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Cod tagging off Labrador, November-December 1962

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Between 28 November and 1 December 1962, 382 cod were tagged from the RV ERNEST HOLT off Labrador, mostly on or near the Hamilton Inlet Bank in Div. 2J. The tags were of the yellow plastic flag type, attached between the first and second dorsal fins with braided nylon thread. By the end of 1966, 33 tags had been returned, representing 8.6% of the fish released. On release the fish were classified in three categories for scale condition and two categories for activity. The numbers tagged and returned from each category were:

		<u>Tagged</u>	<u>Returns</u>
<u>Scales</u>	Good	22	3
	Good-moderate	152	10
	Poor	208	20
<u>Activity</u>	Lively	271	23
	Sluggish	111	10

These numbers suggest that the condition on release had no effect on subsequent returns. The returns are analysed in Tables 1 to 4.

Table 1 gives the release areas. In areas A, B and C, where there are several stations, the release positions are within five miles of the position given. Area A is just inside the southern edge of Div. 2H off Hopedale.

Table 2 analyses the returns by years and quarters, by divisions, and by whether they came from the inshore or offshore fisheries. The one recapture from Div. 2G in April 1965 was from the edge of the shelf 120 miles ESE of Cape Chidley. In Div. 2H two recaptures were off Hopedale and two further north. Most of the recaptures in Div. 2J came from Hamilton Inlet Bank during the fishery on spawning concentrations in April-May 1963 and 1964; or from the same area in the summer of 1964. No recaptures came from the Hamilton Inlet Bank in either the fourth or first quarters, although the fish were tagged there in winter. The cod catch in thousands of tons in Subarea 2 and the tags returned in the three half years between April 1963 and September 1964 were:

	<u>Quarters</u>	<u>Catch</u>	<u>Tags</u>
1963	2+3	182	5
1963-4	4+1	75	0
1964	2+3	125	8

The four recaptures from Div. 4R all came from the Belle Isle Strait between June and August 1963, two from cod traps and two from trawlers. Four of the five inshore recaptures in Div. 3K in 1963 were from cod traps round Notre Dame Bay in June-July, and the other came from St. Anthony. The one return from Div. 3L was also from a cod trap in Trinity Bay. This distribution of the returns suggests that the tagged fish formed part of a widely distributed Labrador-Newfoundland stock, with a range from the north of Labrador to the northern edge of the Grand Bank.

Table 3A shows all the returns, analysed according to returning countries. Table 3B gives the catch of cod by each country fishing in Subarea 2 in the second and third quarters of 1963 and 1964 and in Div. 3K in the second and third quarters of 1963, and the numbers of tags returned from the areas during these periods, when many of the returns were made. If the return of tags caught by Spain in Subarea 2 is assumed to be 100%

and the tagged fish are assumed to be equally catchable by all the fleets, one would have expected twenty-one returns instead of thirteen; similarly if returns from Canada and Spain in Div. 3K are assumed to be 100% the expected number of returns would be ten instead of seven. These figures suggest that at least one third of the tags caught have not been reported.

Table 4 gives the length distribution of the tagged cod and the number of returns from each length group. Most of the fish were between 45 cm and 65 cm, and the best percentages OP returns came from the 60-70 cm range. Reports of length on recapture came from only 25 fish and four of these were reported as doubtful. As several of the other reports appear to be unreliable there are insufficient data for a discussion of growth rates, but most of the fish appeared to be slow-growing. Otoliths were returned from fifteen fish and twelve of these were 6-8 years old when tagged. Most of the otoliths showed at least one "spawning zone" and only one was recorded as immature; that was the first one caught in April 1963 on Hamilton Inlet Bank, and measured 48 cm when tagged. Three fish recaptured in 1964 were recorded as having only one spawning zone, so presumably not all the cod on Hamilton Inlet Bank in winter will spawn there in the following spring.

By plotting the logarithms of the number of tags returned each year a rough estimate of total mortality (Z) in the population can be obtained if the fishing effort is steady and the tagged fish are assumed to be well mixed in a defined stock. For these few returns over four years the estimate of Z is 0.6.

Summary

Three hundred and eighty-two cod were tagged off Labrador in November-December 1962 and 33 of them (8.6%) were returned by the end of 1966. The returns are analysed by area and date of return, by returning countries, and by length and age distribution. The pattern of returns shows that the fish on Hamilton Inlet Bank in late autumn were part of the Labrador-Newfoundland stock of cod, which is distributed over a wide area of the shelf and coast of Labrador and north-east Newfoundland in spring and summer.

Table 1

Release areas and returns of tagged cod
(arranged from north to south)

Date	Area	Stations	Position		Depth (fathoms)	Number Tagged	Recaptures	
			N	W			Nos.	%
25 Nov	A	11,12,15	55°25'	56°33'	80-115	132	15	11.4
28 Nov	B	27,28	54 47	54 37	135-145	62	3	4.8
28-29 Nov	C	30,31,32	54 26	54 53	90-125	135	10	7.4
27 Nov	D	25	53 28	54 52	165	22	4	18.2
1 Dec	E	37	52 53	52 49	130	28	0	0
1 Dec	F	38	52 21	54 44	110	3	1	33.3
Total						382	33	8.6

Table 2

Returns of tagged cod by quarter of the year, divisions, and whether recaptured offshore or inshore

Year	Quarter	Div. 2G Off.	Div. 2H Off.	Div. 2J Off.	In.	Div. 4R Off.	In.	Div. 3K Off.	In.	Div. 3L In.	Total
1963	1										0
	2			4		2	1	2	3		12
	3			1			1		2		4
	4										0
	Total	0	0	5	0	2	2	2	5	0	16
1964	1							1			1
	2			4				1			5
	3		1	3							4
	4										0
	Total	0	1	7	0	0	0	2	0	0	10
1965	1		1								1
	2	1								1	2
	3										0
	4		1								1
	Total	1	2	0	0	0	0	0	0	1	4
1966	1										0
	2		1		1						2
	3										0
	4							1			1
	Total	0	1	0	1	0	0	0	1	0	3
Total		1	4	13		4		10		1	33

Table 3A

Countries returning tags, by subarea

Country	Subarea			Total
	2	3	4	
Canada (Newfoundland)	1	7	2	10
Spain	5	2		7
Portugal	4		2	6
Germany (East)	4	1		5
Germany (West)	2			2
Faroes	1			1
France	1			1
Iceland		1		1
TOTAL	18	11	4	33

Table 3B

Reported catch of cod, in thousands of tons, and tags returned during the 6 months April to September (+ means less than 1,000 tons)

Country	Subarea 2				Division 3K	
	1963		1964		1963	
	Catch	Tags	Catch	Tags	Catch	Tags
Portugal	66	2	28	0	23	0
Spain	44	2	28	3	8	1
Canada	24	0	16	0	44	5
France	27	1	12	1	4	0
U.S.S.R.	17	0	32	0	3	0
Germany (West)	+	0	1	1	+	0
Germany (East)	?	0	(5?)	3	?	0
Poland	+	0	1	0	3	0
Iceland	0	0	0	0	1	1
Faroes	0	0	+	1	0	0
United Kingdom	+	0	+	0	+	0
TOTAL	178	5	125	8	87	7

Table 4

Length distribution of tagged cod and the recaptures from each length group

Length (cm)	Number tagged	Number Recaptured	% Recaptured
39-44	19	0	0
45-49	70	6	8.6
50-54	96	6	6.3
55-59	86	7	8.1
60-64	54	8	13.8
65-69	30	3	10.0
70-74	13	1	7.6
75-100	14	2	14.3