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The Inshore Capelin Fishery in NAFO Div. 3L in 1987

by

B. S. Nakashima and R. W. Harnum
Science Branch, Department of Fisheries and Oceans,
P. O. Box 5667, St. John's, Newfoundland A1C 5X1

Abstract

The data recorded in research logbooks during the inshore capelin fishery in 1987 in Div. 3L were analyzed and presented in this manuscript. Inshore landings were considerably lower than in previous years at 18,976 t. The fishery was short, commencing on June 19 and ending on June 26. Discarding was high for traps. The main reason for discarding was the presence of 'redfeed' in the fish. Catch rates for traps were the highest in the series and doubled the 1986 catch rates. The catch rate for purse seines was slightly lower than the 1986 value but was one of the highest in the series. The late start of the fishery and its short duration may have influenced these indices.

Introduction

Capelin landings of 18,796 t by the inshore fishery in NAFO Div. 3L were the lowest since 1980 (Table 1). All gear types experienced considerably lower landings than in 1986 and the effect was most pronounced in St. Mary's Bay and Conception Bay (Fig. 1). The overall decline in landings was due to a modest market demand for roe-bearing female capelin. Even though the Norwegian capelin fishery in the Barents Sea was closed in 1987, there were high inventories of capelin in Japan which softened the Newfoundland market share. The season opened on June 1, however the fishery did not commence until June 19 following the resolution of a labour dispute. The delayed start was reflected in the very low landings in St. Mary's Bay and the reduced landings in Conception Bay (Table 1). The fishery was closed in Bonavista Bay on June 25 and on June 26 in the remaining areas in Div. 3L (Fig. 1).

Materials and Methods

Research logbooks were sent to 37 purse seine and 93 fixed gear fishermen who fished in Div. 3L. Following the fishery 23 purse seine and 62 fixed-gear logbooks were returned to us (Table 2). No purse seiners from Div. 3K who completed logbooks for us fished in Div. 3L. The proportion of fishermen who did not fish increased from 1986 (Table 2). Similar to last year's report (Nakashima and Harnum 1987), we did not examine purchase slip data because the landings were not always reported on the actual date landed. Some fishermen reported fishing activity earlier than June 19. Because the fishery did not begin in earnest until the labour dispute was settled, we ignored all records prior to June 19.

Biological samples were collected from the commercial capelin fishery on the basis of two random samples per statistical section (Fig. 1) per gear type per week. From each sample 200 fish were measured for length, sex, and maturity stage (LSM). A stratified sample of 2 fish per sex per 1/2 cm length group was collected from each LSM sample for otoliths. The otoliths were used for age determinations.

Effort data for capelin traps were compiled based on the fishing strategy employed. In 1987 33 fishermen fished a single trap, 21 fished two traps, and one crew fished three traps. Of the 22 who fished more than one trap, seven reported catch and effort data separately for each trap. The other 15 did not. Based upon the logbook data and previous fishing history we were able to categorize three fishermen who used one trap as their primary source of capelin and the second trap was used infrequently when the primary trap had insufficient capelin. Their effort data were estimated by employing an adjustment factor based on separated logbook data from three fishermen who used the same fishing strategy in 1987. The analysis showed that doubling the hauls and multiplying by 0.80 would estimate fishing hauls for both traps and doubling the fishing days would give the total fishing days for both traps. For the remaining 11 fishermen we were unable to discern what fishing strategy was followed. For these records we utilized the method employed by Nakashima and Harnum (1986). After combining the trap records for all fishermen who maintained separate logbooks for each trap, we estimated an adjustment factor of 0.89 for fishing hauls. This was the same value used in 1986 (Nakashima and Harnum 1987). Unlike 1985 (Nakashima and

Harnum 1986) or 1986 (Nakashima and Harnum 1987) no adjustment factor was needed to estimate fishing days. The fishing season was probably too short so both traps fished the same number of days. Thus for the 11 fishermen whose fishing strategies were unknown, the number of hauls was estimated by doubling the reported number and multiplying by 0.89. The fishing days for both traps were determined by doubling the days reported in the logbook. For the one crew who fished three traps, we tripled the reported number of hauls and employed the adjustment factor of 0.89 for hauls and tripled the number of fishing days to estimate the combined effort.

Results

Discarding

A discarding rate of 35% for purse seines in 1987 (Table 3) was similar to 1986 levels but was substantially higher at 74% for traps in 1987 (Table 4) than observed in 1986. Data were available for only three beach seine fishermen from Trinity Bay. The discarding rate was 4% which was much lower than the 63% reported in 1986. All capelin caught but not landed for sales were considered as discards in this analysis with no breakdown between those released alive and those dumped (dead capelin). Capelin given to other fishermen were included in discarding estimates (Table 3, 4) but were excluded in the derivation of the reasons for discarding (Tables 5, 11).

In 1987, 'redfeed' was the major reason why capelin was discarded in Bonavista Bay, Trinity Bay, and Conception Bay for both traps and purse seines (Table 5). For trap fishermen on the Southern Shore, the major reason for discarding was blocked plants and for purse seiners in St. Mary's Bay discarding was due to small females (Table 5). In most cases, the discards listed as 'miscellaneous' were due to over ripe females in the catch. Unlike other years in the fishery the reasons for discarding in 1987 in all areas from mobile and fixed gears were similar (Table 5).

Catch/effort

The extensive data collected from 23 purse seines (Tables 3, 7) and from 78 capelin traps (Tables 4, 8) were examined to estimate catch/effort indices. For

capelin traps and purse seines, fishing effort was substantially lower in 1987 than in 1986 in all areas. Days fished and number of hauls were less than half the number per trap estimated in previous years (Table 6). Purse seiners fished for only 6.0 days and made 9.0 sets on average in 1987 (Table 7).

Catch rates for purse seiners varied among areas (Table 7), whereas catch rates for capelin traps were similar among most areas (Table 8). The lowest catch/day (C/D) for purse seines was in Conception Bay with similar C/D in Bonavista Bay and St. Mary's Bay, and the highest C/D in Trinity Bay. This pattern differed from past years when St. Mary's Bay had the highest C/D and Trinity Bay had the lowest (Nakashima and Harnum 1986, 1987). The average C/D for a purse seiner in Div. 3L in 1987 was 18.1 t per day. The catch/set amongst all four areas was similar and averaged 12.1 t per set. Unlike 1986, catch rates for capelin traps among areas were variable (Table 8). The lowest C/D for traps was 6.9 which was observed in Bonavista Bay. Capelin traps in Conception Bay and on the Southern Shore had similar C/D and the highest C/D of 11.3 was from Trinity Bay. The catch/haul (C/H) followed a similar pattern as the C/D. The average C/D for a trap in Div. 3L was 8.8 t per day and the average C/H was 5.0 t day.

By-catch

The reported by-catch of cod was a total of 11.7 t for 78 traps fished in 1987 (Table 4) which represented 0.4% of reported logbook landings of capelin (Table 4). Herring by-catch in traps was incidental (Table 4). No by-catch was reported for the purse seine fishery.

Age Composition

The age composition of the commercial catch was estimated from 81 samples based on 24 purse seine, 51 capelin trap, and 6 beach seine samples (Table 9). The mean number of otolith pairs read per sample varied from 32.8 for beach seines to 34.3 for capelin traps (Table 9).

Age composition of the catches from 1979-87 are given in Table 10. The 1986 age composition has been revised slightly from last year's report (Nakashima and Harnum 1987) incorporating more recent landing statistics. The 1983 year-class

as four-year-olds dominated the catch in 1987 (Table 10). The 1984 year-class as three-year-olds constituted 18.0% of the catch. The 1987 fishery was projected to be dominated by four-year-olds (Anon. 1986).

Discussion

Discarding was higher in 1987 for traps than in 1986 while discarding from purse seines was similar to what was reported in 1986. For both gear types, 'redfeed' was the major reason for discarding capelin at sea and constituted the highest proportion since 1981 (Table 11). Low percentage females in the catch was not a problem in 1987 probably due to the late start of June 19. In previous years the early catches in the season prosecuted schools which had a high ratio of males to females because males arrived inshore near beaches earlier than females. However, in 1987 by the time the fishery began, a large proportion of the mature biomass had already reached the inshore area, especially in Conception Bay (Nakashima 1988).

Four catch rate indices were estimated for capelin traps and for purse seines based on logbook data (Tables 12, 13). Catch/day (C/D) has been the index of choice because it combines both landings and discards to estimate catch. If the discards were in the same proportion to landings in all years then landings could be utilized in place of the catch. However, the level of discarding varies among years. We assume that catch/set (C/S) and catch/haul (C/H) more likely reflect school size and may not necessarily indicate changes in biomass. The C/D per capelin trap in 1987 was 8.8 t which was the highest in the series since 1981 and is double the estimate in 1986 (Table 12). The C/D per purse seiner was 18.1 t which was one of the highest since 1981 and is marginally lower than the 1986 value (Table 13). Both indices indicated that biomass in 1987 was high. The catch rates in 1987 were influenced by the short fishery which lasted 8 days. Fishing days were much less than in previous years (Table 6). Many purse seiners missed the early appearance of capelin which generally constituted the major part of their fishery. This was especially true in St. Mary's Bay and Conception Bay (Tables 3, 8) and may have resulted in the overall lower catch rates there compared to 1986. Capelin traps experienced a high catch rate which was influenced to some extent by the late start. In previous years the first few days of catches were variable. However, in 1987 catch rates were very high from the first day until the last day of the fishery. No trap fishery took place in

St. Mary's Bay because the fishery began too late for this area to participate in the capelin roe fishery. The catch rate may have been biased upwards due to the fishery opening during peak abundance inshore. The catch rates were high indicating high inshore abundance, however, the magnitude of the increase from 1986 to 1987 is difficult to ascertain due to the unknown influence of the delayed start of the fishery in 1987.

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Table 1. Inshore capelin landings (t) by fishing gear (vessels <21 m in length) by area (Bonavista Bay = BB, Trinity Bay = TB, Conception Bay = CB, Southern Shore = SS, St. Mary's and Trepassey Bays = SMB) in Div. 3L. The mobile fleet was issued ringnet licences until 1982 and purse seine licences from 1983 to the present.

| Year | Area | Ringnet and purse seine (<21 m) | Beach seine | Capelin trap | Total |
|------|------|------------------------------------|----------------|-----------------|-------|
| 1976 | BB | - | 65 | 30 | 95 |
| | TB | - | 399 | 263 | 662 |
| | CB | - | 1101 | 20 | 1121 |
| | SS | - | 4 | 641 | 645 |
| | SMB | - | 46 | - | 46 |
| | 3L | - | 1615 | 954 | 2569 |
| 1977 | BB | - | 126 | - | 126 |
| | TB | - | 1145 | 287 | 1432 |
| | CB | 1703 | 1275 | 722 | 3700 |
| | SS | - | 7 | - | 7 |
| | SMB | - | 4 | - | 4 |
| | 3L | 1703 | 2557 | 1009 | 5269 |
| 1978 | BB | - | 341 | 12 | 353 |
| | TB | 429 | 1756 | 284 | 2469 |
| | CB | 487 | 1687 | 1298 | 3472 |
| | SS | - | 82 | 38 | 120 |
| | SMB | - | 6 | - | 6 |
| | 3L | 916 | 3872 | 1632 | 6420 |
| 1979 | BB | 45 | 680 | 45 | 770 |
| | TB | 1144 | 991 | 1163 | 3298 |
| | CB | 2087 | 1727 | 4250 | 8064 |
| | SS | 15 | 70 | 93 | 178 |
| | SMB | 4 | 2 | - | 6 |
| | 3L | 3295 | 3470 | 5551 | 12316 |
| 1980 | BB | 1388 | 205 | 124 | 1717 |
| | TB | 2541 | 603 | 1612 | 4756 |
| | CB | 3226 | 457 | 3591 | 7274 |
| | SS | - | 80 | 239 | 319 |
| | SMB | 284 | - | 95 | 379 |
| | 3L | 7439 | 1345 | 5661 | 14445 |

Table 1. Continued.

| Year | Area | Ringnet and purse seine (<21 m) | Beach seine | Capelin trap | Total |
|-------|------|------------------------------------|----------------|-----------------|-------|
| 1981 | BB | 3714 | 89 | 62 | 3865 |
| | TB | 6006 | 1006 | 2267 | 9279 |
| | CB | 4670 | 202 | 5537 | 10409 |
| | SS | - | 14 | 51 | 65 |
| | SMB | 820 | 3 | - | 823 |
| | 3L | 15210 | 1314 | 7917 | 24441 |
| 1982 | BB | 3429 | 169 | 133 | 3731 |
| | TB | 7687 | 463 | 2445 | 10595 |
| | CB | 5511 | 174 | 5944 | 11629 |
| | SS | 9 | 33 | 314 | 356 |
| | SMB | 1056 | 58 | 9 | 1123 |
| | 3L | 17692 | 897 | 8845 | 27434 |
| 1983 | BB | 2580 | 96 | 527 | 3203 |
| | TB | 3801 | 603 | 4445 | 8849 |
| | CB | 6349 | 166 | 5500 | 12015 |
| | SS | - | 3 | 3 | 6 |
| | SMB | 983 | 6 | 12 | 1001 |
| | 3L | 13713 | 874 | 10487 | 25074 |
| 1984 | BB | 3805 | 49 | 2037 | 5891 |
| | TB | 4928 | 799 | 5531 | 11258 |
| | CB | 6628 | 89 | 6806 | 13523 |
| | SS | - | 17 | 672 | 689 |
| | SMB | 1714 | 28 | 159 | 1901 |
| | 3L | 17075 | 982 | 15205 | 33262 |
| 1985 | BB | 2286 | 115 | 1593 | 3994 |
| | TB | 1624 | 545 | 6816 | 8985 |
| | CB | 3649 | 211 | 6804 | 10664 |
| | SS | 33 | 9 | 348 | 390 |
| | SMB | 1284 | 12 | 121 | 1417 |
| | 3L | 8876 | 892 | 15682 | 25450 |
| 1986* | BB | 3323 | 199 | 3197 | 6719 |
| | TB | 4005 | 648 | 12142 | 16795 |
| | CB | 7454 | 133 | 9589 | 17176 |
| | SS | 37 | 52 | 1362 | 1451 |
| | SMB | 5685 | 34 | 337 | 6056 |
| | 3L | 20504 | 1066 | 26627 | 48197 |
| 1987* | BB | 2140 | 76 | 2139 | 4355 |
| | TB | 1644 | 193 | 6780 | 8617 |
| | CB | 1317 | 120 | 3084 | 4521 |
| | SS | 106 | 32 | 633 | 771 |
| | SMB | 712 | 0 | 0 | 712 |
| | 3L | 5919 | 421 | 12536 | 18976 |

* provisional

Table 2. Responses from a logbook survey conducted in Div. 3L, 1981-87.

| Year | No. contacted | No. logbooks returned | Did not fish capelin | Logbooks not returned |
|--------------------|---------------|-----------------------|----------------------|-----------------------|
| <u>Purse seine</u> | | | | |
| 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 |
| 1986 | 36 (7)* | 27 (34) | 0 | 9 |
| 1987 | 37 | 23 | 4 | 10 |
| <u>Fixed gear</u> | | | | |
| 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 |
| 1986 | 87 | 56 | 5 | 26 |
| 1987 | 93 | 62 | 14 | 17 |

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

Table 3. Total purse seine landings (t) compiled from logbooks in 1987.

| Area | Landings by logbook | Discards by logbook* | No. of fishermen |
|----------------|---------------------|----------------------|------------------|
| Bonavista Bay | 620.4 | 135.8 | 7 |
| Trinity Bay | 683.8 | 236.5 | 8 |
| Conception Bay | 476.1 | 271.7 | 10 |
| St. Mary's Bay | 67.0 | 5.4 | 3 |
| Div. 3L | 1847.3 | 649.4 | 23 |

* includes capelin given to other fishermen

Table 4. Total capelin trap landings (t) compiled from logbooks in 1987.

| Area | Landings by logbook | Discards by logbook | By-catch | | No. of fishermen | No. of traps |
|----------------|---------------------------|---------------------------|----------|---------|---------------------|-----------------|
| | | | Cod | Herring | | |
| Bonavista Bay | 597.7 | 48.9 | 2.9 | + | 14 | 15 |
| Trinity Bay | 1305.0 | 548.8 | 4.8 | 0 | 21 | 31 |
| Conception Bay | 668.5 | 1406.7 | 3.6 | 0 | 16 | 25 |
| Southern Shore | 223.6 | 54.7 | 0.4 | + | 4 | 7 |
| Div. 3L | 2794.8 | 2059.1 | 11.7 | + | 55 | 78 |

* includes capelin given to other fishermen

Table 5. Percent contribution by weight of reasons for discarding capelin in 1987. (This excludes capelin given to other fishermen.)

| Area | Redfeed | Low X females | Small females | Females picked out | Females spawned out | No market/ quota filled | Misc. | Not given |
|--------------------|---------|------------------|------------------|--------------------------|---------------------------|-------------------------------|-------|--------------|
| <u>Traps</u> | | | | | | | | |
| Bonavista Bay | 59 | 9 | - | - | - | 15 | 17 | - |
| Trinity Bay | 62 | 10 | 2 | + | + | 14 | 11 | 1 |
| Conception Bay | 60 | 30 | 1 | + | 3 | 3 | 2 | 1 |
| Southern Shore | - | 30 | - | 12 | - | 8 | - | - |
| <u>Purse seine</u> | | | | | | | | |
| Bonavista Bay | 68 | - | - | - | - | 4 | 12 | 16 |
| Trinity Bay | 80 | - | - | - | - | - | 10 | 10 |
| Conception Bay | 71 | 8 | 3 | - | 2 | 4 | 12 | - |
| St. Mary's Bay | - | - | 100 | - | - | - | - | - |

Table 6. Average fishing days (D) and average number of trap hauls (H) per capelin trap per area in Div. 3L from 1981-87. (Number of traps given in parentheses.)

| Year | Measure of effort | Areas in Div. 3L | | | | |
|------|-------------------|------------------|-----------|------------|----------------|------------|
| | | Bonavista | Trinity | Conception | Southern Shore | St. Mary's |
| 1981 | D | - | 10.4 (15) | 16.8 (21) | 13.6 (5) | - |
| | H | - | 12.1 | 21.1 | 11.8 | - |
| 1982 | D | - | 14.6 (23) | 24.2 (48) | 13.0 (10) | - |
| | H | - | 18.0 | 30.3 | 12.5 | - |
| 1983 | D | 14.0 (1) | 17.2 (25) | 19.8 (40) | - | - |
| | H | 12.0 | 21.9 | 21.3 | - | - |
| 1984 | D | 13.7 (7) | 19.5 (36) | 18.2 (31) | 19.0 (8) | 19.0 (1) |
| | H | 26.0 | 30.9 | 26.4 | 22.4 | 47.0 |
| 1985 | D | 11.4 (16) | 13.3 (23) | 16.8 (24) | 10.5 (8) | - |
| | H | 19.8 | 18.4 | 23.8 | 9.4 | - |
| 1986 | D | 11.8 (14) | 15.3 (33) | 24.9 (22) | 17.7 (6) | 6.3 (2) |
| | H | 17.7 | 24.4 | 28.8 | 20.8 | 2.5 |
| 1987 | D | 6.3 (15) | 7.7 (31) | 7.3 (25) | 5.0 (7) | - |
| | H | 13.9 | 14.3 | 11.2 | 6.9 | - |

Table 7. Catch/effort data for purse seiners from the 1987 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 | 43 | 68 | 14.4/day 9.1/set | 17.6/day 11.1/set | 7 |
| Trinity Bay | 43 | 71 | 15.9/day 9.6/set | 21.4/day 13.0/set | 10 |
| Conception Bay | 48 | 61 | 9.9/day 7.8/set | 15.6/day 12.3/set | 11 |
| St. Mary's Bay | 4 | 6 | 16.8/day 11.2/set | 18.1/day 12.1/set | 3 |
| Div. 3L | 138 | 206 | 13.4/day 9.0/set | 18.1/day 12.1/set | 23 |

Table 8. Catch/effort data for capelin traps from the 1987 logbook survey.

| Area | No. days fished | No. hauls made | Landings per logbook (t) | Landings and discards per logbook (t) | No. of traps |
|----------------|-----------------|----------------|--------------------------|---------------------------------------|--------------|
| Bonavista Bay | 94.0 | 208 | 6.4/day 2.9/haul | 6.9/day 3.1/haul | 15 |
| Trinity Bay | 239.5 | 443 | 5.4/day 2.9/haul | 7.7/day 4.2/haul | 31 |
| Conception Bay | 183.4 | 280 | 3.6/day 2.4/haul | 11.3/day 7.4/haul | 25 |
| Southern Shore | 34.7 | 48 | 6.4/day 4.7/haul | 8.0/day 5.8/haul | 7 |
| Div. 3L | 551.6 | 979 | 5.1/day 2.9/haul | 8.8/day 5.0/haul | 78 |

Table 9. Summary of the commercial samples collected from the inshore capelin fishery in 1987 in Div. 3L.

| Gear type | No. of LSM/stratified samples | No. of otoliths aged | Mean number of otoliths aged per sample \pm SD |
|--------------|-------------------------------|----------------------|--|
| Purse seine | 24 | 803 | 33.5 \pm 3.8 |
| Capelin trap | 51 | 1749 | 34.3 \pm 5.7 |
| Beach seine | 6 | 197 | 32.8 \pm 4.6 |
| TOTAL | 81 | 2749 | |

Table 10. Age compositions (%) of the catches from the inshore commercial capelin fishery in Div. 3L, 1979-87.

| | | Age | | | | | |
|-----------------------|------|-----|------|------|------|------|-----|
| | | 1 | 2 | 3 | 4 | 5 | 6 |
| Males | | | | | | | |
| S | 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 | - | 5.8 | 66.3 | 26.4 | 1.5 | 0.1 |
| | 1986 | - | 0.3 | 56.0 | 43.1 | 0.5 | - |
| | 1987 | - | 0.3 | 12.7 | 85.4 | 1.6 | - |
| 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 | - | 16.7 | 58.0 | 16.0 | 8.7 | 0.6 |
| | 1986 | - | 0.2 | 66.1 | 28.9 | 3.7 | 1.1 |
| | 1987 | - | 6.6 | 21.7 | 63.6 | 7.7 | 0.3 |
| 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 | - | 12.4 | 61.3 | 20.2 | 5.8 | 0.4 |
| | 1986 | - | 0.3 | 62.3 | 34.2 | 2.5 | 0.7 |
| | 1987 | - | 4.0 | 18.0 | 72.5 | 5.2 | 0.2 |

Table 11. Percent contribution by weight of reasons for discarding capelin in Div. 3L, 1981-87. (This analysis 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 |
|--------------------|---------|---------------|---------------|--------------------|---------------------|-------------------------|-------|-----------|
| <u>Traps</u> | | | | | | | | |
| 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 |
| 1986 | 45 | 28 | + | 10 | + | 5 | 10 | 2 |
| 1987 | 59 | 22 | 1 | + | 2 | 9 | 7 | + |
| <u>Purse seine</u> | | | | | | | | |
| 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 |
| 1986 | 52 | 35 | 1 | + | 1 | 3 | 8 | 1 |
| 1987 | 73 | 4 | 2 | - | 1 | 2 | 11 | 7 |

* use of separators at sea

Table 12. 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 |
| 1986 | 3.2 | 2.4 | 4.6 | 3.4 |
| 1987 | 5.1 | 2.9 | 8.8 | 5.0 |

Table 13. 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 |
| 1986 | 14.4 | 8.6 | 19.0 | 11.4 |
| 1987 | 13.4 | 9.0 | 18.1 | 12.1 |

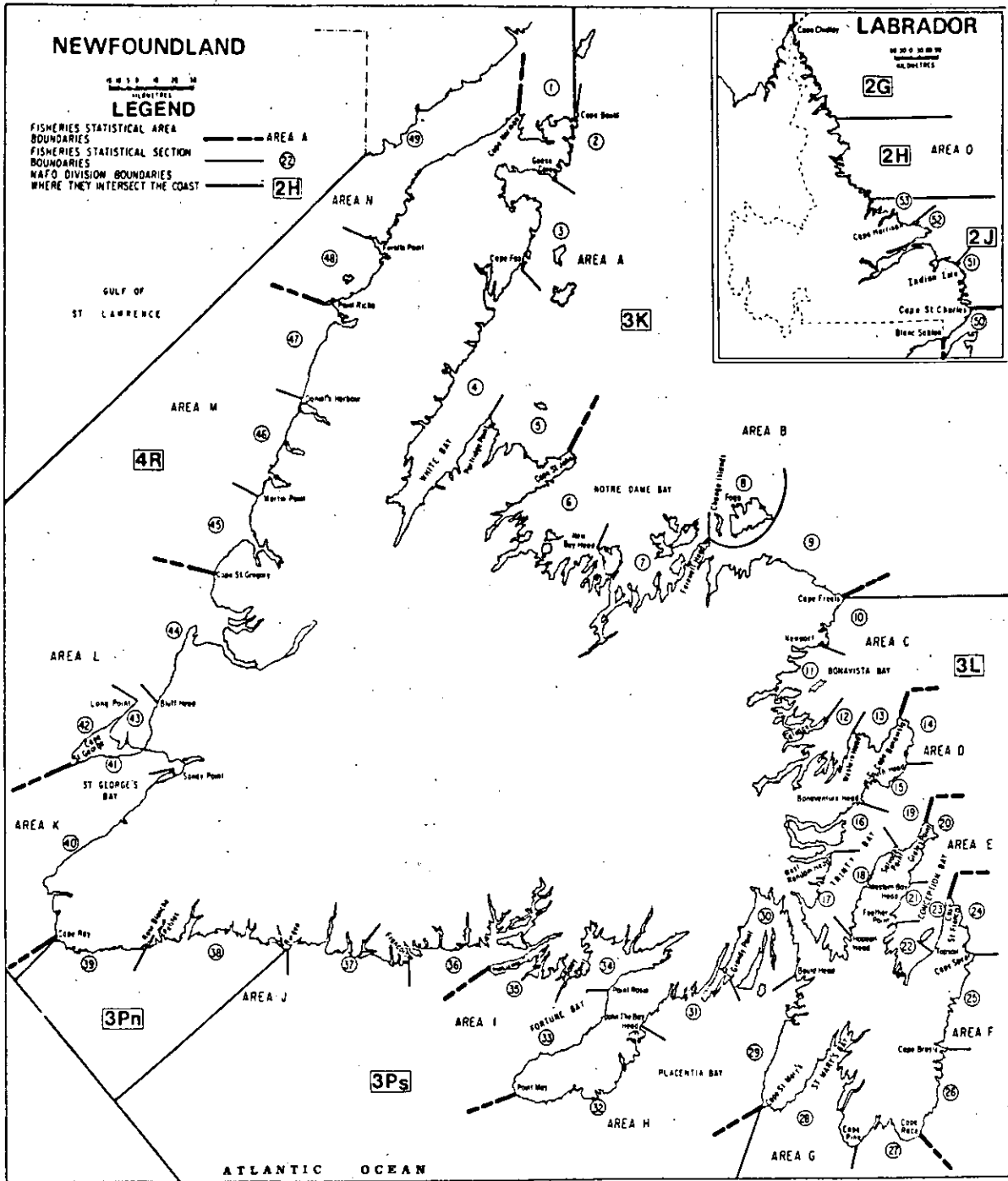


Fig. 1. Statistical areas (C = Bonavista Bay; D = Trinity Bay; E = Conception Bay; F = Southern Shore; G = Trepassey and St. Mary's Bay) and sections (numeric) in Div. 3L along the coast of Newfoundland.