Percentage Age Composition Commercial Salmon Catch, North Esk, 1967-1970

<u>Age Group</u>	<u>February</u>	<u>March</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>
1.2	0.10	0.15	1.17	2.27	3.69	4.06	8.57
1.3	0.00	0.00	0.59	0.30	0.00	0.00	0.00
2.2	36.03	39.30	48.90	61.97	73.19	73.99	75.24
2.3	13.33	20.81	14.39	5.30	3.42	1.67	4.29
2.4	0.29	0.97	0.29	0.15	0.55	0.00	0.00
3.2	38.28	27.52	27.90	25.61	17.23	15.04	8.00
3.3	5.93	8.05	3.08	1.82	0.14	0.71	0.00
3.4	0.15	0.07	0.00	0.00	0.00	0.00	0.00
4.2	4.22	1.34	1.17	1.21	0.41	0.71	0.00
4.3	0.15	0.07	0.00	0.15	0.00	0.00	0.00
5.2	0.00	0.07	0.00	0.00	0.00	0.00	0.00
Previous spawners	1.52	1.64	2.50	1.21	1.37	3.82	3.81

Table 3      Average Fork Length (cm.), Commercial Salmon Catch,  
North Esk 1967-1970

<u>Sea Winters</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>Average</u> <u>1967-70</u>
2	72.6	71.8	72.2	73.1	72.4
3	88.6	87.8	86.5	86.0	87.6
4	100.5	96.1	101.0	95.2	97.4
Previous spawners	79.7	80.0	76.1	74.3	79.2
Average 1967-70	75.4	74.7	76.3	74.6	75.2

Table 4      Average Weight (Kg.), Commercial Salmon Catch  
North Esk 1967-1970

<u>Sea Winters</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>Average</u> <u>1967-70</u>
2	4.1	4.0	4.0	4.2	4.1
3	7.6	7.3	7.0	6.9	7.3
4	11.7	9.5	10.5	9.2	10.1
Previous spawners	5.5	5.4	4.6	4.9	5.4
Average 1967-70	4.8	4.6	4.9	4.5	4.7

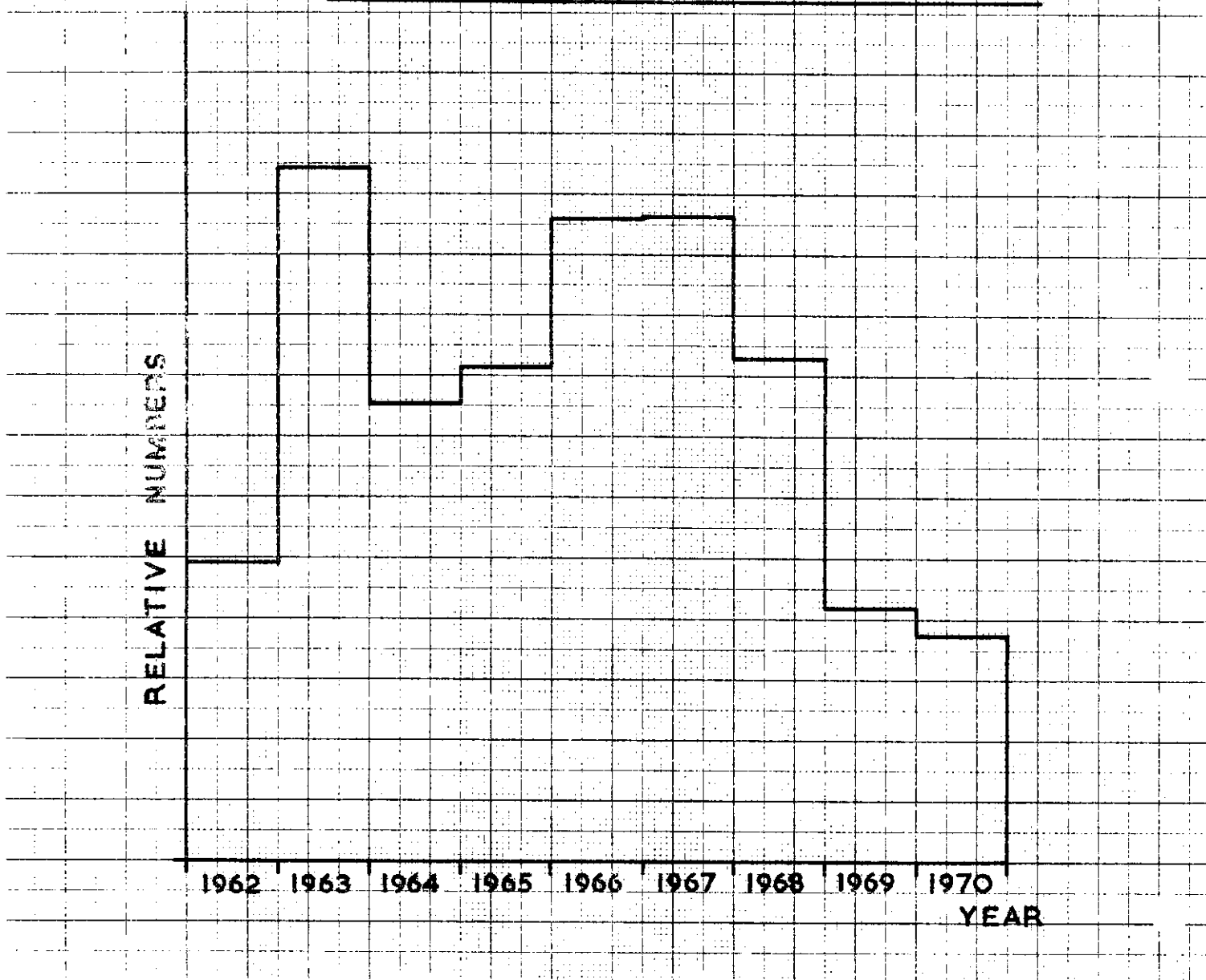
Table 5      Monthly Average Fork Length (cm.), Commercial Salmon Catch  
North Esk, 1967-1970

<u>Month</u>	<u>Sea Winters</u>			<u>Previous Spawners</u>	<u>Overall</u>
	<u>2</u>	<u>3</u>	<u>4</u>		
February	69.4	86.8	95.4	80.3	73.0
March	70.3	87.6	97.6	82.8	75.8
April	71.6	88.4	95.5	79.2	74.9
May	73.4	89.3	94.0	77.7	74.7
June	76.0	90.6	103.3	81.4	76.8
July	78.7	89.3	-	69.2	78.6
August	82.0	93.6	-	86.9	82.7

Table 6      Monthly Average Weight (Kg.), Commercial Salmon Catch  
North Esk, 1967-1970

<u>Month</u>	<u>Sea Winters</u>			<u>Previous Spawners</u>	<u>Overall</u>
	<u>2</u>	<u>3</u>	<u>4</u>		
February	3.6	7.1	9.5	5.7	4.3
March	3.7	7.3	10.2	6.0	4.8
April	3.9	7.4	9.0	5.3	4.5
May	4.3	7.6	9.4	5.0	4.5
June	4.8	8.5	12.3	5.9	5.0
July	5.4	7.5	-	3.5	4.9
August	6.1	9.0	-	7.1	6.2

FIG. 1    NUMBERS OF TWO-SEA-WINTER FISH  
CAUGHT BY NET AND COBLE 1962-1970



**FIG. 2**      **NUMBERS OF TWO-SEA-WINTER FISH**  
**CAUGHT BY NET AND COBLE      1962-1970**

