Northwest Atlantic Fisheries Organization

Serial No. N1127

NAFO SCR Doc. 86/15

SCIENTIFIC COUNCIL MEETING - JUNE 1986

The 1985 Inshore Capelin Fishery in Div. 3L

by

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Abstract

Data from research logbooks maintained in 1985 were compiled and analyzed. Discarding increased substantially from 1984 levels. Trends in catch/effort indices for capelin traps and purse seiners from 1981-85 were similar, indicating an increase in abundance from 1984 to 1985. However the extent of this increase was much higher with traps than with purse seines. Fishing effort in 1985 was reduced because of the late opening of the capelin fishery. The catch was dominated by the 1982 year-class as three-year-olds. Two-year-olds of the 1983 year-class comprised 12.6% of the catch in 1985.

Introduction

This report summarizes data on the inshore commercial capelin fishery in 1985 drawing on information recorded by fishermen in research logbooks and from biological samples collected during the fishery. Inshore landings of 25,729 t in Div. 3L declined markedly from the 1984 high of 32,658 t (Table 1). This decline was probably the result of a lower Japanese market demand for female capelin due to a good Norwegian fishery and a later than usual opening date for the Canadian inshore fishery. Unlike previous years when St. Mary's Bay opened on June 1 and the remainder of Div. 3L by June 10, the 1985 capelin fishery opened on June 26 in St. Mary's Bay, June 27 in Conception Bay, and June 28 in the rest of Div. 3L (Fig. 1). Capelin were late arriving inshore, possibly due to cooler than average water temperatures in May and June as observed at Station 27 outside St. John's, Newfoundland (S. A. Akenhead, pers. comm.).

Materials and Methods

In 1985 we distributed research logbooks to 138 fishermen residing and fishing in Div. 3L (Table 2). Following the fishery, 30 purse seine and 61 fixed gear logbooks were returned and these constitute the basis for much of the analysis and interpretation presented herein. Results from earlier logbook surveys were presented by Nakashima and Harnum (1982, 1983, 1984, 1985). Purchase slips provided by Statistics Branch were examined and landings compared to those estimated by fishermen in their logbooks (Tables 3, 4 and 5).

The biological sampling scheme consisted of collecting two random samples of capelin per statistical section (Fig. 1) per gear type per week. These were collected by fishermen, collectors in fish plants, and other reliable individuals as the capelin fishery progressed. Frozen samples were culled later to meet the above requirements. Each sample was processed as a LSM (length-sex-maturity) and a stratified sample. Ages were read from otoliths.

Effort data for capelin traps from 1981-84 have been revised to more adequately represent information from fishermen who have combined catches from two or more traps in their logbooks. Previously estimates of fishing days and total hauls were underestimated for these fishermen. Since 1984 more fishermen keeping logbook records have begun to fish two traps. In some instances separate logbooks have been kept for each trap, however, the majority combined their data with no discernible, simple way to separate the results from each trap. One solution was to assume that the effort information could be doubled if data from two traps were combined. This assumed a fisherman would fish each of two traps the same way as if he would fish if he only fished one trap. To determine if this were true we examined the logbook records of

fishermen who separated their effort between two or more traps. From 1981-85, 24 fishermen (quite often the same ones over 3 or 4 years) who fished two or more traps kept a logbook record for the performance of each trap. If all the data were combined, these traps in total fished for 1005 days and were hauled 1652 times. Instead if we had doubled the effort of the higher trap record as first proposed we would have estimated 1089 fishing days and 1906 hauls for the same traps. Therefore doubling the fishing days and the total hauls for combined trap data probably overestimates fishing effort. Where two or more traps were used we propose doubling the effort given in combined trap data and multiplying by 0.92 (1005/1089) for fishing days and 0.87 (1652/1906) for trap hauls to obtain the estimated effort.

Results

Discarding

According to logbook records, discarding has increased in 1985 from 1984 levels. Discards expressed as percentages of logbook landings were 56% for purse seines (Table 3), 59% for capelin traps (Table 4), and 170% for beach seines (Table 5). These estimates were almost as high or higher than the 80% for purse seines, 43% for capelin traps, and 33% for beach seines documented for the 1983 fishery (Nakashima and Harnum 1984) when controversy arose over the discarding problem. Similar to 1983, the lower market needs and subsequent 'redfeed' problems contributed to high rates of discarding in 1985. In this report no distinction was made between caught capelin which were released alive and those which were dumped (dead). All capelin which were caught but not landed for sale were considered as being discarded. Capelin given to other fishermen were included in the discarding estimates (Tables 3, 4, and 5) but excluded when reasons for discarding were calculated (Tables 6 and 13).

In 1985 the presence of 'redfeed' was a significant proportion of the total discards for both traps and purse seines (Table 6) and was reminiscent of the discarding problem in 1983. In Conception, Trinity and Bonavista Bays, 'redfeed' problems dominated the trap fishery with low percentages of females and inability to sell the total catch as other major reasons for discarding capelin. The latter reason occurred when plants were blocked during the peak run of capelin and when boat quotas were imposed at several inshore plants. The 'miscellaneous' category involved mainly over ripe females in the catch. Along the Southern Shore small females and picking out males to improve female percentages were the main reasons listed for discarding capelin. 'Redfeed' was negligible. In St. Mary's Bay fixed gear fishermen who had agreed to fill in logbooks did not fish in 1985 because the season was opened too late for them to participate. 'Redfeed' overwhelmingly dominated discarding by purse seiners in 1985 in Conception, Trinity and Bonavista Bays (Table 6). Spent females were the only reasons given for discarding in St. Mary's Bay, however, reported total discarding was low (Table 3). As with the trap fishery, the purse seine fishery in St. Mary's Bay was late opening which may have contributed to the non-existence of the 'redfeed' problem since capelin had already come ashore to spawn.

Catch/effort

Fishing effort for capelin traps was reanalyzed from 1981-84 by doubling the fishing days and the total hauls given by trap fishermen who combined records from more than one trap and multiplying by 0.92 and 0.87 respectively as described earlier in this report. Effort values provided in previous reports by Nakashima and Harnum (1982, 1983, 1984, 1985) should be revised as given in Table 7.

Data from 33 purse seines (Table 9) and 73 capelin traps (Table 10) were utilized in compiling the various catch/effort estimates for the 1985 inshore capelin fishery. Purse seiners in Div. 3L on average searched 9.0 days and made 17.2 sets (Table 9). This was considerably lower than the 1984 estimates of 15.2 searching days and 30.2 sets per vessel (Nakashima and Harnum 1985) and lower than the previous lowest estimate of 11.7 days and 22.5 sets averaged during the 1983 capelin fishery (Nakashima and Harnum 1984). Five of the 30 purse seiners from Div. 3L and 3 of the 10 purse seiners from Div. 3K (Nakashima and Harnum 1986) fished in both NAFO Div. 3L and Div. 3K. For capelin traps the average number of fishing days and average number of hauls per trap by area from 1981-84 were recalculated (Table 8) using the revised estimates of fishing effort (Table 7). The 1985 figures in Table 8 were derived from Table 10. As with the purse seine fishery the fishing effort by traps was very low in 1985. Average fishing days per trap was the lowest since the survey began in 1981 and total number of hauls per trap was much lower than observed in 1984.

Catch rates for purse seines (Table 9) and for capelin traps (Table 10) were variable depending very much on the area fished. The catch/day (C/D) was highest in St. Mary's Bay where the purse seine fleet is small and concentrated in an area much smaller than other areas in Div. 3L (Fig. 1). In the three bays where the large majority of the capelin are caught (Table 1), Bonavista Bay recorded the highest C/D followed by Conception Bay then Trinity Bay. The catch/set (C/S) was the same in Bonavista and Conception Bays and lower in Trinity Bay. Purse seiners experienced a poor fishery in 1985 and especially so in Trinity Bay.

Many Trinity Bay boats fished in other bays. The C/D of capelin traps was similar in Trinity and Conception Bays where the highest catch rates were recorded in 1985. Bonavista Bay traps had a lower C/D with the lowest rate occurring on the Southern Shore. The catch/haul (C/H) was very similar in Trinity Bay, Conception Bay, and the Southern Shore. The C/H in Bonavista Bay was only half as much. Catch rates for purse seiners were equivalent to or better than rates recorded in 1984 except for Trinity Bay where catch rates were down. Catch rates for traps in 1985 were much higher than in 1984 in all areas with significant increases observed especially in the C/H rates.

By-catch

The reported by-catch of cod was 28.2 t in capelin traps in 1985 (Table 4) which represents 1.0% of reported logbook landings. The extremely low amount continues to suggest that cod by-catch in capelin traps is negligible. Herring by-catch was almost non-existent in the 71 traps covered by the survey (Table 4).

Age Composition

The age composition of the commercial catch was estimated from 123 samples of which 19 were from purse seines, 79 from capelin traps, and 15 from beach seines (Table 11). The imbalance between trap and purse seine samples reflected the landings themselves. Beach seine landings were very low in Div. 3L. The 5261 otoliths aged in 1985 was marginally higher than the 5016 aged in 1984 (Nakashima and Harnum 1985). The mean number of otoliths per sample was significantly higher in 1985 than in 1984.

Age compositions of the catch from 1979-85 are provided in Table 12. The 1983 and 1984 age compositions have been updated with more recent landing statistics that were unavailable in 1985 (Nakashima and Harnum 1985). Similar to Div. 3K (Nakashima and Harnum 1986) the catch was dominated by the 1982 year-class as three-year-old fish followed by the 1981 year-class as four-year-olds. The presence of the 1980 year-class as five-year-olds was not as strong as shown in the Div. 3K inshore fishery in 1985 (Nakashima and Harnum 1986). One unusual feature of the age compositions in 1985 was the presence of two-year-old capelin which represented 12.6% of the total catch.

Discussion

The late arrival of capelin inshore in 1985 was longer than the delay experienced in 1984 (Nakashima and Harnum 1985). Cooler than usual water temperatures in May and June may have been the most likely cause. Evidence from comparing inshore distribution of capelin in Trinity and Conception Bays in 1981-85 from aerial survey data (Nakashima 1986), from fishermen commenting in logbooks, and from our purse seine surveys designed to tag capelin in May and June supported the notion of a much later than normal arrival of capelin inshore. There was also at late opening of the capelin fishery in all areas as noted earlier which may have biased catch rates in 1985. Fishermen had always begun to fish prior to the first arrival of capelin until 1985 when capelin were already inshore before the fishery had fully opened.

Discarding was substantial and estimated to be at least 56% of logbook landings. The presence of 'redfeed' in purse seine catches was very high (Table 13). Usually trap fishermen have not had to discard very much capelin because of 'redfeed', however in 1985 30% of trap discards were reportedly due to high 'redfeed' levels (Table 13). Included in 'redfeed' problems was the rejection of capelin due to eggs in the stomach. This appeared to be more prevalent both in Div. 3L and Div. 3K (Nakashima and Harnum 1986) this year than in previous years when it was rarely mentioned. As in 1984, low percentages of females, small fish, and plant-imposed boat quotas also influenced discarding by mobile and fixed gear fishermen (Table 13).

The problem of small fish in the catch (Table 13) was probably the result of an unusually large number of two-year-old fish inshore during spawning (Table 12). From logbook records, both purse seine and trap fishermen noted the presence of very small fish in the catch. These observations were supported by research vessel tagging studies conducted in May and June where we observed small fish in nearly all our tagging sets. The very high number of otoliths collected in stratified samples (Table 11) in 1985 which were in the order of 10 otoliths more per sample than collected in 1984 (Nakashima and Harnum 1985) were primarily due to the occurrence of two-year-old capelin. It is unknown whether this high concentration of the 1983 year-class inshore was due to distribution shifts as a result of the cooler water temperatures or to their very large abundance as projected by offshore acoustic surveys (Miller 1985).

Catch rates of capelin traps (Table 14) were revised according to a recalculation of fishing effort (Table 7) for fishermen who combined data for two or more traps. Generally the effect of incorporating the revised effort to obtain new catch rate estimates has been to reduce catch rates in terms of tons caught per effort expended, however the interannual trends

in the catch rate series remain virtually unchanged. The catch/day (C/D) indices for capelin traps (Table 14) and for purse seiners (Table 15) imply an increase in abundance from 1981 to 1983, a decline in 1984, followed by an increase in 1985. The C/D for traps in 1985 is very much higher than in other years of the logbook survey while purse seine C/D in 1985 is higher than 1984 but not as high as in 1983. The landings/day (L/D) index behaves somewhat differently between the two gear types. The L/D for traps is high in 1982, declines in 1983, then increases from 1983 to 1985 (Table 14). For purse seines the L/D (Table 15) follows the trend for capelin traps until 1985 when the L/D rate declines to the 1983 rate. We rely more on the C/D index than the L/D because the former is an estimate of the true catch since it includes reported discards, whereas the L/D index may reflect more the uncertainties associated with plant capacity, market needs, and changing quality restrictions. If we accept the C/D as the most reliable of the four available commercial indices and assume catch rates are indicative of abundance trends then inshore capelin abundance in 1985 was higher than in 1984. The purse seine series indicates that the 1985 abundance was as high as in 1982 but not as high as in 1983, while the trap C/D index suggests that abundance in 1985 was considerably higher than the highest abundance of the series which had been observed in 1983.

Some precautions are required when interpreting the results of the catch/effort estimates derived for the 1985 fishery. The delayed opening of the inshore fishery certainly influenced estimates of fishing effort reported in logbooks in 1985. From 1981-84 most capelin traps were set before capelin were available to the gear resulting in fishing days with no or very low catches early in the season. In 1985 fixed gear landings were low in St. Mary's Bay and fishermen who were requested to record their activities in 1985 stated that they did not fish capelin because most of the fish had spawned by the time the season opened on June 26. In the rest of Div. 3L, catches of capelin were high from the first fishing day for all traps. Thus catch/day and catch/haul were higher in 1985 (Table 10) than in previous years. Also the average fishing days per trap per area was down in 1985 (Table 8) which was most likely due to less days set before the capelin were inshore than to low market demands alone. Purse seine catch rates were also affected by the late opening dates as their searching times and sets per vessel were noticeably curtailed. Another important observation was that capelin in 1985 migrated in quickly close to spawning beaches thus being unavailable to purse seiners for any length of time. This is supported somewhat by the 'daily' aerial survey counts of schools and school surface measurements from photographs (Nakashima 1986) and by comments in purse seine logbooks. The extent of the increase in inshore abundance from 1984 to 1985 supported by catch rate data is uncertain since fishing patterns for mobile and fixed gear fishermen were different in 1985 from previous years.

Both the school surface index derived from aerial photographs and the projections of mature biomass from acoustic surveys (Nakashima 1986) suggest that inshore capelin abundance was higher in 1985 than in 1984. However the increase was not as great as suggested by catch rates by capelin traps (Table 14) nor was it as small as implied from purse seine catch rates (Table 15). As discussed earlier the two catch rates in 1985 may not be comparable to the 1981-84 part of their respective indices because of the effect of the late opening of the capelin fishery in 1985. Despite these suspected problems, the two commercial catch rate indices from logbook records support the trend of higher abundance in 1985 which was projected from acoustic surveys (Anon. 1984) and confirmed by aerial surveys (Nakashima 1986).

Acknowledgments

These data were collected by many inshore capelin fishermen who have cooperated with us over the years in keeping fully-documented logbooks. P. Williams organized the biological sampling program and P. Eustace aged the capelin. The technical staff of the Pelagic Section processed the biological samples. M. Hynes assisted in the preparation of this manuscript.

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Table 1. Capelin landings (t) by area in Div. 3L from Statistics Branch in Div. 3L, 1974-85 (for vessels <30 m in length).

Year	Bonavista Bay	Trinity Bay	Conception Bay	Southern Shore	Trepassey and St. Mary's Bays	Div. 3L Total
1974	1288	2287	310	791	22	4698
1975	150	967	463	646	8	2234
1976	98	618	1165	645	46	2571
1977	127	1424	3708	7	4	5270
1978	351	2469	3475	117	6	6418
1979	762	3300	8070	178	6	12316
1980	1712	5029	7090	324	299	14454
1981	3834	9398	10302	67	796	24397
1982	3664	10659	11584	368	1123	27398
1983	3137	9190	11674	7	1000	25008
1984	5907	11472	12780	692	1807	32658*
1985	4091	9321	10620	378	1319	25729*

* preliminary

Table 2. Responses from a logbook survey conducted in Div. 3L, 1981-85.

Year	No. contacted	No. logbooks returned	Did not fish capelin	Logbooks not returned
Purse seine				
1981	70 (7)*	37 (44)	11	22
1982	91 (7)*	54 (61)	10	27
1983	75 (9)*	37 (46)	7	31
1984	63 (3)*	39 (42)	3	21
1985	45 (3)*	30 (33)	2	13
Fixed gear				
1981	119	74	13	32
1982	136	81	36	19
1983	131	66	38	27
1984	142	91	20	31
1985	93	61	8	24

* fishermen who reside in Div. 3K but fished in Div. 3L. These are added to the 'No. logbooks returned' column in parenthesis.

Table 3. Total purse seine landings (t) compiled from logbooks and from purchase slips in 1985.

Area	Landings by logbook	Discards by logbook*	Landings by purchase slips	No. of Fishermen
Bonavista Bay	1159.3	766.0	1119.4	12
Trinity Bay	205.4	204.3	195.2	8**
Conception Bay	1359.7	770.1	672.3	21
St. Mary's Bay	399.4	22.4	424.1	4
Div. 3L	3123.8	1762.8	2411.0	33

* includes capelin given to other fishermen

** includes one fisherman with purchase slips from this area according to Statistics Branch but did not fish there according to Research Branch logbook records

Table 4. Total capelin trap landings (t) compiled from logbooks and from purchase slips in 1985.

Area	Landings by logbook	Discards by logbook*	Landings by purchase slips	By-catch		No. of fishermen	No. of traps
				Cod	Herring		
Bonavista Bay	469.9	161.5	312.7	6.7	0.1	12	16
Trinity Bay	1043.6	456.1	793.5	5.8	0	15	23
Conception Bay	1060.2	901.5	930.5	14.9	0	18	24
Southern Shore	125.6	121.1	106.3	0.8	+	6	8
Div. 3L	2799.3	1640.2	2134.0	28.2	0.1+	51	71

* includes capelin given to other fishermen

Table 5. Total beach seine landings (t) compiled from logbooks and from purchase slips in 1985.

Area	Landings by logbook	Discards by logbook	Landings by purchase slips	No. of Fishermen
Bonavista Bay	0.5	14.5	3.5	1
Trinity Bay	242.8	410.6	44.0	7
Conception Bay	7.2	0.0	0	1
Div. 3L	250.5	425.1	47.5	9

Table 6. Percent contribution by weight for reasons for discarding capelin in 1985. (This excludes capelin given to other fishermen.)

Area	Redfeed	Low % females	Small females	Females picked out	Females spawned out	No market/ quota filled	Misc.	Not given
Traps								
Bonavista Bay	37	23	+	+	11	20	7	-
Trinity Bay	47	36	2	1	-	7	7	1
Conception Bay	24	24	1	6	1	34	3	8
Southern Shore	5	12	41	26	16	-	-	-
St. Mary's Bay	-	-	-	-	-	-	-	-
Purse seine								
Bonavista Bay	71	14	3	-	-	4	7	1
Trinity Bay	74	8	-	10	4	4	-	-
Conception Bay	50	18	17	-	2	4	5	4
St. Mary's Bay	-	-	-	-	100	-	-	-

Table 7. Revised estimates of effort for fishing days (F) and number of trap hauls (H) for capelin traps from 1981-84. (The number of traps per area in the survey is given in parentheses.)

Year	Measure of effort	Areas in Div. 3L				
		Bonavista	Trinity	Conception	Southern Shore	St. Mary's
1981	F	-	156 (15)	353 (21)	68 (5)	-
	H	-	182	439	59	-
1982	F	-	335 (23)	1165 (48)	130 (10)	-
	H	-	415	1456	125	-
1983	F	14 (1)	431 (25)	791 (40)	-	-
	H	12	547	853	-	-
1984	F	96 (7)	703 (36)	565 (31)	152 (8)	19 (1)
	H	182	1114	819	179	47

Table 8. Revised estimates of average fishing days (F) and average number of trap hauls (H) per capelin trap per area in Div. 3L from 1981-85.

Year	Measure of effort	Areas in Div. 3L				
		Bonavista	Trinity	Conception	Southern Shore	St. Mary's
1981	F	-	10.4	16.8	13.6	-
	H	-	12.1	21.1	11.8	-
1982	F	-	14.6	24.2	13.0	-
	H	-	18.0	30.3	12.5	-
1983	F	14.0	17.2	19.8	-	-
	H	12.0	21.9	21.3	-	-
1984	F	13.7	19.5	18.2	19.0	19.0
	H	26.0	30.9	26.4	22.4	47.0
1985	F	11.4	13.3	16.8	10.5	-
	H	19.8	18.4	23.8	9.4	-

Table 9. Catch/effort data for purse seiners from the 1985 logbook survey.

Area	No. days fished	No. sets made	Landings per logbook (t)	Landings and discards per logbook (t)	No. of purse seiners
Bonavista Bay	94	221	12.3/day 5.3/set	20.5/day 8.7/set	12
Trinity Bay	46	76	4.5/day 2.7/set	8.9/day 5.4/set	7
Conception Bay	141	244	9.6/day 5.6/set	15.1/day 8.7/set	21
St. Mary's Bay	17	26	23.5/day 15.4/set	24.8/day 16.2/set	4
Div. 3L	298	567	10.5/day 5.5/set	16.4/day 8.6/set	33

Table 10. Catch/effort data for capelin traps from the 1985 logbook survey.

Area	No. days fished	No. hauls made	Landings per logbook (t)	Landings and discards per logbook (t)	No. of traps
Bonavista Bay	182	317	2.6/day 1.5/haul	3.5/day 2.0/haul	16
Trinity Bay	306	423	3.4/day 2.5/haul	4.9/day 3.6/haul	23
Conception Bay	404	570	2.9/day 2.0/haul	5.1/day 3.6/haul	24
Southern Shore	84	75	1.5/day 1.7/haul	2.9/day 3.3/haul	8
Div. 3L	976	1385	2.9/day 2.0/haul	4.6/day 3.2/haul	73

Table 11. Summary of the commercial samples collected from the inshore capelin fishery in 1985 in Div. 3L.

Gear type	No. of LSM/stratified samples	No. of otoliths aged	Mean number of otoliths aged per sample ± SD
Purse seine	29	1274	43.9 ± 4.9
Capelin trap	79	3396	43.0 ± 5.4
Beach seine	15	591	39.4 ± 8.7
TOTAL	123	5261	

Table 12. Age-compositions (%) from the inshore commercial capelin fishery in Div. 3L, 1979-85.

	Age					
	1	2	3	4	5	6
Males						
1979	-	-	47.6	36.3	15.1	0.9
1980	-	0.2	53.4	43.4	2.9	0.1
1981	9.0	1.9	29.7	37.7	20.6	1.2
1982	0.1	0.5	88.8	10.0	0.6	-
1983	-	2.3	62.9	34.0	0.9	-
1984	-	0.4	37.5	61.5	0.7	-
1985	-	6.3	66.0	26.2	1.4	0.1
Females						
1979	-	0.8	59.1	25.4	11.3	3.4
1980	0.1	3.3	64.6	31.1	0.4	0.6
1981	5.8	5.6	54.0	20.1	14.0	0.6
1982	0.2	2.4	76.4	13.0	6.4	1.6
1983	-	6.4	59.1	32.1	2.3	0.2
1984	-	2.8	41.5	47.1	8.3	0.3
1985	-	16.9	57.6	16.1	8.7	0.6
Sexes combined						
1979	-	0.2	50.3	33.8	14.2	1.5
1980	-	1.7	58.9	37.3	1.7	0.4
1981	7.4	3.2	42.7	28.7	17.2	0.9
1982	0.1	1.4	83.1	11.4	3.2	0.7
1983	-	4.6	60.7	32.9	1.7	0.1
1984	-	1.7	39.6	53.7	4.8	0.2
1985	-	12.6	61.0	20.2	5.8	0.4

Table 13. Percent contribution by weight for reasons for discarding capelin in Div. 3L, 1981-85. (This analysis excludes capelin given to other fishermen.)

Year	Redfeed	Low % females	Small females	Females picked out	Females spawned out	No market/ quota filled	Misc.	Not given
Traps								
1981	13	43	1	10	+	22	3	8
1982	4	57	+	19	1	4	13	2
1983	17	37	+	3	+	18	13	12
1984	1	31	-	35	6	15	11	1
1985	30	26	4	5	3	22	4	5
Purse seine								
1981	32	35	14	8*	+	8	+	3
1982	45	41	3	-	+	+	10	1
1983	70	17	1	-	+	5	3	4
1984	18	78	+	-	+	3	2	-
1985	61	15	9	1	3	4	5	2

* use of separators at sea

Table 14. Catch/effort of capelin traps in Div. 3L utilizing research logbook data.

Year	L = Logbook landings (t)		C = Logbook landings and discards (t)	
	L/day	L/haul	C/day	C/haul
1981	2.2	1.9	2.9	2.5
1982	2.7	2.2	3.1	2.5
1983	2.4	2.1	3.4	3.0
1984	2.6	1.7	2.9	1.9
1985	2.9	2.0	4.6	3.2

Table 15. Catch/effort of purse seines in Div. 3L utilizing research logbook data.

Year	L = Logbook landings (t)		C = Logbook landings and discards (t)	
	L/day	L/set	C/day	C/set
1981	6.9	3.4	9.4	5.3
1982	13.5	6.7	16.4	8.1
1983	10.4	5.4	18.8	9.7
1984	12.3	6.2	14.3	7.2
1985	10.5	5.5	16.4	8.6

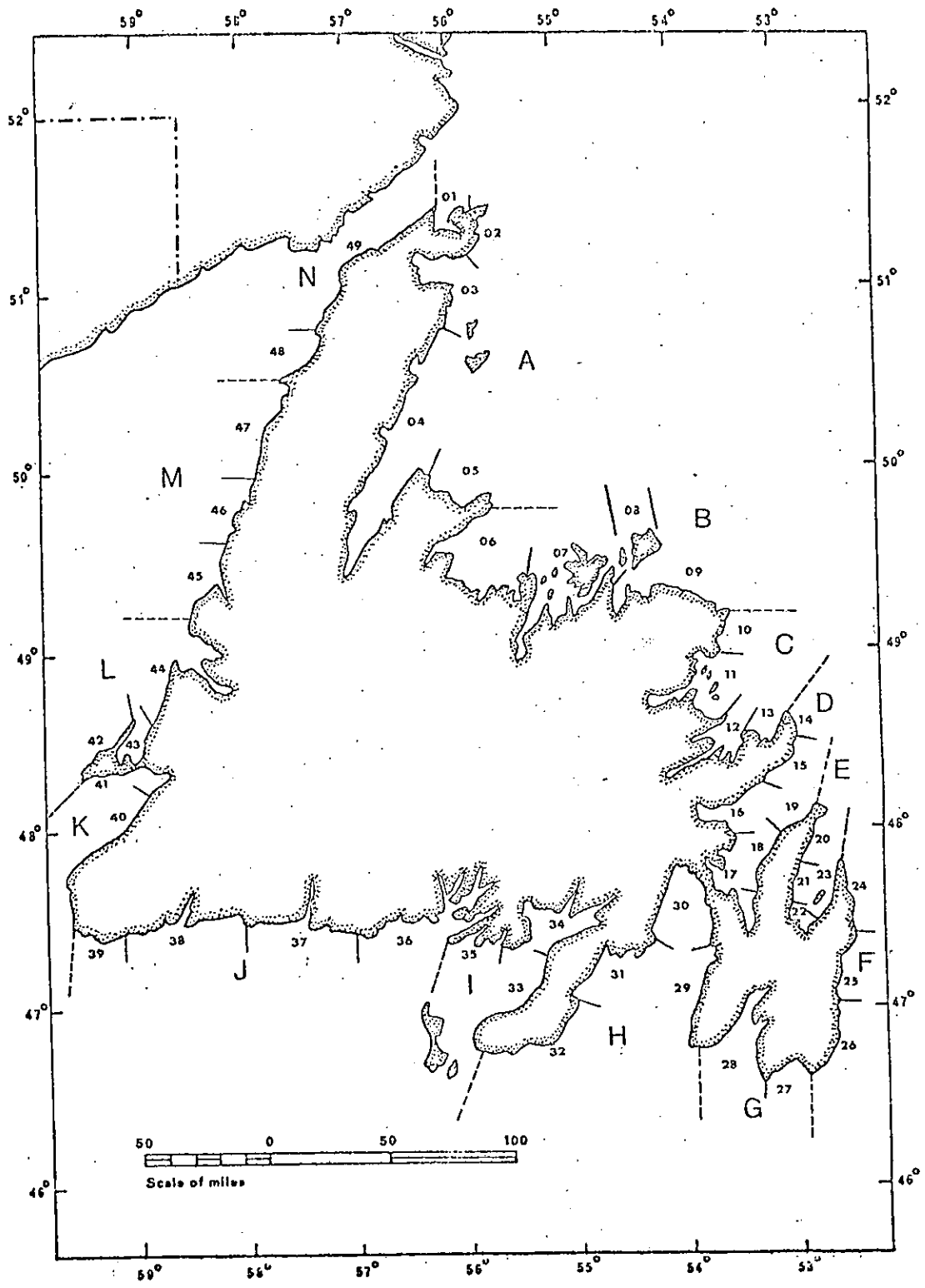

Fig. 1. Statistical areas (C = Bonavista Bay; D = Trinity Bay; E = Conception Bay; F = Southern Shore; G = Trepassey and St. Mary's Bay) and sections (numeric) in Div. 3L along the coast of Newfoundland.