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# The 1974-75 Canadian Cape Breton (4VWa) herring fishery

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## Introduction

The purpose of this paper is to describe the 1974-75 Canadian herring fishery in Div. 4VWa, with consideration being given to geographical distribution of the catch, age composition and catch per unit effort.

## Materials and Methods

Analysis of the 1974-75 Div. 4VWa fishery was based on 87 samples taken in Div. 4Vn and 71 samples taken in Div. 4Wa. The numbers of lengths and ages taken are given below:

Table 1.

| | Catch (mt) | Number | | |
|---|---|---|---|---|
| | | Samples | Lengths | Ages |
| 4Vn | | | | |
| 1974 | 12517 | 73 | 16054 | 2701 |
| 1975 | 4005 | 14 | 2521 | 467 |
| 4Wa | | | | |
| 1974 | 3231 | 3 | 601 | 121 |
| 1975 | 23799 | 68 | 17134 | 2869 |
| Total | 43552 | 158 | 36310 | 6158 |

Monthly age-length keys and length-weight relationships (log transform) were derived for each area. Due to the relatively few ages available from the 1974 Subdiv. 4Wa catches, the January, 1975, age-length key for that area was used (ages were reduced by one year due to the arbitrary January 1 birthdate used in ageing).

The catch statistics and CPUE values were obtained from log records, purchase slips, and landing report data compiled during the fishery. (The catch statistics may differ somewhat from the official Canadian statistics.) Daily catches by small geographical area obtained from these same sources were weighted by length frequency samples taken from catches in that day and area. Occasionally, catches taken on two or three successive days in one area had to be combined and weighted against samples from one day.

## Results

### Geographical Distribution

The distribution of catches and fishing effort in the Div. 4VWa fishery are given in Fig. 1. In the last few years, the fishery has commenced in mid-November and terminated in late February to early March. In 1974-75, however, the Canadian quota allocation was taken, and the fishery terminated, by the end of January.

The 1974-75 fishery followed a similar pattern to that in 1973-74. The fishery began in mid-November and the majority of the November catch was taken, in the Sydney Bight area of Subdiv. 4Vn. In December, the fishery was somewhat more dispersed than in November with substantial catches being also made in the southwestern portion of Subdiv. 4Vn and in the western portion of Subdiv. 4Wa. In January, 1975, the only catches made in Subdiv. 4Vn were in the southwestern portion, with the large majority (86%) being caught in Subdiv. 4Wa.

### Catch Statistics and Catch per Unit Area

Monthly catch statistics for the 1974-75 fishery in Subdiv. 4Vn and 4Wa are presented in Table 2. Over 43,500 mt were taken by the Canadian fishery. In Subdiv. 4Vn, 75% of the catch of 16,500 mt was taken in the November - December period, while over 88% of the 27,000 mt caught in Subdiv. 4Wa was taken in January. In both areas in 1974-75, the catch was limited by quota restrictions.

Monthly catch per unit effort values for Subdiv. 4Vn and 4Wa are given in Table 3. The large purse seiner (>70 feet in length) category accounted for over 90% of the catch in both areas, and comparisons are thus made only for this category. The CPUE was greater in Subdiv. 4Wa than 4Vn in all months and more than twice as great in January, 1975. The weighted mean catch per unit effort, that is the mean CPUE for the season, was 76.4 and 146.5 tons for Subdiv. 4Vn and 4Wa respectively.

The historical performance of the fishery for each area since the 1968-69 season is given in Table 4. The catch in Subdiv. 4Vn increased to over 17,000 tons in 1972-73 and has remained relatively constant since. The catches in Subdiv. 4Wa have been greater than 25,000 tons in all years, except in 1972-73 when ice cover prematurely terminated the fishery. The catch in both areas in 1974-75 were restricted by quota regulations; this TAC was a precautionary one set at the average catch during the period 1968-69 to 1972-73 (Redbook, 1973, p. 96).

The CPUE effort in the two areas, however, have dramatically different trends (Table 5, Figure 2). Effort data was not available prior to 1971-72, however, since that time CPUE in Subdiv. 4Vn has decreased from 115 mt to 76 mt in 1974-75, a decline of 34% in three years. In Subdiv. 4Wa, the CPUE during this period has increased by almost 97% from 75 mt in 1971-72 to 147 mt in 1974-75. It should be further noted that in January, 1975, at the peak of the fishery, individual daily quotas were imposed on many of the boats; the mean January CPUE was 159 mt, but during the first week of January, before daily quotas were imposed, the CPUE in Subdiv. 4Wa was 181 mt.

### Catch Composition

The age-length distributions by month from the stratified samples are presented in Tables 6, 7, 8 and 9.

The numbers of fish at age taken by the Canadian fishery from Div. 4VWa are given in Table 10 and the weighted length and age compositions are presented in Figure 3. In 1974-75, as in 1973-74, the 1970 year class supported the fishery in both areas, comprising respectively 52.4% and 47.9% of the Subdiv. 4Vn 1974 and 1975 catches and 72.2% and 49.4% of the Subdiv. 4Wa 1974 and 1975 catches. The 1972 year class made a relatively strong appearance in the Subdiv. 4Wa fishery, comprising 24% of the catch, but in Subdiv. 4Vn, it represented only 8%. As observed in previous years, older fish (6years and older) continue to represent more of the catch in Subdiv. 4Vn (26%) than in Subdiv. 4Wa (12%).

Table 2 . Monthly catches (m.t.) in the 1974-75 Canadian 4VWa herring fishery.

| | November | December | January | Total |
|---|---|---|---|---|
| 4Vn | 4988.0 | 7528.8 | 4005.4 | 16522.2 |
| 4Wa | 1371.5 | 1859.4 | 23799.0 | 27029.9 |
| Total | | | | 43552.1 |

Table 3. Canadian monthly CPUE values for herring in ICNAF Subdivisions 4Vn and 4Wa during the 1974-75 fishing season. The CPUE is given in three categories: HPS - purse seiners greater than 70' in length; hps - purse seiners 70' or less in length; MWT - midwater trawlers. Unit of effort was days actually fishing and is given in parenthesis. Most, but not all of the catch is accounted for by these figures.

| | 4Vn | | | 4Wa | | |
|---|---|---|---|---|---|---|
| | HPS | MWT | hps | HPS | MWT | hps |
| November | 53.5 (91) | | | 78.6 (11) | 40.9 (10) | |
| December | 82.3 (88) | 43.6 (3) | 21.5 (3) | 102.2 (13) | 48.8 (10) | |
| January | 125.2 (32) | | | 159.1* (105) | 79.1 (5) | 54.4 (12) |
| Weighted mean | 76.4 (211) | | | 146.5 (129) | | |

*CPUE for the period January 1-7 was 180.7 but following that period (30) daily catch maximums were put on many on many of the boats.

Table 4. Yearly catches (m.t.) in the Canadian 4VWa herring fishery 1968-69 to 1974-75.

| | 1968-69 | 1969-70 | 1970-71 | 1971-72 | 1972-73 | 1973-74 | 1974-75 |
|---|---|---|---|---|---|---|---|
| 4Vn | 2276 | 4992 | 3065 | 10662 | 17179 | 15347 | 16522* |
| 4Wa | 25112 | 27107 | 52535 | 25656 | 7921** | 27791 | 27030* |

*The catches in both 4Vn and 4Wa were limited by quota regulations: in November-December due to the 1974 quota allocation and in January due to the Jan.-June 1975 quota allocation.
**Fishery terminated prematurely due to ice conditions

Table 5. Yearly CPUE for the Canadian herring fishery in ICNAF Subdivisions 4Vn and 4Wa for the 1971-72 to 1974-75 seasons.

| | 1971-72 | 1972-73 | 1973-74 | 1974-75 |
|---|---|---|---|---|
| 4Vn | 115.2 (56) | 93.8 (149) | 78.6 (193) | 76.4 (211) |
| 4Wa | 74.5 (270) | 73.6 (97) | 132.0 (194) | 146.5 (129) |

Table 6. Age-length distribution of the Canadian, November, 1974, samples from ICNAF Subdivision 4Vn.

| Length Group | Year Class (Age) 73 (1) | 72 (2) | 71 (3) | 70 (4) | 69 (5) | 68 (6) | 67 (7) | 66 (8) | 65 (9) | 64 (10) | 63+ (11+) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20.5 | 1 | 2 | | | | | | | | | | 3 |
| 21.0 | | 1 | | | | | | | | | | 1 |
| 21.5 | | | | | | | | | | | | |
| 22.0 | | 13 | | | | | | | | | | 13 |
| 22.5 | | 21 | | | | | | | | | | 21 |
| 23.0 | | 29 | | | | | | | | | | 29 |
| 23.5 | | 28 | | | | | | | | | | 28 |
| 24.0 | | 22 | 1 | | | | | | | | | 23 |
| 24.5 | | 21 | 8 | | | | | | | | | 29 |
| 25.0 | | 7 | 15 | | | | | | | | | 22 |
| 25.5 | | 6 | 21 | 1 | | | | | | | | 28 |
| 26.0 | | 1 | 24 | 1 | | | | | | | | 26 |
| 26.5 | | 1 | 37 | 3 | | | | | | | | 41 |
| 27.0 | | | 36 | 9 | | | | | | | | 45 |
| 27.5 | | | 24 | 21 | | | | | | | | 45 |
| 28.0 | | | 17 | 44 | | | | | | | | 61 |
| 28.5 | | | 4 | 47 | | | | | | | | 51 |
| 29.0 | | | 3 | 68 | | | | | | | | 71 |
| 29.5 | | | | 47 | 1 | | | | | | | 48 |
| 30.0 | | | | 77 | 1 | | | | | | | 78 |
| 30.5 | | | | 52 | 4 | | | | | | | 56 |
| 31.0 | | | | 45 | 12 | 3 | | | | | | 60 |
| 31.5 | | | | 35 | 15 | 3 | | | | | | 53 |
| 32.0 | | | | 7 | 36 | 7 | 4 | | | | | 54 |
| 32.5 | | | | 2 | 20 | 15 | 11 | | | | | 48 |
| 33.0 | | | | 1 | 9 | 14 | 17 | 2 | 1 | | | 44 |
| 33.5 | | | | | 2 | 12 | 18 | 5 | | | | 37 |
| 34.0 | | | | | | 3 | 14 | 17 | 5 | 1 | | 40 |
| 34.5 | | | | | | | 16 | 9 | 13 | 5 | 1 | 44 |
| 35.0 | | | | | | | 2 | 19 | 17 | 8 | 1 | 47 |
| 35.5 | | | | | | | 2 | 13 | 9 | 10 | 3 | 37 |
| 36.0 | | | | | | | 3 | 5 | 15 | 9 | 6 | 38 |
| 36.5 | | | | | | | | 3 | 11 | 5 | 14 | 33 |
| 37.0 | | | | | | | | 1 | 2 | 11 | 17 | 31 |
| 37.5 | | | | | | | | | 3 | 8 | 13 | 24 |
| 38.0 | | | | | | | | | 2 | 2 | 8 | 12 |
| 38.5 | | | | | | | | | | 2 | 5 | 7 |
| 39.0 | | | | | | | | | | | 6 | 6 |
| 39.5 | | | | | | | | | | 1 | 2 | 3 |
| Total | 1 | 152 | 190 | 460 | 100 | 57 | 87 | 74 | 78 | 62 | 76 | 1337 |

Table 7. Age-length distribution of the Canadian, December, 1974, samples from ICNAF Subdivision 4Vn.

| Length Group | Year Class (Age) 73 (1) | 72 (2) | 71 (3) | 70 (4) | 69 (5) | 68 (6) | 67 (7) | 66 (8) | 65 (9) | 64 (10) | 63+ (11+) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15.5 | 1 | | | | | | | | | | | 1 |
| 16.0 | | | | | | | | | | | | |
| 16.5 | | | | | | | | | | | | |
| 17.0 | | | | | | | | | | | | |
| 17.5 | 1 | | | | | | | | | | | 1 |
| 18.0 | | | | | | | | | | | | |
| 18.5 | 2 | 1 | | | | | | | | | | 3 |
| 19.0 | 3 | 2 | | | | | | | | | | 5 |
| 19.5 | 3 | | | | | | | | | | | 3 |
| 20.0 | | | | | | | | | | | | |
| 20.5 | 1 | 6 | | | | | | | | | | 7 |
| 21.0 | | 6 | | | | | | | | | | 6 |
| 21.5 | | 17 | | | | | | | | | | 17 |
| 22.0 | | 23 | 1 | | | | | | | | | 24 |
| 22.5 | | 19 | | | | | | | | | | 19 |
| 23.0 | | 25 | 2 | | | | | | | | | 27 |
| 23.5 | | 23 | 2 | | | | | | | | | 25 |
| 24.0 | | 29 | 2 | | | | | | | | | 31 |
| 24.5 | | 16 | 6 | | | | | | | | | 22 |
| 25.0 | | 14 | 14 | | | | | | | | | 28 |
| 25.5 | | 5 | 21 | | | | | | | | | 26 |
| 26.0 | | | 28 | | | | | | | | | 28 |
| 26.5 | | | 31 | 3 | | | | | | | | 34 |
| 27.0 | | | 26 | 10 | | | | | | | | 36 |
| 27.5 | | | 25 | 19 | | | | | | | | 44 |
| 28.0 | | | 12 | 39 | 1 | | | | | | | 52 |
| 28.5 | | | 5 | 45 | | | | | | | | 50 |
| 29.0 | | | 4 | 58 | | | | | | | | 62 |
| 29.5 | | | | 53 | 3 | | | | | | | 56 |
| 30.0 | | | | 66 | 3 | | | | | | | 69 |
| 30.5 | | | | 51 | 9 | 2 | | | | | | 62 |
| 31.0 | | | | 38 | 16 | 1 | | | | | | 55 |
| 31.5 | | | | 27 | 23 | 9 | 2 | | | | | 61 |
| 32.0 | | | | 9 | 28 | 6 | 2 | 1 | | | | 46 |
| 32.5 | | | | 1 | 15 | 17 | 2 | 4 | 1 | | | 40 |
| 33.0 | | | | 1 | 5 | 17 | 13 | 2 | | 1 | | 39 |
| 33.5 | | | | | 1 | 14 | 13 | 9 | 1 | | | 38 |
| 34.0 | | | | | | 4 | 14 | 14 | 7 | 3 | | 42 |
| 34.5 | | | | | | 2 | 11 | 10 | 7 | 6 | | 36 |
| 35.0 | | | | | | | 11 | 12 | 13 | 8 | 3 | 47 |
| 35.5 | | | | | | | | 4 | 16 | 13 | 7 | 40 |
| 36.0 | | | | | | | | 8 | 11 | 14 | 12 | 45 |
| 36.5 | | | | | | | | 2 | 14 | 10 | 6 | 32 |
| 37.0 | | | | | | | | | 4 | 19 | 21 | 44 |
| 37.5 | | | | | | | | | | 5 | 18 | 23 |
| 38.0 | | | | | | | | | 1 | 1 | 14 | 16 |
| 38.5 | | | | | | | | | | 1 | 11 | 12 |
| 39.0 | | | | | | | | | | 1 | 5 | 6 |
| 39.5 | | | | | | | | | | 1 | 2 | 3 |
| 40.0 | | | | | | | | | | | | |
| 40.5 | | | | | | | | | | | 1 | 1 |
| Total | 11 | 186 | 179 | 420 | 104 | 72 | 68 | 66 | 75 | 83 | 100 | 1364 |

Table 8. Age-length distribution of the Canadian, January, 1975, samples from ICNAF Subdivision 4Wa.

| Length Group | Year Class (Age) 73 (2) | 72 (3) | 71 (4) | 70 (5) | 69 (6) | 68 (7) | 67 (8) | 66 (9) | 65 (10) | 64+ (11+) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 12.5 | 2 | | | | | | | | | | 2 |
| 13.0 | 1 | | | | | | | | | | 1 |
| 13.5 | | | | | | | | | | | |
| 14.0 | 8 | | | | | | | | | | 8 |
| 14.5 | 2 | | | | | | | | | | 2 |
| 15.0 | 6 | | | | | | | | | | 6 |
| 15.5 | 1 | 1 | | | | | | | | | 2 |
| 16.0 | 3 | 4 | | | | | | | | | 7 |
| 16.5 | 6 | 6 | | | | | | | | | 12 |
| 17.0 | 10 | 6 | | | | | | | | | 16 |
| 17.5 | 8 | 9 | | | | | | | | | 17 |
| 18.0 | 2 | 12 | | | | | | | | | 14 |
| 18.5 | 4 | 20 | | | | | | | | | 24 |
| 19.0 | 6 | 20 | | | | | | | | | 26 |
| 19.5 | 6 | 18 | | | | | | | | | 24 |
| 20.0 | 1 | 31 | 1 | | | | | | | | 33 |
| 20.5 | 1 | 29 | | | | | | | | | 30 |
| 21.0 | | 51 | | | | | | | | | 51 |
| 21.5 | 2 | 62 | | | | | | | | | 64 |
| 22.0 | | 90 | 1 | | | | | | | | 91 |
| 22.5 | | 88 | 1 | | | | | | | | 89 |
| 23.0 | | 102 | 2 | | | | | | | | 104 |
| 23.5 | | 95 | 4 | | | | | | | | 99 |
| 24.0 | | 100 | 6 | | | | | | | | 106 |
| 24.5 | | 74 | 24 | | | | | | | | 98 |
| 25.0 | | 28 | 38 | 2 | | | | | | | 68 |
| 25.5 | | 9 | 42 | 9 | | | | | | | 60 |
| 26.0 | | 3 | 58 | 14 | | | | | | | 75 |
| 26.5 | | 2 | 55 | 29 | | | | | | | 86 |
| 27.0 | | 1 | 62 | 45 | | | | | | | 108 |
| 27.5 | | | 47 | 62 | 1 | | | | | | 110 |
| 28.0 | | | 25 | 82 | | | | | | | 107 |
| 28.5 | | | 17 | 99 | 3 | | | | | | 119 |
| 29.0 | | | 3 | 108 | 3 | | | | | | 114 |
| 29.5 | | | 1 | 123 | 4 | | | | | | 128 |
| 30.0 | | | | 119 | 10 | 1 | | | | | 130 |
| 30.5 | | | 1 | 91 | 12 | 1 | 1 | | | | 106 |
| 31.0 | | | | 60 | 24 | 2 | | | | | 86 |
| 31.5 | | | | 38 | 24 | 8 | | | | | 70 |
| 32.0 | | | 1 | 13 | 34 | 9 | 2 | | | | 59 |
| 32.5 | | | | 1 | 24 | 23 | 10 | 2 | | | 60 |
| 33.0 | | | | | 13 | 18 | 13 | 4 | 2 | | 50 |
| 33.5 | | | | | 4 | 18 | 12 | 12 | 2 | | 48 |
| 34.0 | | | | | 3 | 8 | 16 | 12 | 7 | 4 | 50 |
| 34.5 | | | | | | 6 | 14 | 11 | 9 | 1 | 41 |
| 35.0 | | | | | | | 8 | 24 | 8 | 8 | 48 |
| 35.5 | | | | | | 1 | 3 | 11 | 13 | 9 | 36 |
| 36.0 | | | | | | | 1 | 13 | 21 | 13 | 48 |
| 36.5 | | | | | | | | 4 | 13 | 20 | 37 |
| 37.0 | | | | | | | | 1 | 12 | 30 | 43 |
| 37.5 | | | | | | | | | 1 | 21 | 22 |
| 38.0 | | | | | | | | | | 13 | 13 |
| 38.5 | | | | | | | | | | 10 | 10 |
| 39.0 | | | | | | | | | | 6 | 6 |
| 39.5 | | | | | | | | | | 2 | 2 |
| 40.0 | | | | | | | | | | 2 | 2 |
| Total | 69 | 861 | 389 | 895 | 159 | 95 | 80 | 94 | 88 | 139 | 2869 |

Table 9. Age-length distribution of the Canadian, January, 1975, samples from ICNAF Subdivision 4Vn.

| Length Group | Year Class (Age) 73 (2) | 72 (3) | 71 (4) | 70 (5) | 69 (6) | 68 (7) | 67 (8) | 66 (9) | 65 (10) | 64+ (11+) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16.5 | 1 | | | | | | | | | | 1 |
| 17.0 | | | | | | | | | | | |
| 17.5 | 2 | | | | | | | | | | 2 |
| 18.0 | 1 | | | | | | | | | | 1 |
| 18.5 | | | | | | | | | | | |
| 19.0 | | 2 | | | | | | | | | 2 |
| 19.5 | | | | | | | | | | | |
| 20.0 | | 1 | | | | | | | | | 1 |
| 20.5 | | | | | | | | | | | |
| 21.0 | | 5 | | | | | | | | | 5 |
| 21.5 | | 3 | | | | | | | | | 3 |
| 22.0 | | 7 | | | | | | | | | 7 |
| 22.5 | | 9 | | | | | | | | | 9 |
| 23.0 | | 11 | | | | | | | | | 11 |
| 23.5 | | 12 | | | | | | | | | 12 |
| 24.0 | | 12 | 2 | | | | | | | | 14 |
| 24.5 | | 9 | 3 | | | | | | | | 12 |
| 25.0 | | 4 | 8 | | | | | | | | 12 |
| 25.5 | | 2 | 3 | 1 | | | | | | | 6 |
| 26.0 | | | 10 | | | | | | | | 10 |
| 26.5 | | 2 | 7 | 4 | | | | | | | 13 |
| 27.0 | | | 14 | 6 | | | | | | | 20 |
| 27.5 | | | 4 | 6 | | | | | | | 10 |
| 28.0 | | | 3 | 14 | | | | | | | 17 |
| 28.5 | | | 2 | 16 | 1 | | | | | | 19 |
| 29.0 | | | 1 | 19 | | | | | | | 20 |
| 29.5 | | | | 14 | | | | | | | 14 |
| 30.0 | | | | 28 | | | | | | | 28 |
| 30.5 | | | | 14 | 1 | | | | | | 15 |
| 31.0 | | | | 18 | 2 | | | | | | 20 |
| 31.5 | | | | 3 | 8 | | | | | | 11 |
| 32.0 | | | | 5 | 10 | 3 | 1 | | | | 19 |
| 32.5 | | | | | 8 | 4 | 1 | | | | 13 |
| 33.0 | | | | | 4 | 3 | 4 | 3 | | | 14 |
| 33.5 | | | | | 1 | 1 | 5 | 2 | 2 | | 11 |
| 34.0 | | | | | 1 | | 5 | 3 | 4 | 1 | 14 |
| 34.5 | | | | | | 1 | 2 | 4 | 4 | | 11 |
| 35.0 | | | | | | | 1 | 7 | 6 | | 14 |
| 35.5 | | | | | | | 3 | | 4 | 2 | 9 |
| 36.0 | | | | | | | | 2 | 7 | 8 | 17 |
| 36.5 | | | | | | | | 2 | 5 | 5 | 12 |
| 37.0 | | | | | | | | 1 | 3 | 6 | 10 |
| 37.5 | | | | | | | | | | 12 | 12 |
| 38.0 | | | | | | | | | 1 | 6 | 7 |
| 38.5 | | | | | | | | 1 | | 5 | 6 |
| 39.0 | | | | | | | | | | 3 | 3 |
| Total | 4 | 79 | 57 | 148 | 36 | 12 | 22 | 25 | 36 | 48 | 467 |

Table 10. Monthly numbers of herring at age (thousands) caught during the 1974-75 4VWa fishery.

| Month | AGE | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11+ | Total |
| **4Vn** | | | | | | | | | | | | |
| 1974 | | | | | | | | | | | | |
| November | 2 | 1844 | 1416 | 11679 | 2030 | 783 | 941 | 798 | 869 | 742 | 978 | 22082 |
| December | 100 | 2345 | 2254 | 17725 | 3905 | 1582 | 1038 | 986 | 1188 | 1273 | 1598 | 33994 |
| Total | 102 | 4189 | 3670 | 29404 | 5935 | 2365 | 1979 | 1784 | 2057 | 2015 | 2576 | 56076 |
| 1975 | | | | | | | | | | | | |
| January | | 46 | 1805 | 1102 | 8562 | 1396 | 328 | 642 | 860 | 1423 | 1724 | 17887 |
| **4Wa** | | | | | | | | | | | | |
| 1974 | | | | | | | | | | | | |
| November | | 54 | 533 | 5006 | 472 | 154 | 119 | 175 | 156 | 139 | 130 | 6938 |
| December | | 73 | 723 | 6783 | 639 | 209 | 162 | 237 | 211 | 188 | 176 | 9401 |
| Total | | 127 | 1256 | 11789 | 1111 | 363 | 281 | 412 | 367 | 327 | 306 | 16339 |
| 1975 | | | | | | | | | | | | |
| January | | 1936 | 39777 | 15444 | 73952 | 7361 | 2231 | 1548 | 1957 | 1911 | 3443 | 149561 |
| **Totals** | | | | | | | | | | | | |
| Nov.-Dec.,1974 | 102 | 4316 | 4926 | 41193 | 7046 | 2728 | 2260 | 2196 | 2424 | 2342 | 2882 | 72415 |
| January, 1975 | | 1982 | 41582 | 16546 | 82514 | 8757 | 2559 | 2190 | 2817 | 3334 | 5167 | 167448 |

## Discussion

### Catch Composition and CPUE Trends

The history of this fishery is relatively short, however, since 1968 the CPUE figures for the two components show radically different trends (Figure 2). Although the geographical distribution of the fishery during the 1974-75 season was similar to that of previous years and the catch has remained relatively constant, the CPUE in Subdiv. 4Vn has continued to decline (34% decline in the last three years). The Subdiv. 4Wa fishery has experienced the complete opposite, with a dramatic increase (97%) in CPUE for the same period.

The year class composition of the catch continues to indicate that catches in Subdiv. 4Vn (26%) consist of a greater proportion of old fish than catches in Subdiv. 4Wa (12%). The fishery in both areas, however, was supported by the 1970 year class, with over 50% of the catches (in numbers) from each area consisting of this year class. The 1972 year class also appeared strong in Subdiv. 4Wa (24% of the catch in numbers).

### Stock relationships

The Div. 4VWa management unit has been assumed to consist of three components, one in each of Subdiv. 4Vn, 4Vs, and 4Wa. The Subdiv. 4Vs component has virtually collapsed, with annual catches of less than 3000 mt being reported since 1971. The Canadian CPUE in Subdiv. 4Vn has also been declining since 1971, a fact which could relate these two Subdivisions, but the decline in Subdiv. 4Vn has not been as dramatic as in Subdiv 4Vs. The dramatic increase in Canadian CPUE in Subdiv. 4Wa indicates an increased abundance or availability in that area.

Catch compositions prior to the 1973-74 (Stobo et al.,1973) indicated that catches in Subdiv. 4Vn and 4Vs consisted mainly of large old fish, while catches in Subdiv. 4Wa were primarily of younger fish. This suggests some similarity between the two fisheries in Div. 4V, but in the 1973-74 and 1974-75 Canadian fisheries the catches in Subdiv. 4Vn and 4Wa have been dependent on the 1970 year class. Catches made by the international fleet since 1971 are reported as caught in Div. 4V, therefore, they could be from either Subdiv. 4Vn or 4Vs and are thus difficult to compare with the Canadian catch composition.

The general conclusion which must be drawn from these data is that CPUE and catch composition data are of limited value in determining stock relationships. The differences observed between the Div. 4V and Subdiv. 4Wa fisheries could be explained by differential migration and availability of adults and juveniles in the respective areas. The decline in catches and CPUE in Subdiv. 4Vs and 4Vn respectively are important, however, since they indicate a greatly reduced abundance of older fish.

Additional studies have been underway to clarify some of the relationships involved. In October-November, 1974, herring larval surveys (Iles and Stobo, unpublished) conducted in ICNAF Div. 4W and 4V both inshore and offshore (including Middle, Banquereau, Misaine, and Canso Banks) indicated no larval concentrations. Biological sampling of the commercial fisheries has indicated that large proportion of the Subdiv. 4Vn and almost all of the Subdiv. 4Wa catches consist of fall spawners (Stobo, unpublished), thus the absence of herring larvae in Div. 4VW during this period, indicates that there is no spawning stock in that area to support the Div. 4VWa fishery.

The results of tagging experiments (Stobo et al., 1975) indicate that a proportion of the fish exploited off southwest Nova Scotia overwinter in Subdiv. 4Wa. An average of 1.5 recoveries per day were made during January in that fishery. No recaptures were made in Subdiv. 4Vn during the November-December period, and the very few recaptures taken in January were just east of the Subdiv. 4Wa-Vn boundary line. Thus, the data do not indicate that these fish move into Subdiv. 4Vn in any substantial amount.

### Management Units and 1976-77 Catch Levels

The larval surveys indicate that the fisheries in Subdiv. 4Vn, 4Vs, and 4Wa are exploiting stock(s) spawning in areas other than Div. 4VW. This probably also means that these fish are being exploited elsewhere. The tagging results suggest a strong relationship between Subdiv. 4Wa and Div. 4XWb and thus these two fisheries should be treated as a single management unit. Very few tag recoveries were made in Subdiv. 4Vn,

and none during the peak period of that 1974-75 fishery, thus until the stock relationships are finalized, Subdiv. 4Vn should be managed separately from Subdiv. 4Wa. Subdiv. 4Vs appears to have greater similarities with Subdiv. 4Vn and based on the available information, it would appear advisable to consider these two areas as one management unit.

In view of the declines in catch and CPUE in Subdiv. 4Vs and 4Vn respectively, it would be difficult to justify an increase in the TAC for that area for either the 1975-76 or 1976-77 season and a decrease should be considered.

If the Subdiv. 4Wa fishery is to remain as a discrete mangement unit, although the larval surveys and tagging data indicate such a state is not warranted, it would be difficult to justify increased exploitation of the fish in Subdiv. 4Wa in 1975-76 or 1976-77. This fishery is dependent on younger fish and increased exploitation in Subdiv. 4Wa could be detrimental to the Div. 4XWb fishery. Accepting a relationship between Subdiv. 4Wa and Div. 4XWb, it is difficult to reconcile the difference in Canadian CPUE in Subdiv. 4Wa (159.1 mt) with that in Div. 4XWb (63.4 mt), unless the fish are much more concentrated on the overwintering grounds. If this possibility is correct, increases in the TAC in Subdiv. 4Wa could seriously deplete the Div. 4XWb stock.

## References

Stobo, W. T., J. J. Hunt and T. D. Iles. MS 1973. A preliminary report on the herring fishery in ICNAF Divisions 4V and 4Wa. Intern. Comm. Northw. Atlant. Fish. Res. Doc. 73/94. 20 p.

Stobo, W. T., J. S. Scott, and J. J. Hunt. MS 1975. Movements of herring tagged in the Bay of Fundy. Intern. Comm. Northw. Atlant. Fish. Res. Doc. 75/38.

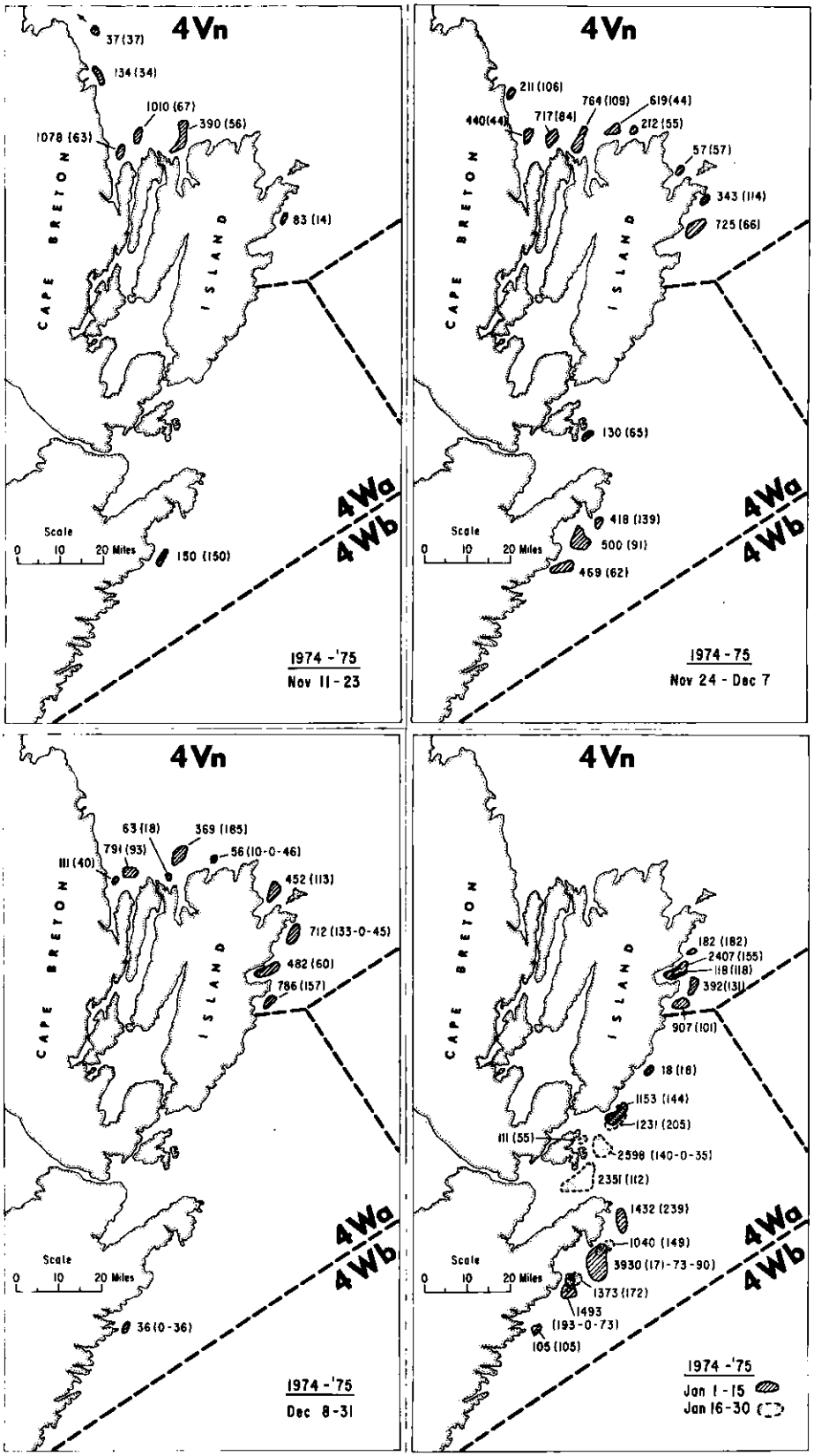


Figure 1. Geographical distribution of the 4VWa herring fishery for specified time intervals in 1974-75. The catch (metric tons) and the catch per unit effort (in parentheses) are given respectively for purse seiners >70' and midwater trawlers, and purse seiners >70' if they participated.

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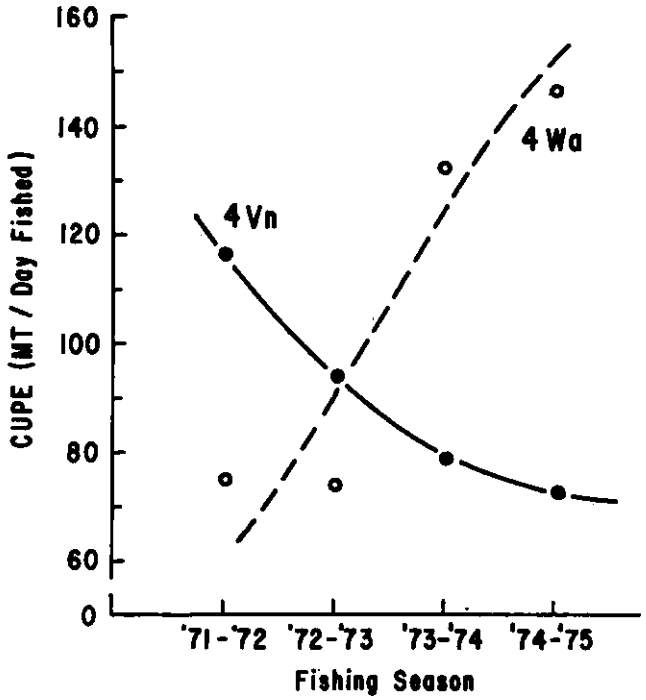


Figure 2. Mean yearly Canadian catch per unit effort values for the Subdiv. 4Vn and 4Wa fisheries for the seasons 1971-72 to 1974-75.

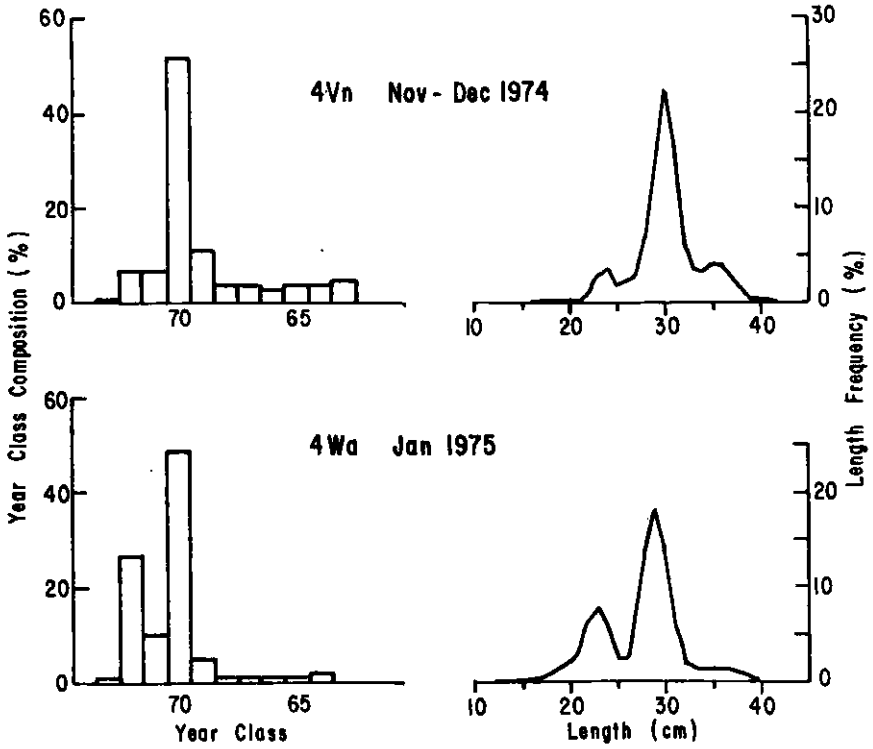


Figure 3. Weighted year class composition and length frequency of the 4VWa removals during the 1974-75 fishery.