

ANNUAL MEETING. - JUNE 1967Results of Atlantic salmon tagging in the Maritime
Provinces, Canada, 1964-66

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Although the earliest Canadian tags recovered from Greenland were attached in 1959, it is only the 1963, 1964 and 1965 smolt taggings which have given sufficient numbers of recoveries there to provide a useful basis for analysis. In the earlier years the numbers of tags used were comparatively small, and the Greenland fishery had not reached sufficient intensity to give a high recovery rate. The still larger number of smolts tagged in Canada in 1966 will, of course, not begin to appear in Greenland catches until the autumn of 1967.

The principal results for 1963, 1964 and 1965 are summarized in the appended table. They have been divided into three areas: (a) on the west coast of the Gulf of St. Lawrence; the Miramichi River in New Brunswick; (b) on the south and south-east coasts of the Gulf in Nova Scotia, the Margaree River and the River Philip, and (c) in the Bay of Fundy; the Big Salmon River on the south coast of New Brunswick. Counting fences or traps which permitted the examination of returning adults were operated on all these rivers except the Margaree River, where the only fence was on a minor tributary.

The additional data which have become available from the 1966 fishery have brought out three points:

(a) The effect of the size and condition of smolts at the time of migration on their subsequent movements may extend to influencing the proportion which travel to the Greenland area.

(b) There may be major variations from year to year in the proportion of Canadian salmon visiting Greenland.

(c) There may be differences in the proportion of salmon going to Greenland from different parts of the Canadian coast.

Effects of smolt size and condition

Some indications of the effect of size and condition at migration on subsequent movements can be obtained by examination of the data for the hatchery-produced fish, since these may vary much more in growth rate and parentage than the natural smolts in any one river. For example, of the hatchery-produced smolts liberated in the Miramichi River in 1964, 3 returns were received from Greenland and 24 as grilse or 2-sea-year salmon in home waters (Greenland giving 11% of total recaptures), while in the same year the natural smolts were 7 against 236 (2%). In 1963 the corresponding figures were: hatchery smolts 3 against 105 (3%), natural smolts 9 against 78 (10%). Thus the hatchery smolts gave a return from Greenland which was much higher than that for natural smolts in 1964 and much lower in 1963. There appear to be no significant differences in the proportions returning as grilse as 2-sea-year salmon between the various lots. Detailed examination of the full data for hatchery-produced fish suggests that there may be a tendency for the larger smolts to produce relatively fewer grilse and, perhaps as a result, a larger proportion of fish visiting Greenland.

Variations from year to year

The number of Canadian tags recovered from Greenland in 1966 was much greater than in any previous year, and the

increase was due more to a higher proportion of tags being recaptured and reported than to the increase in the number of tags used. Pooling all data for the Gulf of St. Lawrence, the results are

Year of tagging	Total smolts			Natural smolts		
	Tagged	Greenland	%	Tagged	Greenland	%
1963	12710	13	.10	4678	9	.19
1964	40135	14	.03	14220	7	.05
1965	41980	110	.26	16483	58	.35

The trend is similar if the hatchery smolts are examined separately, the 1964 return being lowest, and the 1965 return highest.

These figures would be affected by any differences in the tagging procedure which could influence overall recovery. It is therefore interesting to compare the returns as grilse and from Greenland for the same material

	Total smolts			Natural smolts		
	Grilse	Greenland	<u>Greenland grilse</u>	Grilse	Greenland	<u>Greenland grilse</u>
1963	196	13	.07	66	9	.14
1964	260	14	.05	187	7	.04
1965	445	110	.25	163	58	.36

Comparisons between Greenland and 2-sea-year returns can only be made yet for the first two years. These give the following results

	Total smolts			Natural smolts		
	2-sea-year	Green-land	<u>Greenland 2-sea-year</u>	2-sea-year	Green-land	<u>Greenland 2-sea-year</u>
1963	37	13	.35	12	9	.75
1964	100	14	.14	59	7	.12

Thus, all analyses show similar trends; a moderate drop in the relative return from Greenland from 1963 to 1964, and a strong rise in 1965 to well above the 1963 level.

To obtain overall figures which would indicate approximately the relation between the proportions of returns coming from Greenland in the three years, the values for 1963 have been taken as 1.0, and geometric means determined for all the series of data for the other years. This leads to the following table

	<u>Ratio</u>	<u>Greenland catches for following year</u>
1963	1.0	1400 metric tons
1964	0.3	716 " "
1965	2.5	1235 " "

The comparison in the table with the Greenland catches shows that while the decline in the 1964 returns is of the same order as the change in the Greenland catch, the rise in returns for 1965 is not associated with a rise of similar magnitude in the Greenland catch. A better comparison would be with the size of the fishing effort in each year at Greenland but these data are not available. The information which has been received does not suggest that there was any substantial increase in effort at Greenland in 1966.

If the increased return from Greenland for the 1965 tags is not due to more intensive fishing, it could be the result either of more efficient tag recovery there, or of a real increase in the proportion of Canadian smolts entering Greenland inshore waters. An increase of $2\frac{1}{2}$ times in the proportion of tags handed in seems unlikely to have been achieved between one season and the next, but the tag data from other countries should also bear on this point.

An increase in the proportion of Canadian smolts going to Greenland could be contributed to both by an increase in the proportion remaining in the sea for a second year, and by a larger part of those which spend 2 years in the sea reaching the Greenland coast. There is no indication at present of any decrease in the proportion of fish returning as grilse from the 1965 taggings such as might be expected if more of these fish than usual had remained at sea for 2 years. The tag

recoveries from 2-sea-year fish caught in Canadian waters in 1967 will, however, provide more satisfactory evidence on this point. If these confirm the indications from the data now available, an increase in the proportion of 2-sea-year fish reaching Greenland may remain the most probable hypothesis.

If it is possible for a significantly greater proportion of Canadian fish to visit Greenland in one year than in another, then obviously the effects of the Greenland fishery on Canadian fisheries and stocks may vary from one year to another, and it will be correspondingly more difficult to reach soundly-based generalizations until long series of good data are available.

Migration to Greenland from different areas

In the previous section the results for the Miramichi and Nova Scotia have been pooled, and on the present data the hypothesis that equal proportions of smolts go to Greenland from these two areas in the Gulf of St. Lawrence cannot be rejected.

The returns from the Bay of Fundy, however, give very different results as the following table, summarizing the data for hatchery smolts, shows:

	<u>Miramichi and Nova Scotia</u>					<u>Bay of Fundy</u>				
	<u>Tagged</u>	<u>Grilse</u>	<u>land</u>	<u>land</u>	<u>grilse</u>	<u>Tagged</u>	<u>Grilse</u>	<u>land</u>	<u>land</u>	<u>grilse</u>
1963	25915	73	7	.027	.10	21000	29	0	0	0
1964	25497	282	52	.204	.18	20000	72	1	.005	.014
Total	51412	355	59	.115	.17	41000	101	1	.002	.010

The results for both years show a very small return from Greenland for the Bay of Fundy smolts. Since the Bay of Fundy tagged smolts produced satisfactory numbers of grilse, the difference cannot be

due to poor survival from these fish. More rigorous comparisons are not, however, possible at this stage on account not only of the limited amount of data, but also of the possibility, discussed early, of different batches of hatchery smolts tending to show different migration behaviour.

PIRAMIGHT RIVER

NOVA SCOTIA

YEAR OF LIBERATION	PIRAMIGHT RIVER		NOVA SCOTIA		NEW BRUNSWICK	
	No. liberated	Green-land	No. liberated	Green-land	No. liberated	Green-land
1963	Nat. 4678	66(33) 9	0	-	0	-
	Hat. 4280	89(47) 3	3752 ¹	41(3) 1	0	-
	Total 8958	155(80) 12	3752	41(3) 1	0	-
1964	Nat. 14000	187 (82) 7	220 ¹	0	0	-
	Hat. 11533	20(1) 3	14382 ²	53(46) 4	21000	29(9) 0
	Total 25533	207(83) 10	14602	53(46) 4	21000	29(9) 0
1965	Nat. 15452	162(85) 58	1031 ¹	1	0	-
	Hat. 14823	250(69) 40	10674 ¹	32(0) 12	20000	72(56) 1
	Total 30275	412(154) 98	11705	33(0) 12	20000	72(56) 1
	GRAND TOTAL	64766 774(317) 120	30059	127(49) 17	41000	101(65) 1

¹All Margaree R.

²Margaree R. 2999:R. Phillip 11383

Figures in parentheses are numbers of fish caught in counting fences; they are included in the totals.