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The 1996 large seiner fishery in 4Vn.

by R. Claytor

Department of Fisheries and Oceans
P.O. Box 5030
Moncton, New Brunswick E1C 9B6

Abstract

The 4Vn large seiner herring fishery was marked by several issues in 1996. First, there was an increase in allocation from 4200 t to 6423 t, second, the starting date of the fishery was changed from November 1 to October 15, third, the percentage of small fish in the catch was much higher than in recent years, and fourth, a nights fishing late in the season had a high rate of spring spawners in the catch.

Development of a management plan and decision rules for this fishery require information concerning, weight to be caught, size of herring in catch, opening date, and catch composition. Results from an analysis of the fishery and surveys indicate that the size limit in 1996 was sufficient to meet management objectives, that the 4T migration into 4Vn is consistently well underway by November 1, and that there were temporal and spatial trends in the catch composition regarding spring and fall spawners but not immature fish.

These results and those describing the results of the status of the Bras d'Or lake herring stock were used in developing decision rules for this fishery. Relevant documents are: Claytor (1997), the 4WX stock status report (Anon 1997a) and a fishery stock status report (Anon 1997b).

Résumé

Plusieurs paramètres de la pêche du hareng par gros senneurs en 4Vn ont été modifiés en 1996. Tout d'abord, l'allocation, de 4 200 t a été portée à 6 423 t. Ensuite, la date d'ouverture de la pêche, qui était le 1er novembre, a été avancée au 15 octobre. Troisièmement, le pourcentage de petits poissons des prises était de beaucoup supérieur à celui des années précédentes et, quatrièmement, une pêche de nuit pratiquée en fin de saison a donné lieu à la capture d'un taux élevé de géniteurs de printemps.

L'élaboration d'un plan de gestion et de règles de décision pour cette pêche exige de disposer de renseignements sur le poids des captures, la taille des harengs capturés, la date d'ouverture et la composition des prises. L'analyse des résultats de la pêche et des relevés montre que la limite de taille imposée en 1996 était suffisante pour l'atteinte des objectifs de gestion, que la migration de 4T en 4Vn est presque toujours bien en cours au 1er novembre et que la composition des prises en géniteurs de printemps et d'automne, mais non en poissons immatures, présente des tendances spatiales et temporelles.

Ces résultats et ceux de l'étude de l'état du stock de hareng du lac Bras d'Or ont été utilisés pour l'élaboration de règles de décision pour cette pêche. Les documents pertinents à ce sommaire sont : Claytor (1997), le rapport sur l'état des stocks en 4WX (Anon., 1997a) et un rapport sur l'état de stocks exploités (Anon., 1997b).

Introduction

Four points regarding the herring stocks present in 4Vn and their effect on management regulations and allocations are necessary to consider when evaluating the fisheries in the area. These points are:

1. The existence of small stocks, which spawn in the area.
2. 4Vn is an overwintering area for 4T and other stocks of 4Vn, Bras d'Or Lakes, and 4WX origin.
3. Herring of 4T origin predominate in the overwintering catch and a portion of the 4T TAC is allocated to 4Vn.
4. The 4Vn allocation includes an amount set aside for the large seiners based in the Gulf, as well as local fishers from 4Vn.

Allocations set in 4Vn in recent years have been <3% of the 4T biomass. Thus, the main issues concerning the large seiner fishery relate to the impact of this fishery on local spawning stocks. The principal local stocks of concern are the spring spawning stock in the Bras d'Or Lakes and small groups of fall spawners which occur along the coast and in the Bras d'Or Lakes.

Timing of opening dates, closed areas, and size limits are the managment measures used to assist in reducing exploitation on these local stocks. For example, the opening date is set with the intent of waiting until the migration of 4T herring into 4Vn is well under way. Large seiners from the Gulf of St. Lawrence have access to 4Vn north of the Cape Dauphin Line, while those from southwest Nova Scotia (4WX) have access to 4Vn south of the Scaterie Line. Fishing by large seiners is prohibited between the Cape Dauphin and Scaterie Lines (Fig. 1). The management intent of the Cape Dauphin Line is to restrict large seiners from fishing at the only entrance and exit point for Bras d'Or Lake herring to and from the 4Vn area. Fishing by 4WX large seiners south of the Scaterie Line has the intent of allowing this fleet access to any 4WX herring which may migrate to this area of 4Vn. In recent years there has been no catch by the 4WX fleet in 4Vn south of the Scaterie Line.

In 1992, it was decided to include all herring caught by large seiners in this fishery as part of the 4T stock assessment. As a result, catches in the 4Vn winter purse seine fishery are added to the 4T assessment and the allocation for the winter 4Vn fishery is included in the overall 4T herring TAC. These changes have been made for the 4T assessment for all years back to 1978.

This decision was based on analyses of historical tagging data, length-frequencies, and acoustic surveys which indicated that most of the herring caught in the 4Vn purse seine fishery were of 4T origin (Simon and Stobo 1983, Chadwick et al 1993). This change does not mean or imply that no local stocks or 4WX fish are caught in this fishery, but that the predominant part of the catch was from 4T and these fish should be accounted for in that stock assessment. Prior to 1992, catches in 4Vn were not included in either the 4WX or 4T herring assessments.

Historical Description of the Fishery

Herring fisheries in 4Vn include purse seine vessels (>65') from the southern Gulf of St. Lawrence, local bait fisheries by gillnetters during the spring in the Bras d'Or Lakes and along the coast, and local trapnets during the spring, and a combination of local trapnets and small seiners in the fall.

A 4Vn herring gillnet bait fishery takes place from mid-May to mid-July in depths of about 15 fathoms. About 500 fishers participate in this fishery for lobster bait. Bait requirements are about 300 pounds of herring a day for a lobster fishery lasts about 50 days. Thus, a maximum of 3500 tonnes of herring are potentially harvested each year in this fishery.

The Bras d'Or lake fishery is described in detail in a separate working paper (Denny et al. 1997). The majority of this fishery occurs in the spring with about 30 participants in 1996. The Bras d'Or

lakes also support a small fall fishery, and a minimal winter fishery under the ice for herring by the Eskasoni First Nation has occurred historically.

In the late 60s and early 70s the large seiner fishery occurred primarily from November to December with some catches from February to April by foreign (Table 1) and domestic fleets (Table 2). During the 1980s catches were concentrated in November and December and during the 1990s catches have occurred primarily in November (Table 2).

The large seiner allocation in 4Vn was 4200 tonnes from 1986 to 1995. In 1996, it was raised to 6423 tonnes to reduce fishing mortality in Chaleur Bay (4T) and spread the fishing mortality from the large seiners to other components of the 4T stock (Table 3).

In 1996, the large purse seine fishery began with a test fishery on Oct. 18 and concluded on Dec. 4. Catches occurred primarily in Aspy Bay, as in recent years, but some also occurred near Neils Harbour and St. Ann's Bay (Fig. 2).

The size regulation in the 4Vn fishery was changed in 1996. In 1996, 10% of the herring by number were permitted to be <24.5 cm fork length compared to <26.5 cm fork length in previous years. This change made the size regulations in 4Vn consistent with those in 4T.

1996 Large Seiner Fishery Data

The spring spawner catch in 1996 was about 25% higher than the long-term average but was almost twice as high as the 1991 - 1995 average (Table 3). The percentage of fall spawners in the catch was above the long-term average but was lower than occurred from 1991 - 1995 (Table 3).

The percentage of spring and fall spawners changed through the season. The highest percentage of fall spawners was at the beginnning of the season and in Aspy Bay. The lowest percentage was during the last part of the season (Dec. 3-4) near St. Ann's Bay (Fig. 2, Table 4).

The fall spawner catch-at-age matrix was dominated by age 4 herring from the 1992 year-class (Fig. 3, Table 5). The 1990 year-class was second in importance and the 1991 year-class (Age 5) was not as strong as the 1990 or 1992 year-classes (Fig. 3, Table 6).

The spring spawners were dominated by age 5 herring from the 1991 year-class (Fig. 4, Table 5). Age 4 herring from the 1992 year-class seem to be somewhat weaker than other recent year-classes (Fig. 4, Table 7).

Spring spawners tended to be heavier at age than fall spawners, although length at age was similar between the two spawning components (Table 5).

Size

Size of herring caught in 4Vn is an issue for two reasons. First, the 4T TAC is set based on expected fishing patterns. The ages expected to be caught in the fishery are predicted from the previous years age structure with the assumption that there will be no major changes in the partial recruitment by age for the fishery. This projection establishes expected targets of immature and mature fish in the catch. If the catch of immature fish is expected to increase then the target fishing mortality would have to be lowered to account for the greater numbers of fish that would be harvested. Concentrating harvest on immature fish, regardless of species, has relatively more risk than concentrating on larger mature fish.

Second, a large portion of immature fish in the 4T population over-winter in 4T or at least migrate later to 4Vn than adults. This delay in migration means that a larger percentage of immature herring caught in the over-wintering fishery would be of local origin than is expected in the harvest of larger mature fish. A likely reason for this delay in migration is the presence of anti-freeze proteins in juvenile herring which permits them to over-winter under the ice (Chadwick et al. 1990).

Thus, the purpose of the minimum size regulation in this fishery is to maintain the harvest of immature fish within the target fishing mortalities projected for the 4T stock and to protect local juvenile herring.

The first target of keeping the harvest of immature herring within the $F_{0.1}$ fishing mortality level was met for fall and spring spawners in combined 4T and 4Vn catches in 1996 (Table 8). In comparison with other years, the catch of immature herring in 1996 was the second highest since 1992 and accounted for about 7% of the catch by weight (Table 9). There were no temporal or spatial trends to the percentage of catch of immature herring (Table 10).

There were no immature herring over 28.5 cm total length in the large purse seine catch in 1996 (Fig. 5). Not all herring below 28.5 cm are immature (Fig. 5) and about 30% of the large purse seine catch of mature herring was below 28.5 cm (Fig. 5, Table 11). Immature herring are defined as those with maturity state 1-2, while maturing and mature herring are stages 3-8. Half the immature herring caught were between 27.5 and 28.5 cm total length (Figs. 6, 7).

There was a higher percentage of fish less than 28.5 cm in the catch in 1996 compared to previous years (Table 11). This difference is consistent with the relatively high percentage of fall spawners (24%) and spring spawners (65%) age 3 and less found in the acoustic survey in 4T in 1996 compared to previous years (Claytor et al. 1997). These percentages indicate that a higher than normal percentage of immature fish are in the 4T population at the present time.

Opening Date

The most appropriate opening date of the 4Vn large seiner fishery depends on when 4T herring start their migration into 4Vn and at what point the numbers are large enough so that catches will consist predominately of 4T herring.

Research surveys have been conducted during January, July, September, October, and November in 4Vn. Thus, there is considerable information to assist in determining when over-winter migrations to 4Vn from other areas occur.

January surveys have found large concentrations near St. Pauls Island and off Neils Harbour during the three years of this survey from 1995 to 1997. In 1995, a large concentration was observed in the southern portion of 4Vn and in 1996 large concentrations were also observed in deep water off St. Anns Bank (Figs. 8-10). Herring during these January surveys were primarily found at depths of 50 to 200m. Surveys during February were conducted in 1981 and 1995 but were restricted to areas south of the Cape Dauphin Line. Few herring were observed in these surveys (Fig. 11).

Catches of herring in July bottom trawl surveys are extemely variable. Biomass estimates in this survey range from 0 to 39,000 tonnes (Table 12). Distribution maps indicate that when herring are found in this area they are south of Aspy Bay. (Figs. 12-16). A comparison of the January surveys to these July surveys indicates that over-wintering populations have left the 4Vn area by July.

In September of 1994-95, bottom trawl surveys indicated low abundance of herring in 4Vn compared to January levels, with herring primarily found in the southern portion (Fig. 17). These surveys occurred in the second half of September and indicate that the winter migration of 4T had not begun.

Acoustic surveys in 4Vn from September to November indicate that the 4T migration has consistently advanced after November 1. In some years, the migration appears to make an appreciable start by mid-October but in other years this is not the case (Table 12). Two years, 1991 and 1992, were the peak abundance years for the 4T stock, yet the abundance in 4Vn by mid-October in these years was very different (Table 12). A comparison of 1995, when the acoustic survey was in 4Vn at the end of September, and 1996 in mid-October, indicate a biomass four times higher in 1996 than 1995, supporting a mid-October and later migration of 4T herring into 4Vn (Table 13).

The major biomass concentration during October and November north of the Cape Dauphin Line are in Aspy Bay, with smaller concentrations off St. Anns Bank (Fig. 18). In some years, herring schools are also found on the Gulf of St. Lawrence side of Cape Breton during October and November (Fig. 18). Offshore bottom trawl surveys during October from 1979-1984, observed few herring in deeper water (Fig. 19). This lack of herring in deeper water at this time of year is consistent with oberservations during the acoustic surveys for offshore strata.

These results indicate that 4T herring probably begin their migration around the middle of October, but the 4T migration is consistently well established by November 1. This migration continues through to January and concentrations of 4T herring in the 4Vn area would increase as the season progresses.

Observations that are consistent with the migration beginning around the middle of October are the decline in size of fish caught in the Chaleur Bay purse seine fishery around the middle of October and the increase of size of herring in 4Vn during 1995 (Tables 14, 15).

Catch Composition

Fall Spawners: A comparison of the age composition of 4T fall spawner population with the 4Vn fall spawner purse seine catch indicates that the dominant ages and year-classes correspond between these two matrices from 1992 to 1996 (Fig. 20). The exception is that 11+ herring in the purse seine catch were a higher percentage of the purse seine catch than in the population from 1992 to 1995 (Fig. 20). A similar correspondance between dominant year-classes is observed in comparisons among the 4T fall spawner mobile and fixed gear catch-at-age matrices and the 4Vn purse seiner catch (Fig. 21).

In 1996, some sampling was done from local fixed gear fisheries in Neils Harbour and small purse seines and trapnets in Aspy Bay at the same time that the purse seiners were fishing in Aspy Bay. Age compositions of these catches were quite different from those of the purse seiners for fall spawners (Fig. 22).

These results are consistent with the hypothesis that the majority of the fall spawners 4Vn purse seine catch is from herring of 4T origin. The higher percentage of older fish in the catch than expected from the 4T population indicates that a mixture of stock components may be in the catch.

Spring Spawners: A comparison of 4T spring spawner population age structure and spring spawner catches in the 4Vn purse seine catch indicate the same year class dominating both catch matrices for 1994 to 1996, but not 1992 and 1993 (Fig. 23). The 1991 year-class (5 year-olds) dominanted in 4Vn and 4T mobile and 4T fixed gear spring spawner catches in 1996 (Fig. 24).

A comparison of the spring spawners caught in the Bras d'Or lakes in 1996 to catches of spring spawners in 4T mobile and fixed gear and by 4Vn purse seiners indicates that different year-classes are important in the the Bras d'Or lake catch compared to the 4T and 4Vn purse seine catches (Fig. 25).

Spring stocks likely to be harvested originate in 4T and locally, including the Bras d'Or lakes. Spring spawning herring are about 25% of the 4T population. As a result, harvest of spring 4T herring could occur in 4Vn as well those of local origin.

From 1992-1995 the catch of spring spawners ranged from 4-9% (by weight) in this fishery (Table 3) and catches occurred primarily in Aspy Bay. At these levels, and because of the fishing location, risk of excessive harvest of local Bras d'Or lake spring stocks was miminal. In 1996, catches of spring spawners were 6% or less when the season began in Aspy Bay and increased to 13 to 22% from mid-November to Dec. 1. Percentage of spring spawners increased to 32% when fishing occurred near St. Ann's Bay on Dec. 3-4 (Table 4).

The catch of 167 tonnes of spring spawners on Dec. 3-4 raised concern because of its proximity to Bras d'Or Lakes and the time of year. Samples were collected and otoliths examined to determine stock origin from qualitative characteristics. Scientific staff from Moncton and St. Andrews participated in this indentification. It was possible to identify 64 tonnes as originating

from 4T spring spawners but the remainder could not be positively identified as Bras d'Or or 4T originating herring (Table 16).

The size of the Bras d'Or stock is unknown. If all herring whose origin could not be positively identified were of Bras d'Or origin then this could represent a substantial increase in harvest of that stock. For example, about 160 tonnes were harvested in the spring of 1996 for bait from that stock (Denny et al. 1997).

A comparison of spring spawners caught by 4Vn purse seiners when fishing in Aspy Bay and Neils Harbour compared to those caught when fishing near St. Ann's Bay indicates a similarity in age structure (Fig. 26). These catches are dissimilar from those caught in Bras d'Or lakes (Fig. 26). A comparison of age structure of fish identified as 4T origin from the St. Ann's Bay catch and those that could not be identified as 4T or Bras d'Or lakes indicates that ages 5 and 6 predominate in both groups but not age 7 as in the Bras d'Or catch (Fig. 26).

These results are not consistent with the worse case scenario of the St. Ann's Bay catch of Dec. 3-4 that all 100 tonnes of spring spawners of unknown origin were from the Bras d'Or lake stock.

Acknowledgements

Colin MacDougall and Mike Power identified otolith origins. Colin MacDougall, Clarence Bourque, and Jim Fennel were responsible for field and laboratory processing of large seiner samples. A special thanks to Mike Power for supplying the 4Vn bottom trawl survey data.

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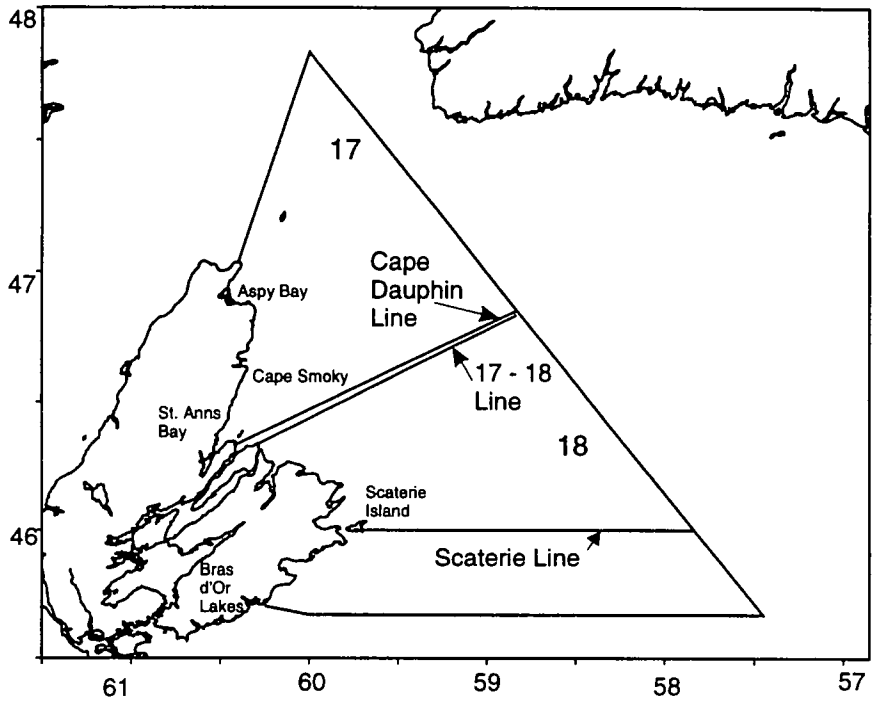

Fig. 1. Areas and lines demarcating fishing zones in 4Vn.

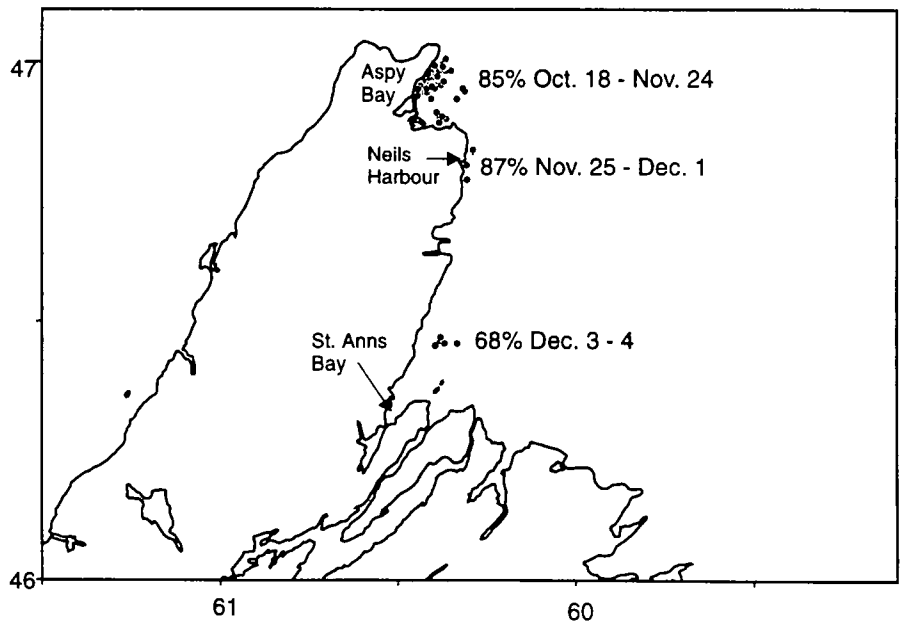

Fig. 2. Percentage of fall spawners in large seiner catch by date and area in 4Vn, 1996.

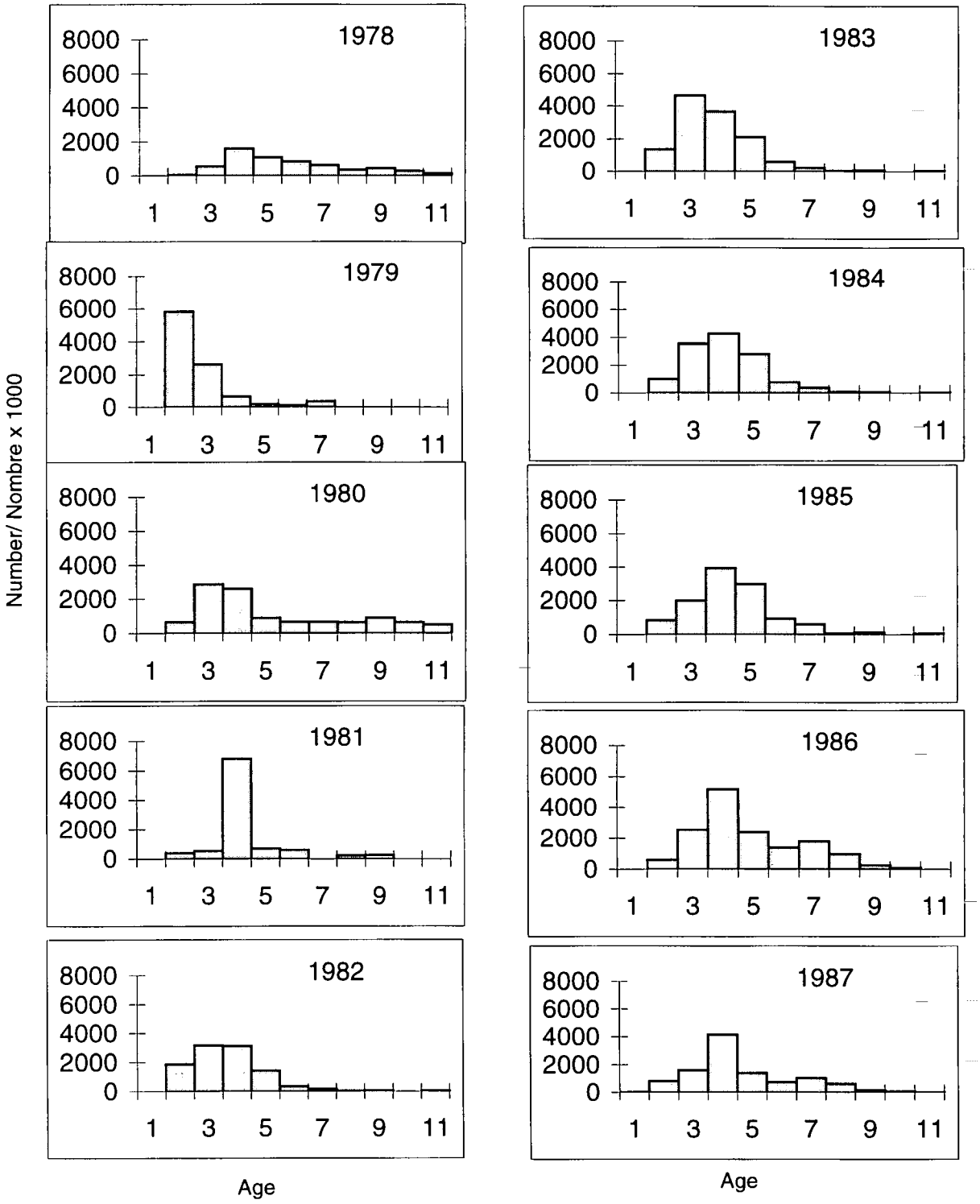

Fig. 3. Fall spawner catch at age by year for large seiners in 4Vn.

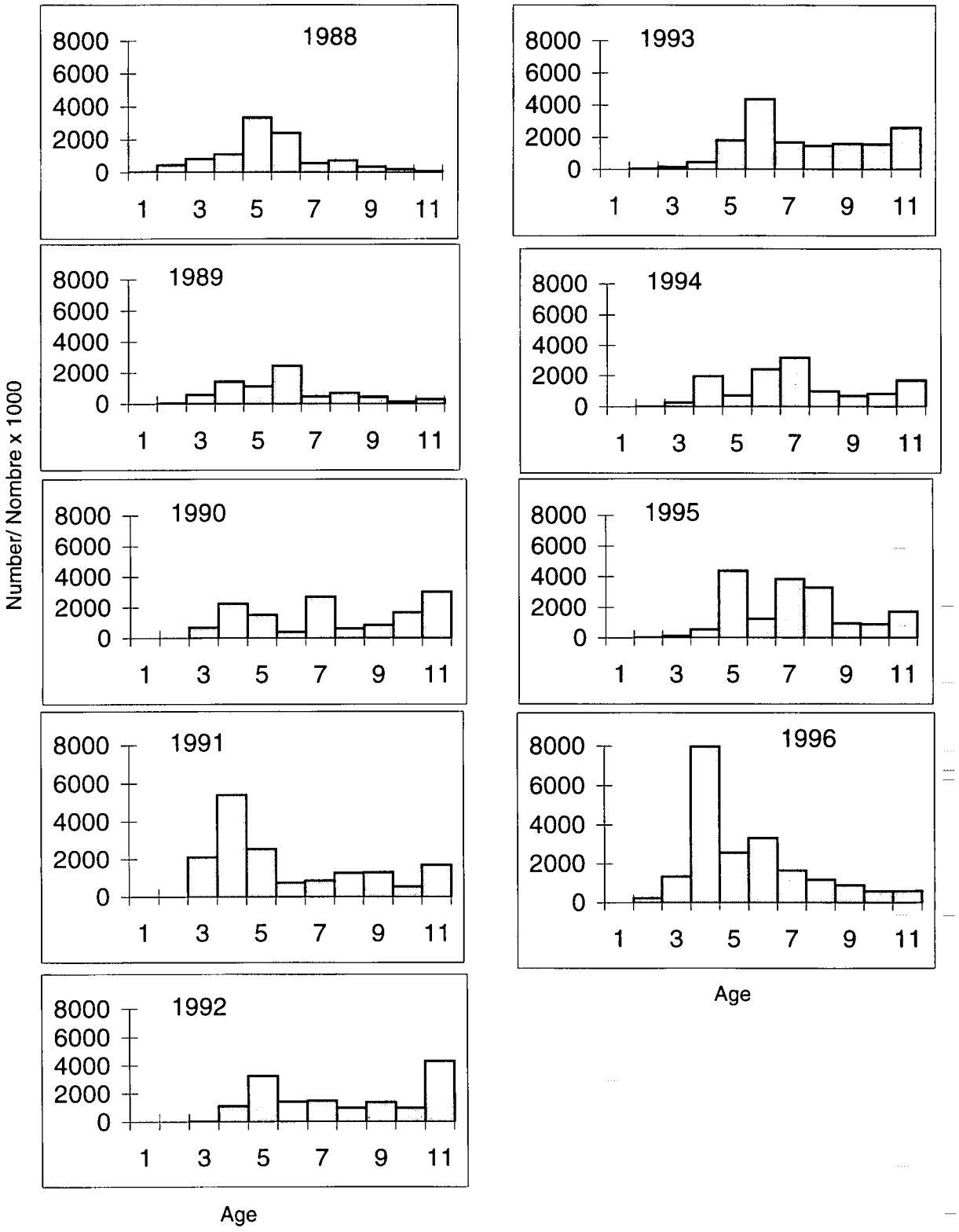

Fig. 3 (cont). Fall spawner catch at age by year for large seiners in 4Vn.

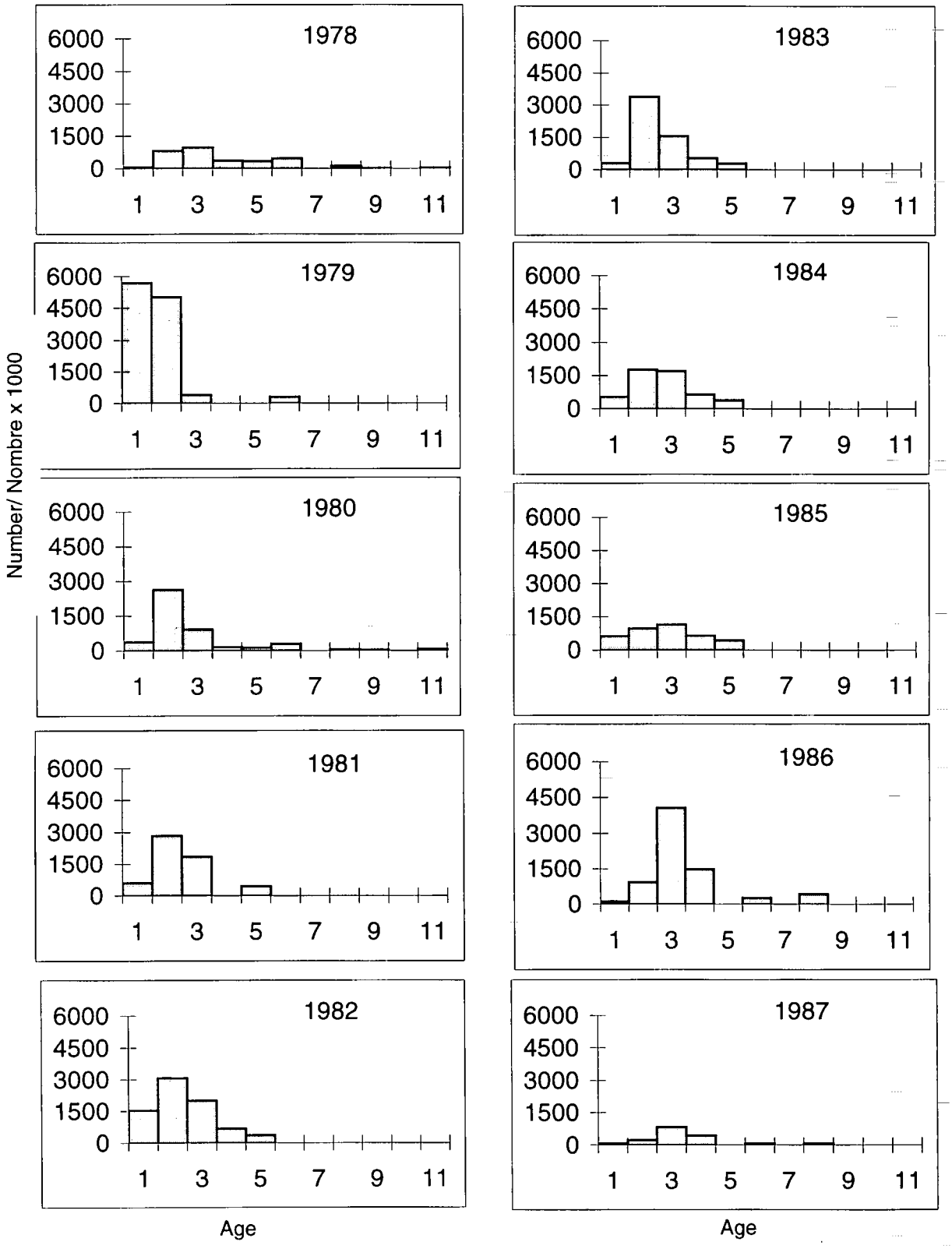

Fig. 4. Spring spawner catch at age by year for large seiners in 4Vn.

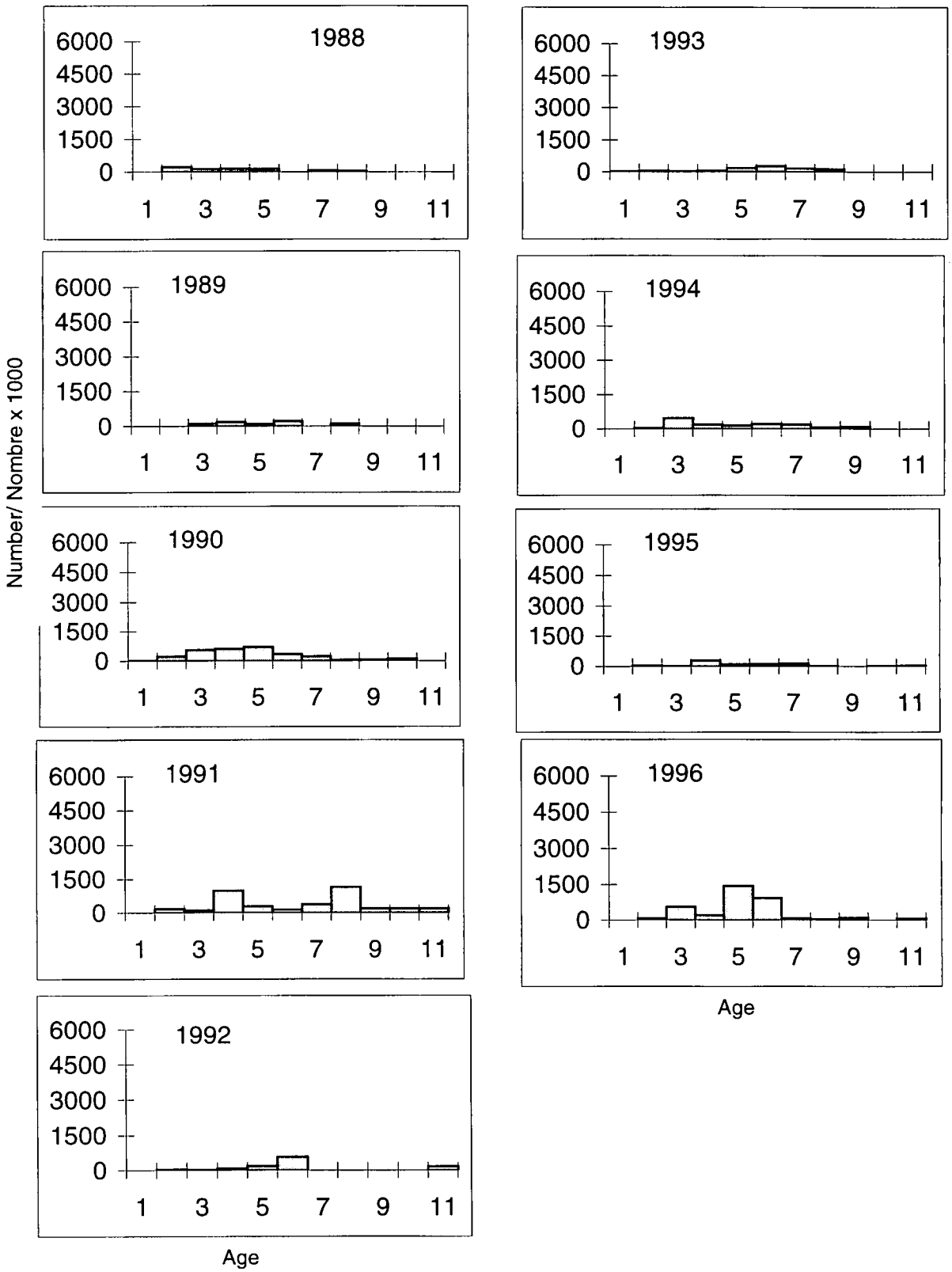

Fig. 4 (cont). Spring spawner catch at age by year for large seiners in 4Vn.

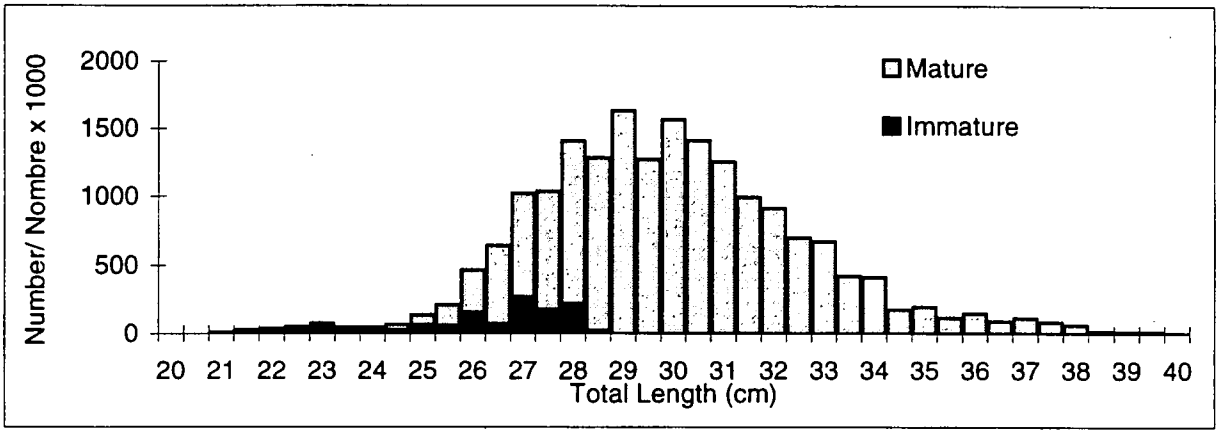

Fig. 5. Length frequency distribution of total catch by large seiners in 4Vn, 1996.

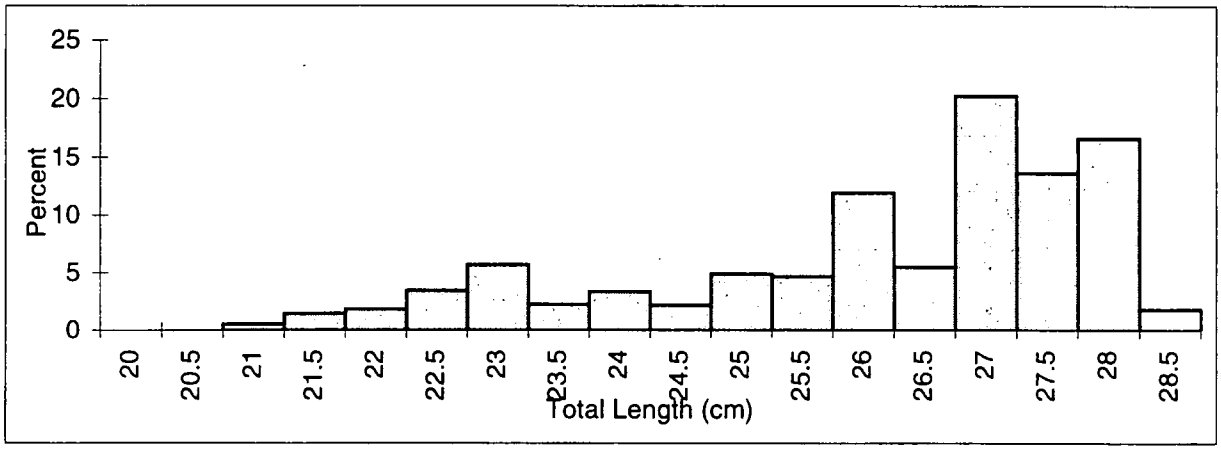

Fig. 6. Length frequency distribution of immature fall spawning herring caught by large seiners in 4Vn, 1996.

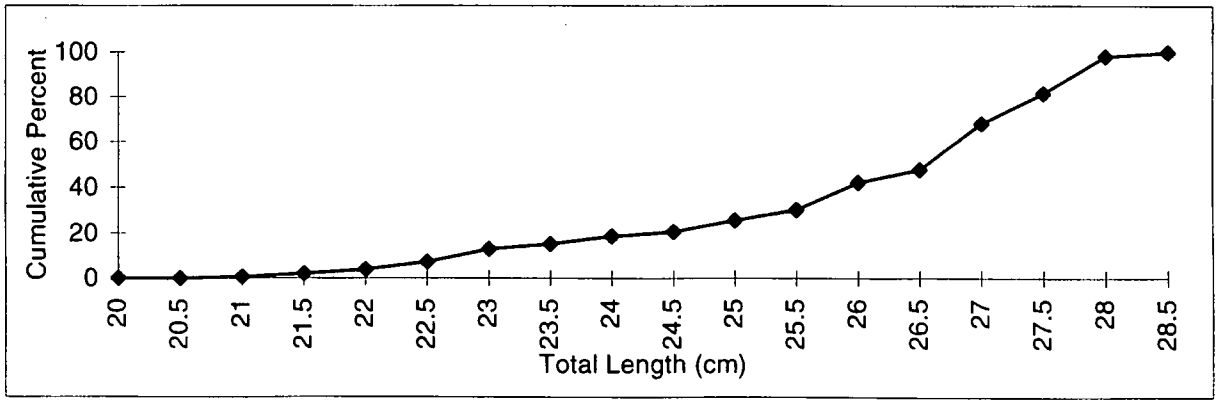

Fig. 7. Cumulative percentage at length for total catch of immature herring by large seiners in 4Vn, 1996.

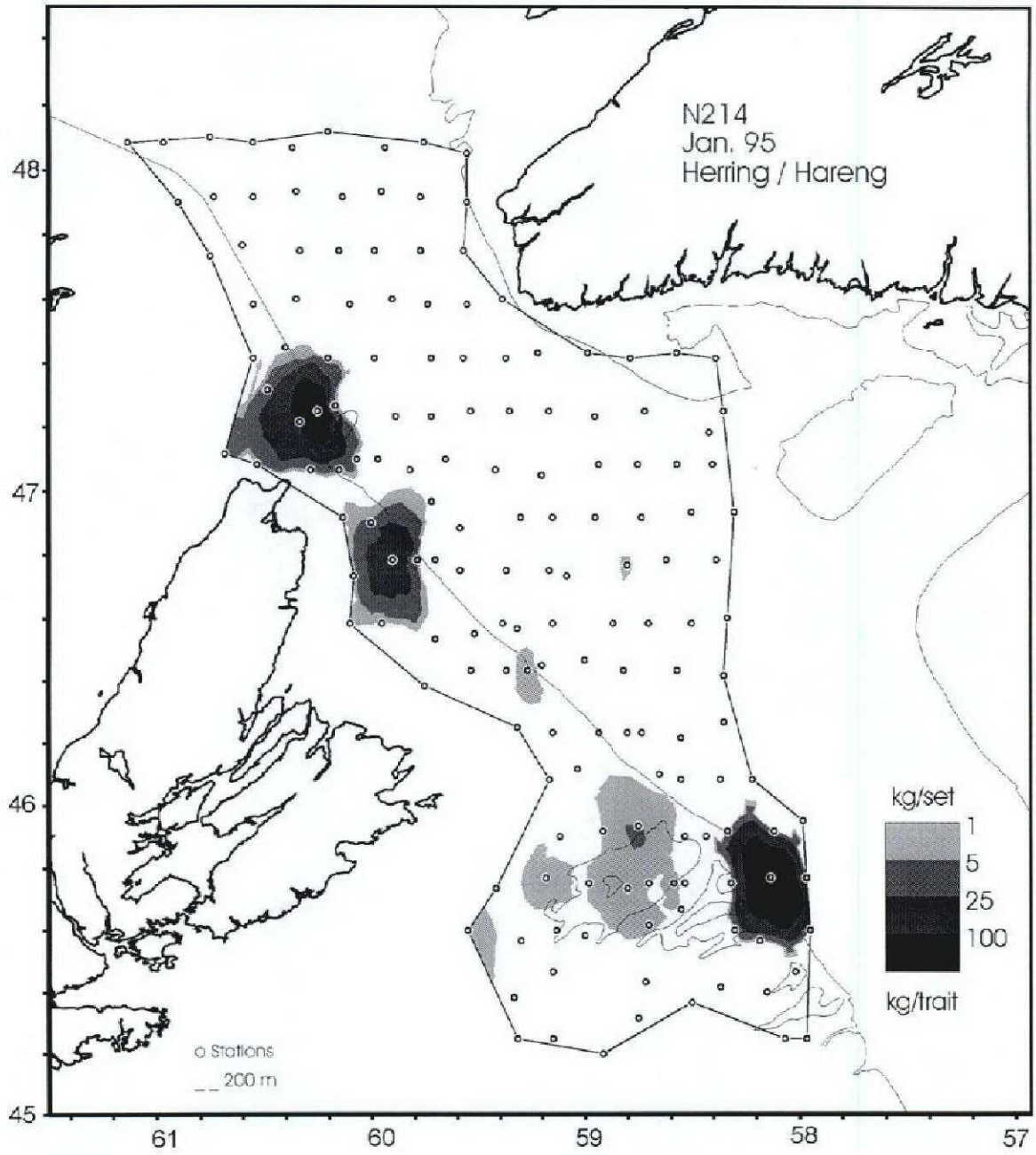

Fig. 8. Distribution of herring during the January 1995 bottom trawl survey in 4Vn.

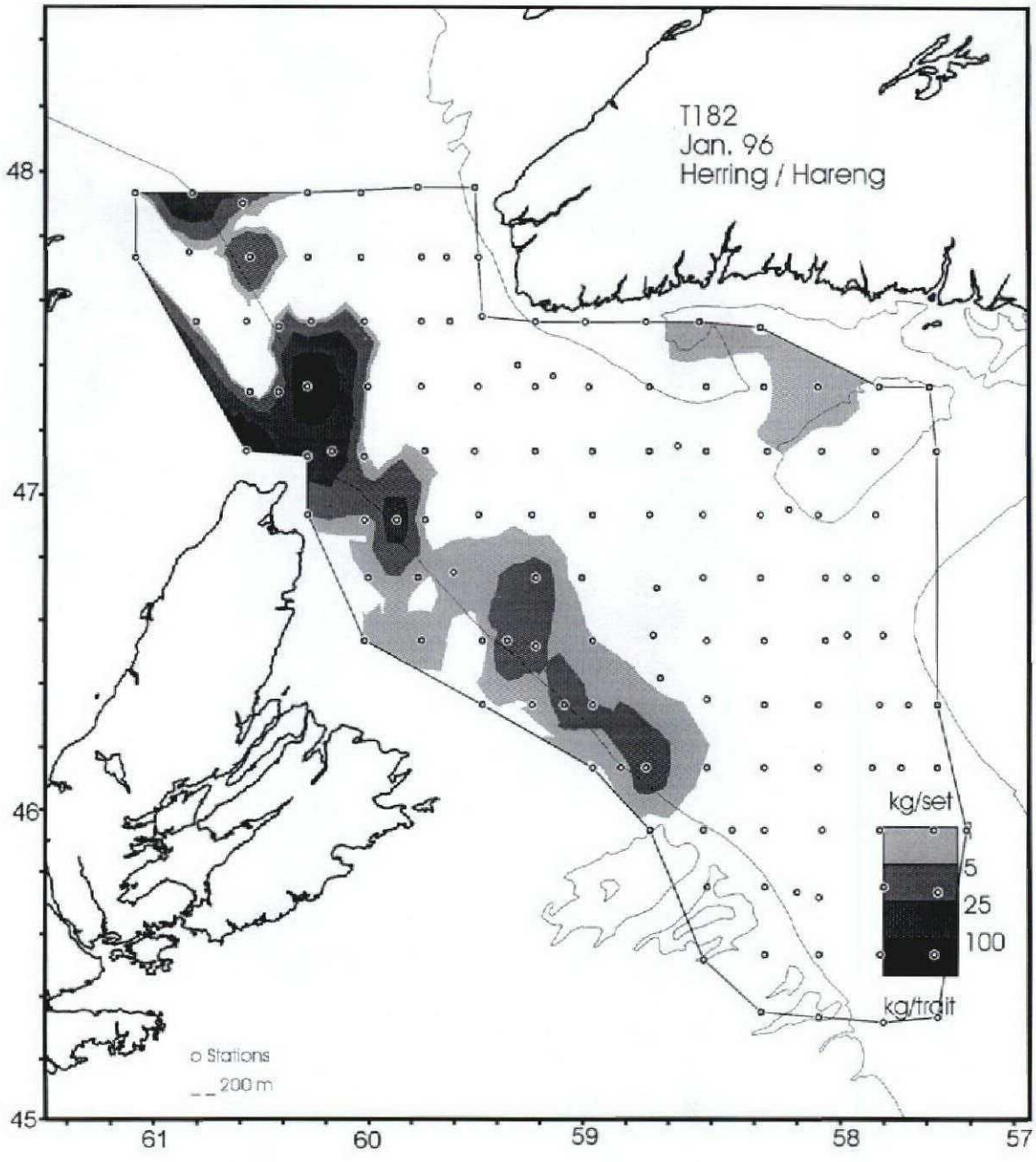

Fig. 9. Distribution of herring during the January 1996 bottom trawl survey in 4Vn.

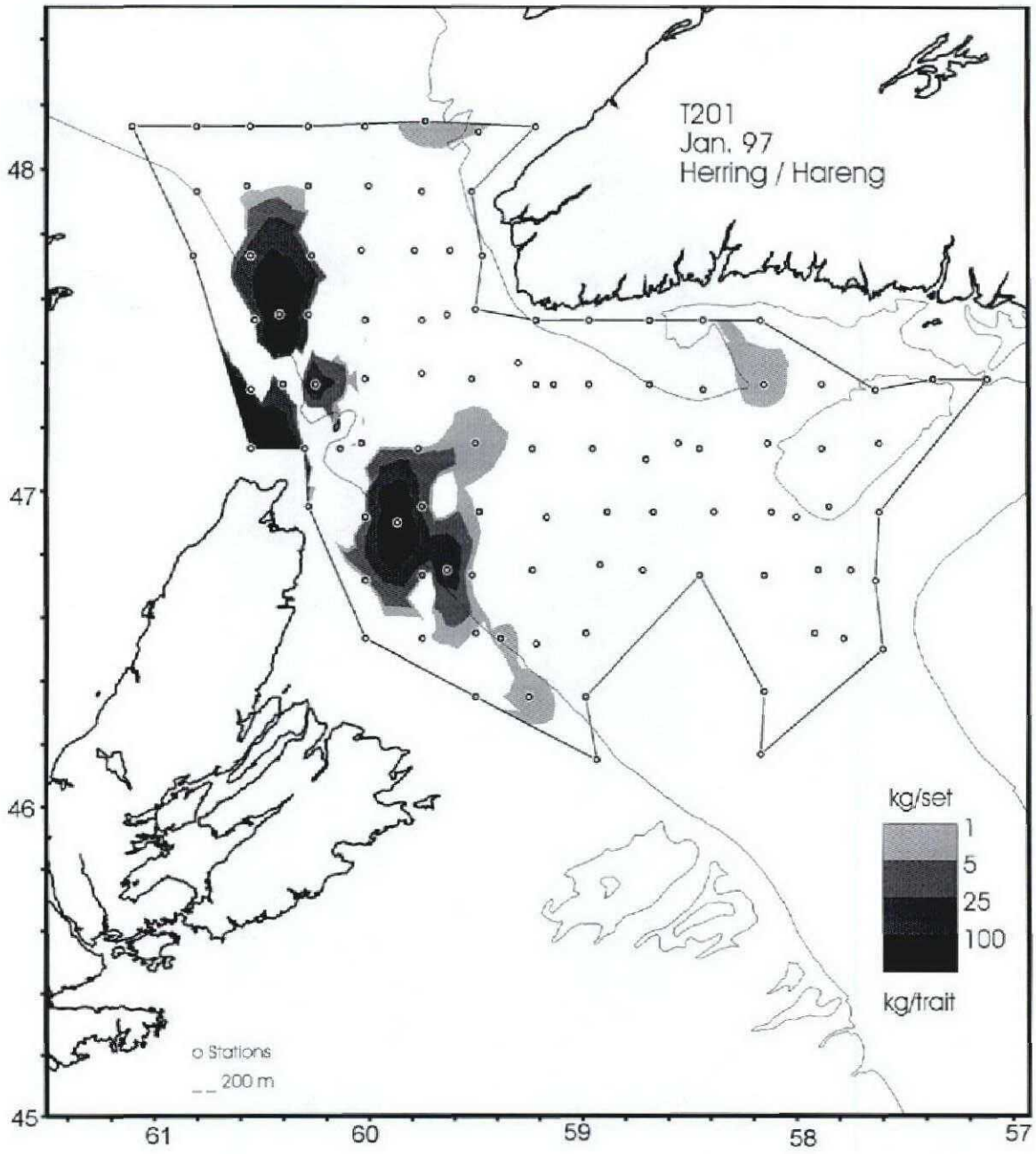

Fig. 10. Distribution of herring during the January 1997 bottom trawl survey in 4Vn.

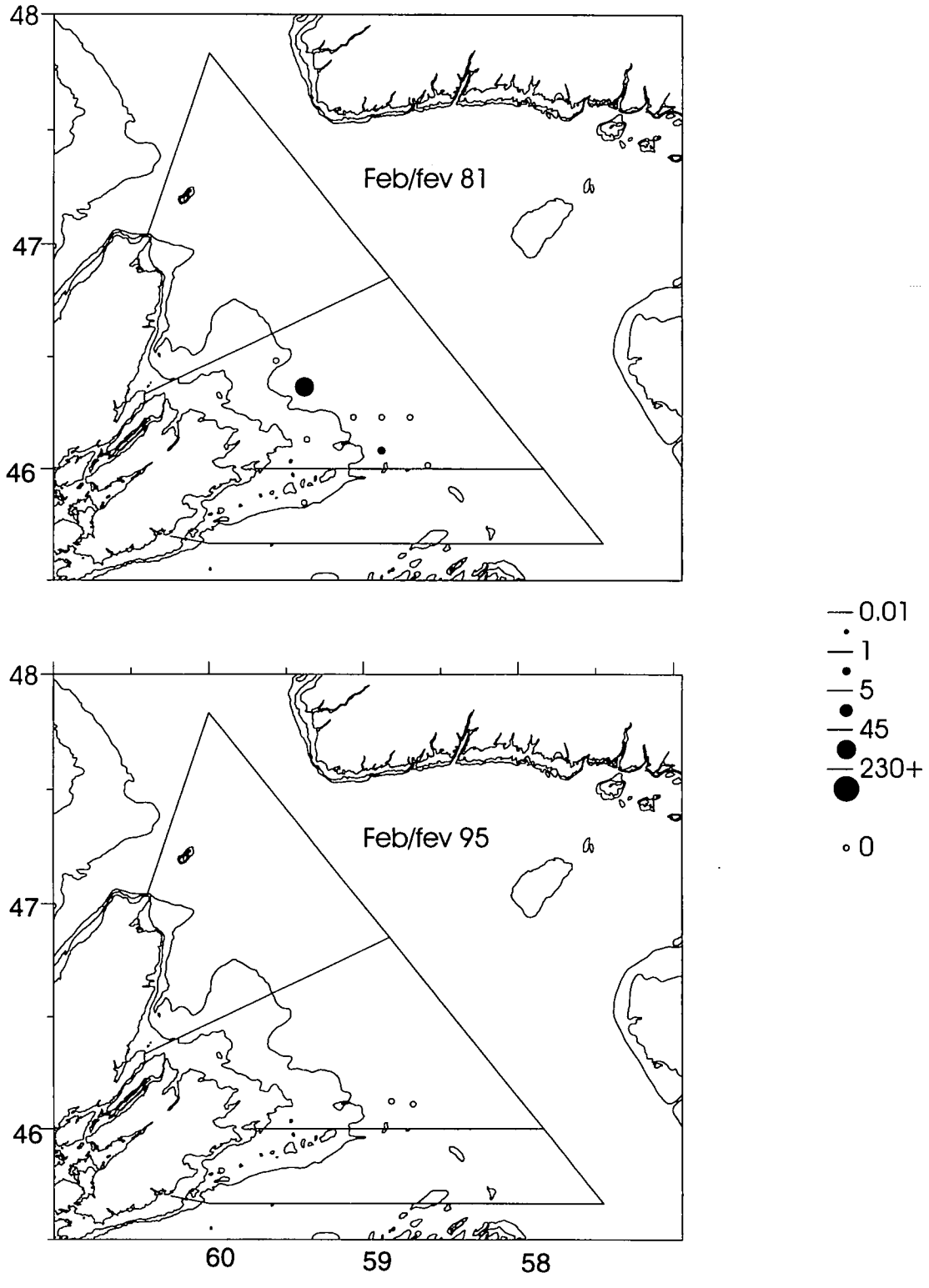

Fig. 11. Distribution of herring during February bottom trawl surveys in 4Vn 1981, 1995. Offshore lines are 50 and 100 m depth contours. Units are kg/standard tow. Cape Dauphin and Scaterie Lines are as in Fig. 1.

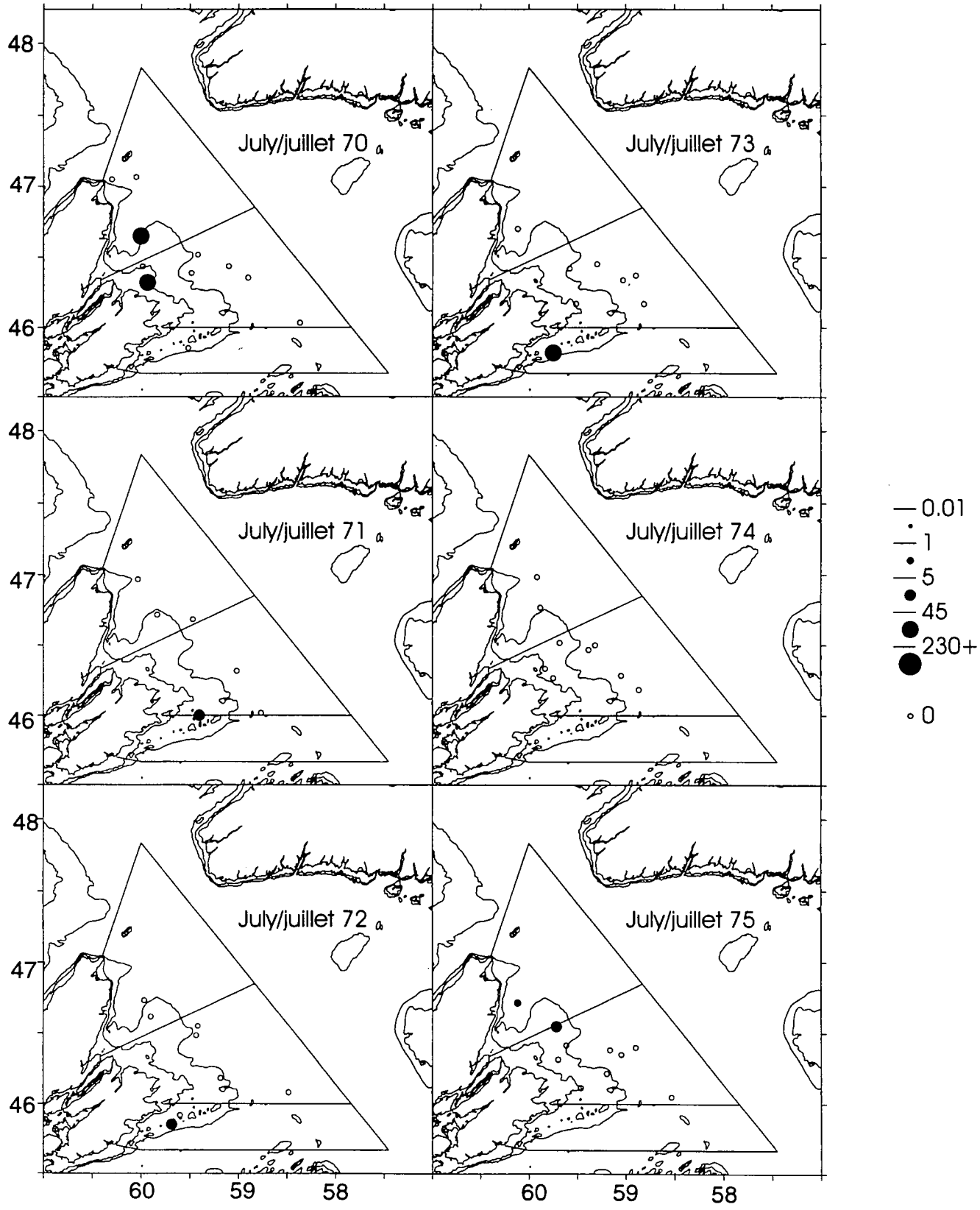

Fig. 12. Distribution of herring during July bottom trawl surveys in 4Vn, 1970-75. Offshore lines are 50 and 100 m depth contours. Units are kg/standard tow. Cape Dauphin and Scaterie Lines are as in Fig. 1.

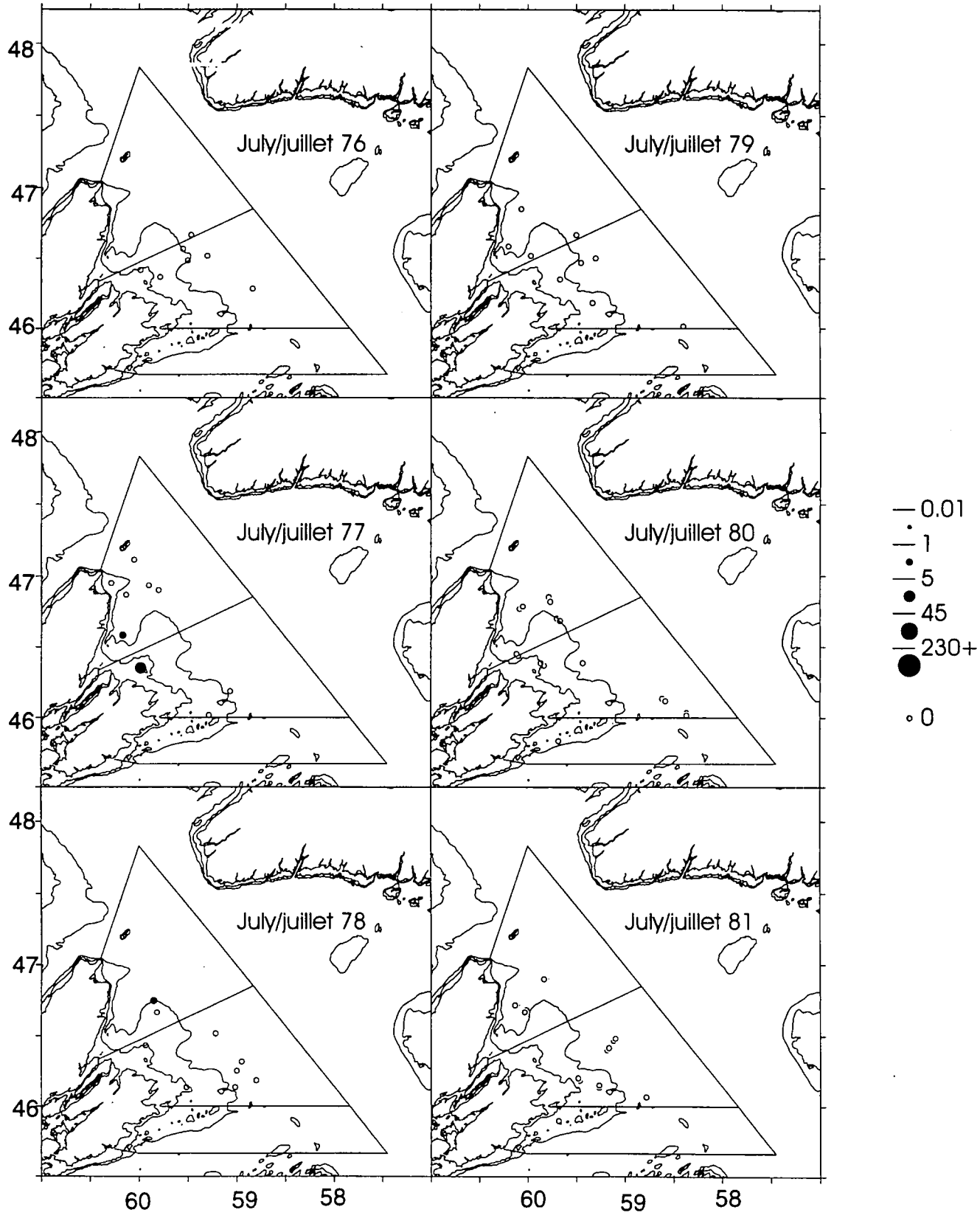

Fig. 13. Distribution of herring during July bottom trawl surveys in 4Vn, 1976-81. Offshore lines are 50 and 100 m depth contours. Units are kg/standard tow. Cape Dauphin and Scaterie Lines are as in Fig. 1.

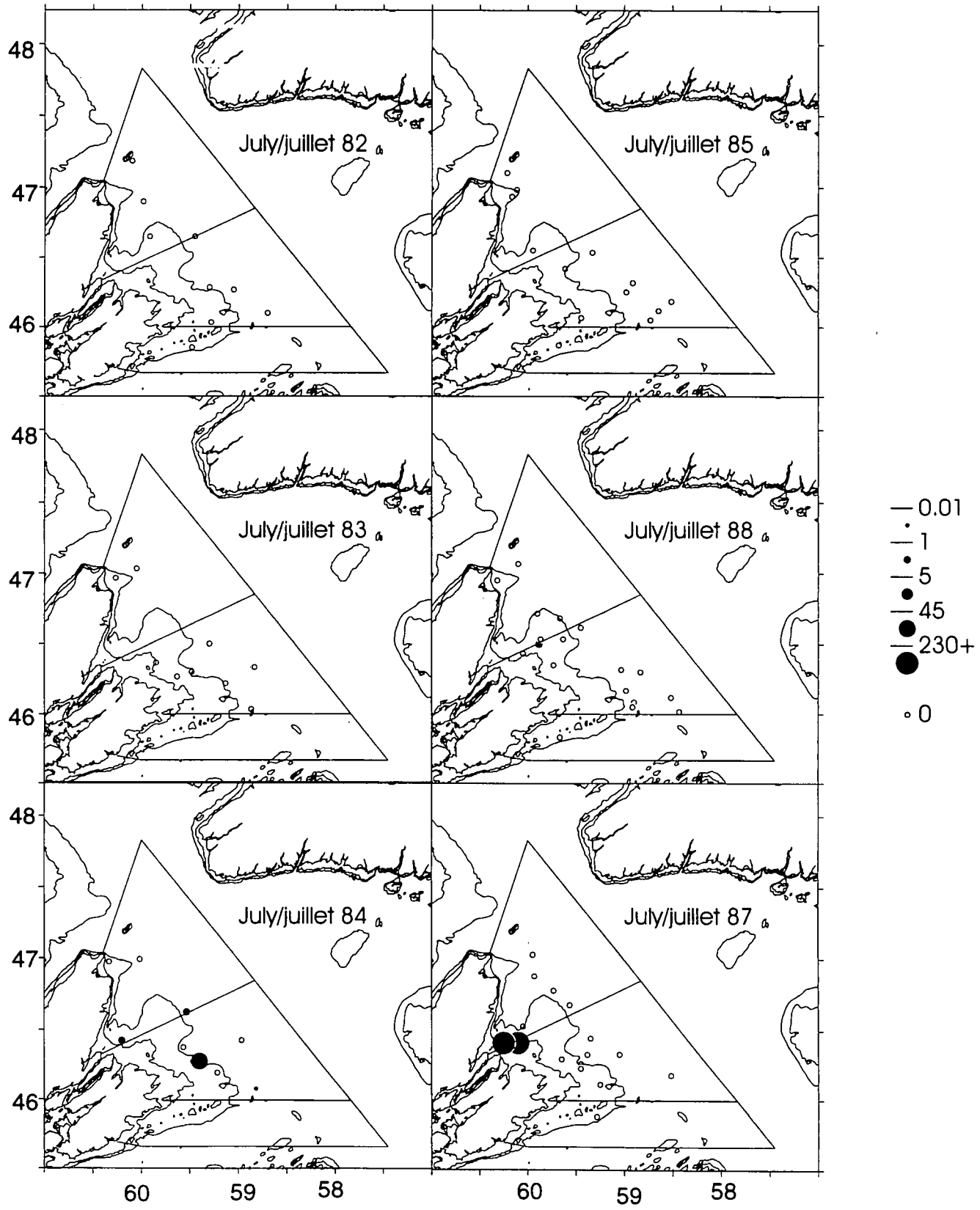

Fig. 14. Distribution of herring during July bottom trawl surveys in 4Vn, 1982-87. Offshore lines are 50 and 100 m depth contours. Units are kg/standard tow. Cape Dauphin and Scaterie Lines are as in Fig. 1.

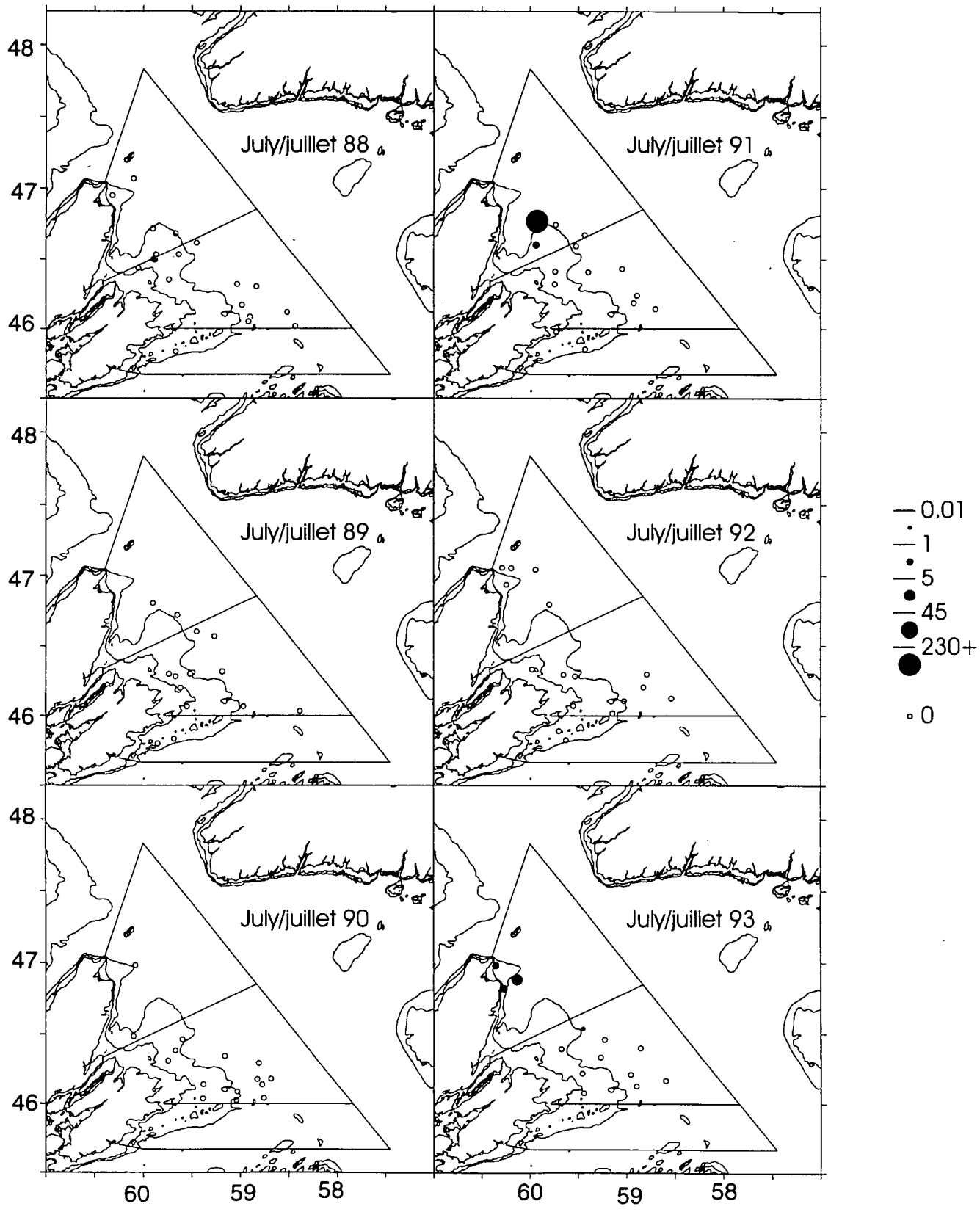

Fig. 15. Distribution of herring during July bottom trawl surveys in 4Vn, 1988-93. Offshore lines are 50 and 100 m depth contours. Units are kg/standard tow. Cape Dauphin and Scaterie Lines are as in Fig. 1.

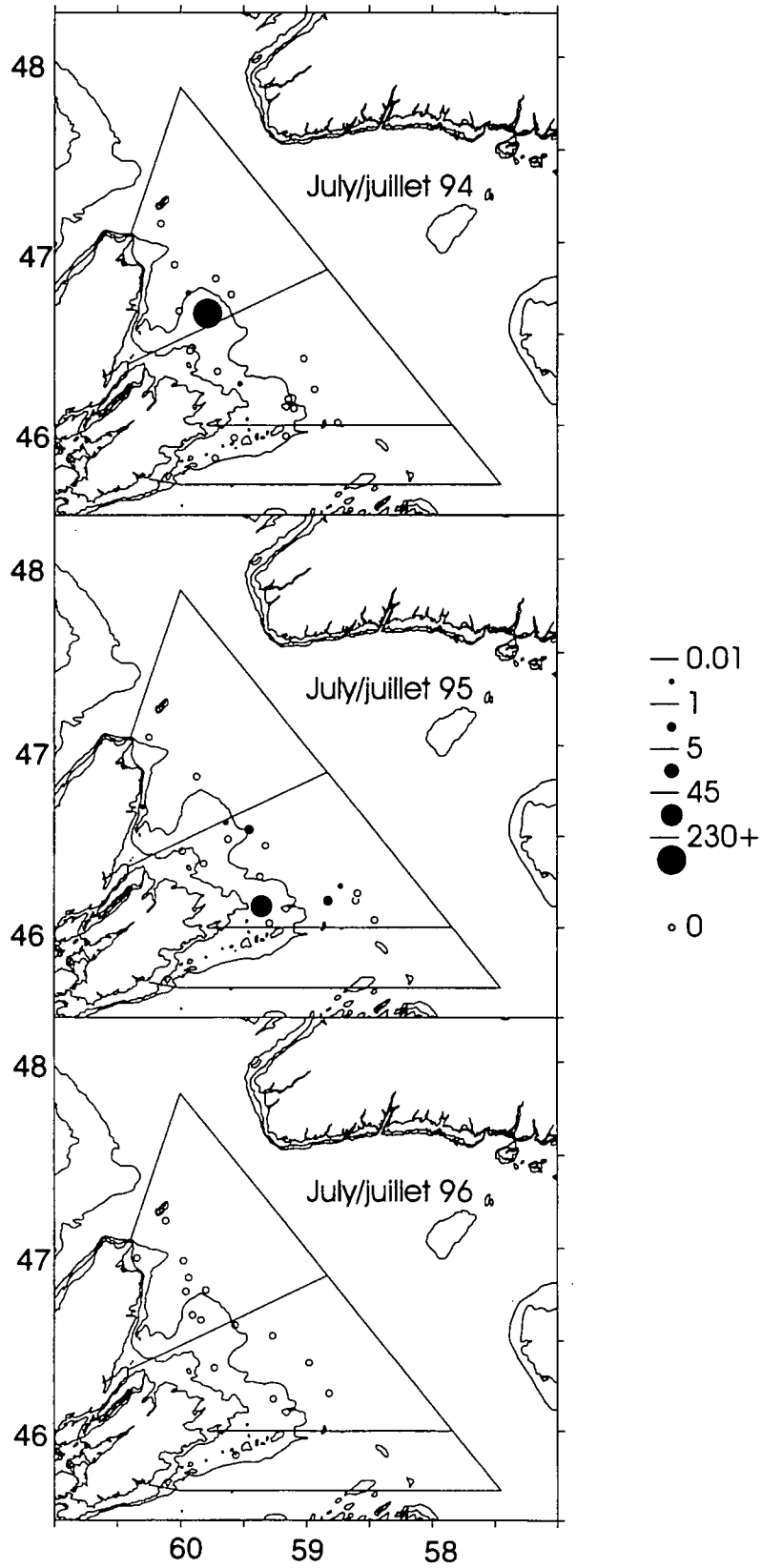

Fig. 16. Distribution of herring during July bottom trawl surveys in 4Vn, 1994-96. Offshore lines are 50 and 100 m depth contours. Units are kg/standard tow. Cape Dauphin and Scaterie Lines are as in Fig. 1.

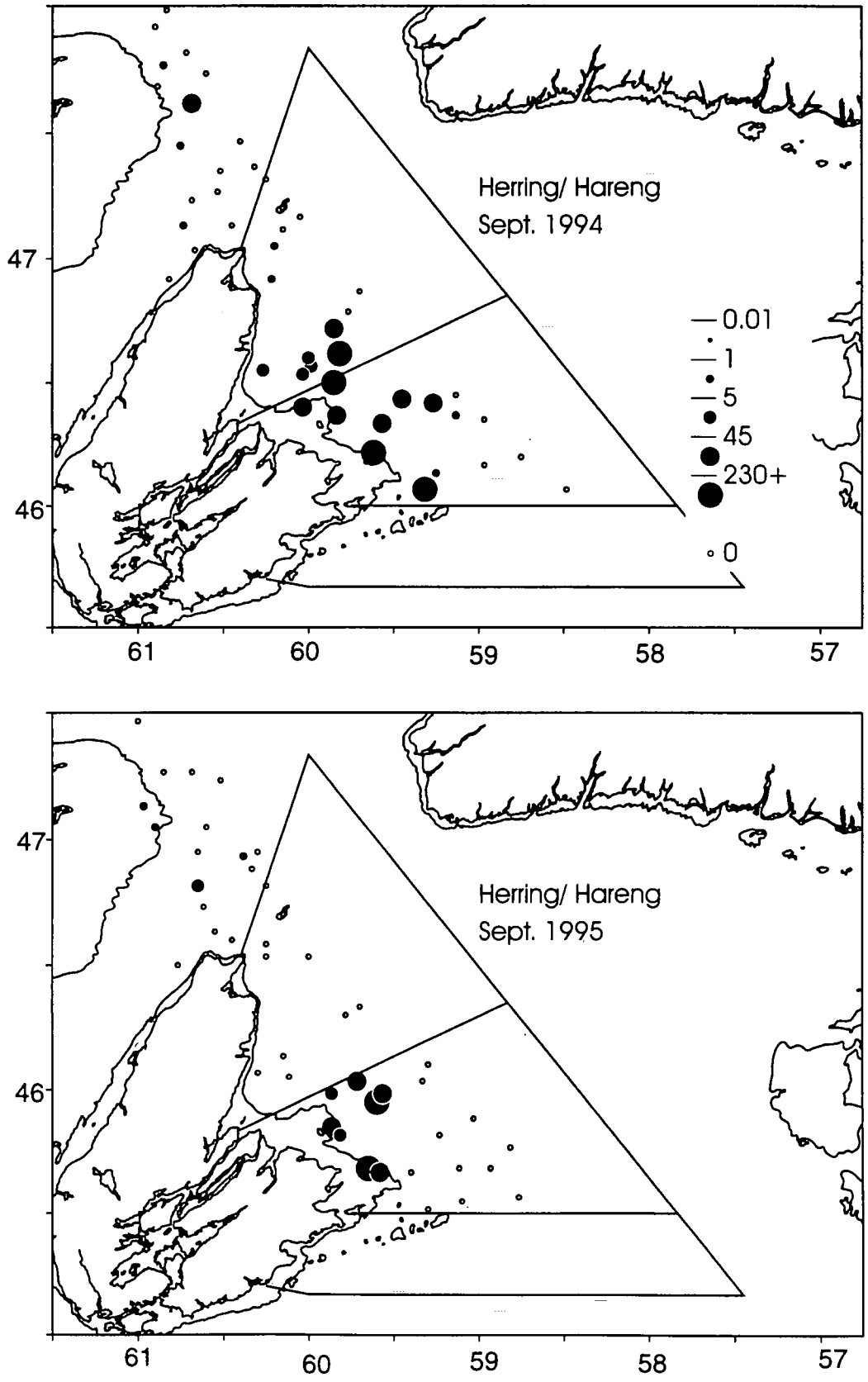

Fig. 17. Herring kg/tow from September bottom trawl surveys in 4Vn. Cape Dauphin and Scaterie Lines as in Fig. 1 are shown. Offshore line is 50 m depth contour.

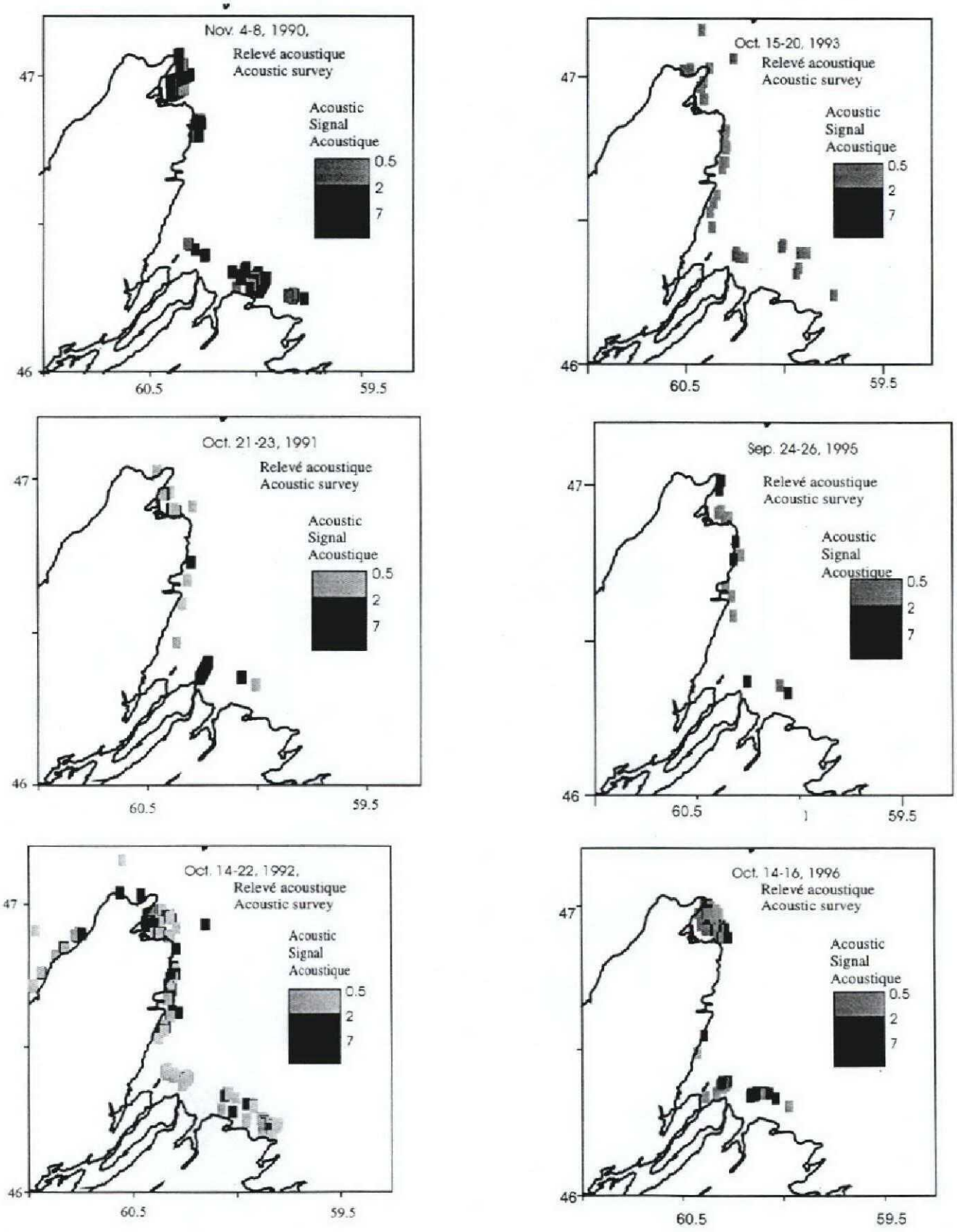

Fig. 18 . Distribution of herring during acoustic surveys from 1990 -93, 1995-96 in 4Vn. There was no survey in 4Vn during 1994.

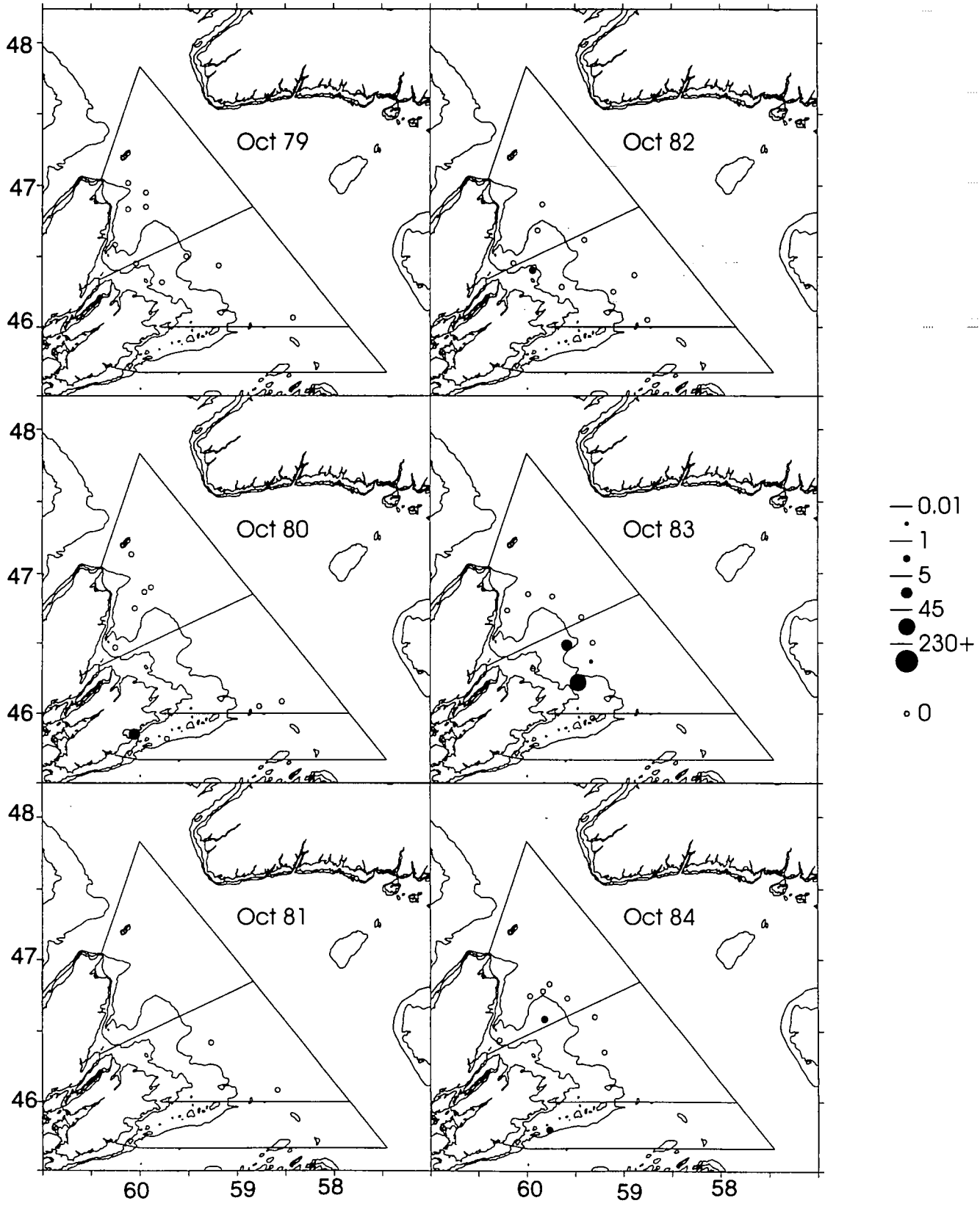

Fig. 19. Distribution of herring during October bottom trawl surveys in 4Vn, 1979-84. Offshore lines are 50 and 100 m depth contours. Units are kg/standard tow. Cape Dauphin and Scaterie Lines are as in Fig. 1.

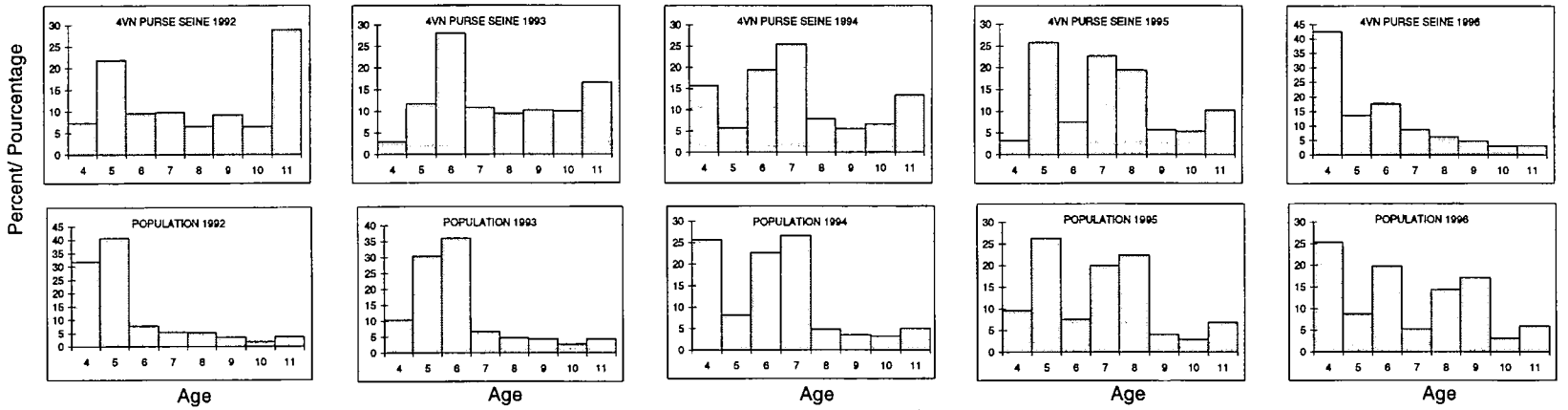

Fig. 20. Age distributions for fall spawner purse seine catch in 4Vn and fall spawner 4T population from ADAPT-VPA.

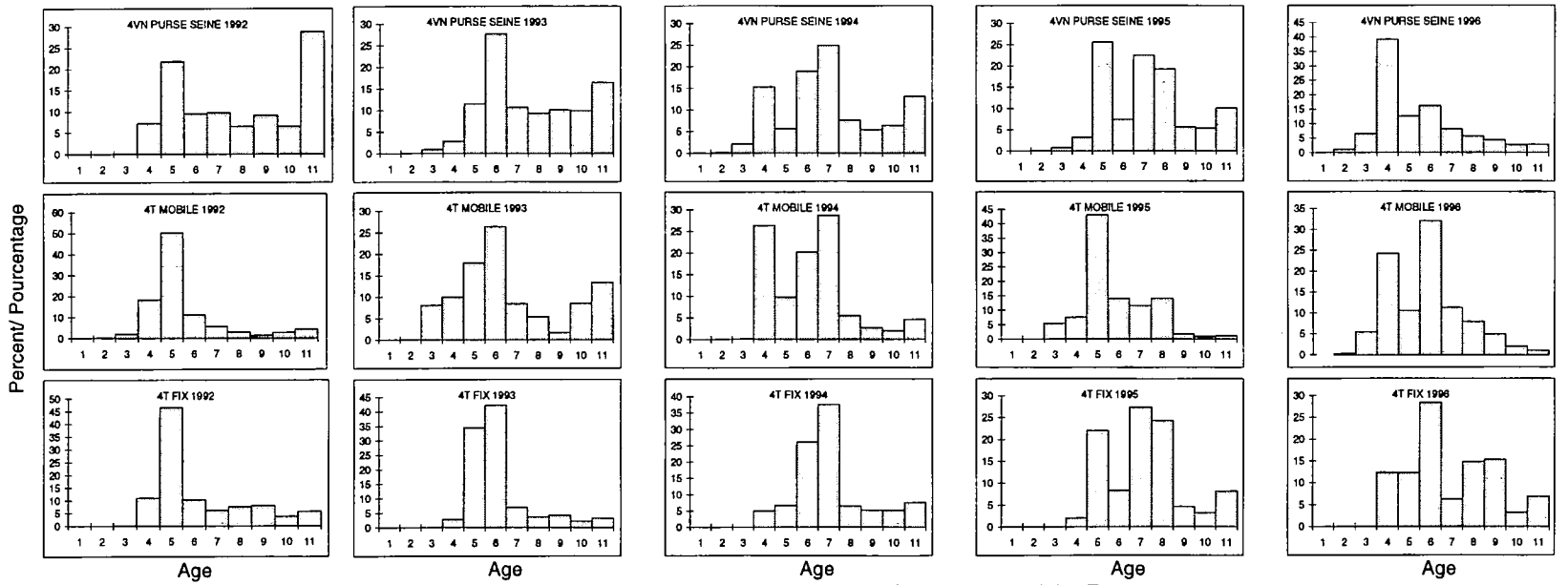

Fig. 21. Age distributions for fall spawner purse seine catch in 4Vn and 4T compared to inshore fall spawner catch in 4T.

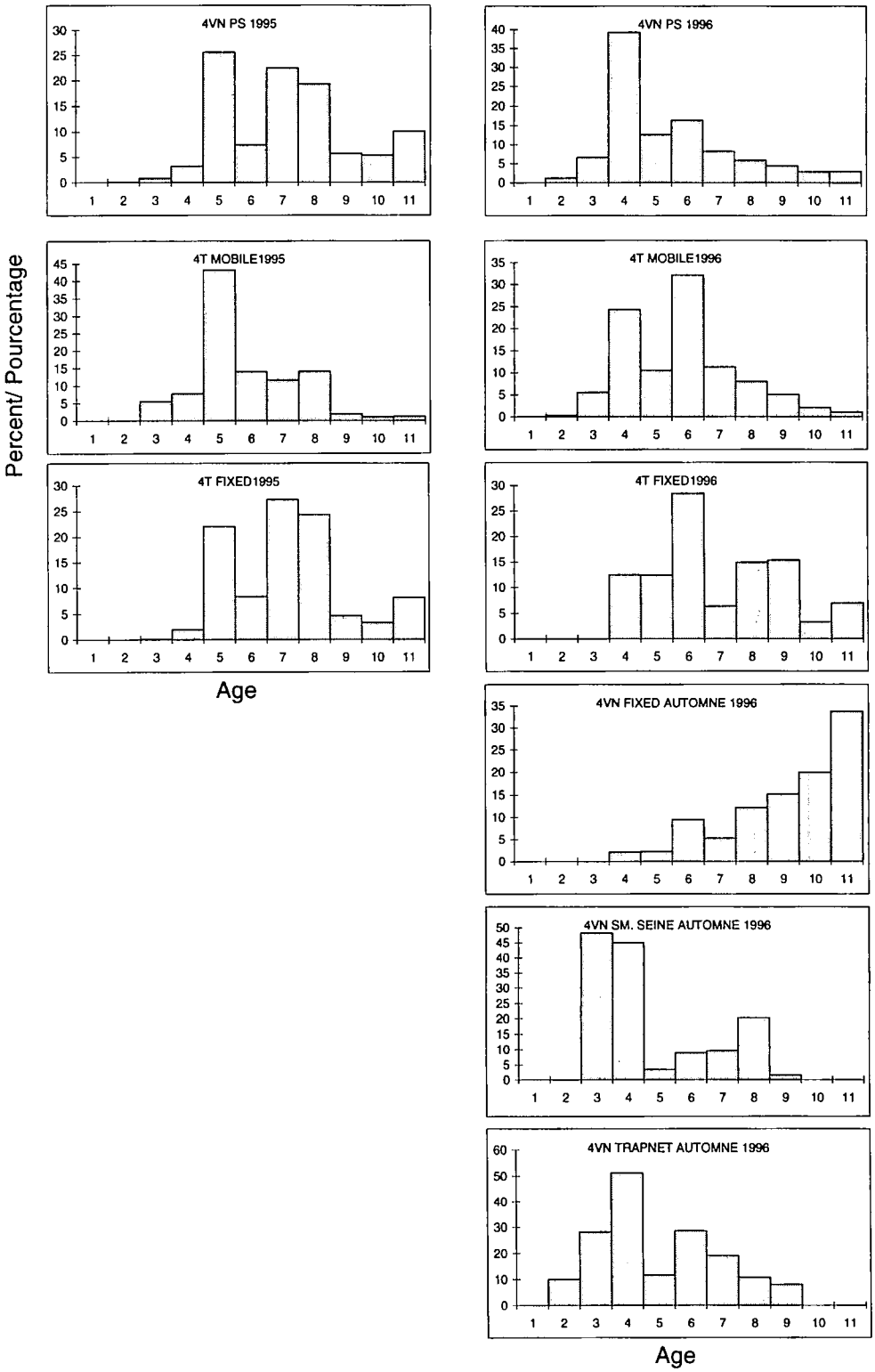

Fig. 22. Comparison of fall spawner catches in purse seine (mobile) and inshore (fixed) gears in 4T and 4Vn in 1995 and 1996.

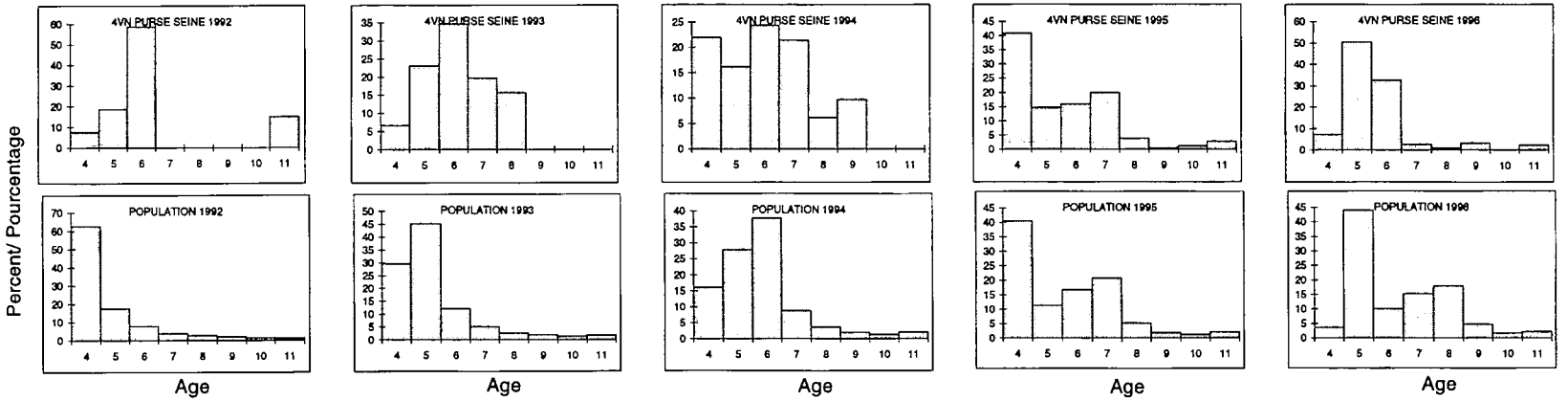

Fig. 23. Age distributions for spring spawner purse seine catch in 4Vn and spring spawner 4T population from ADAPT-VPA.

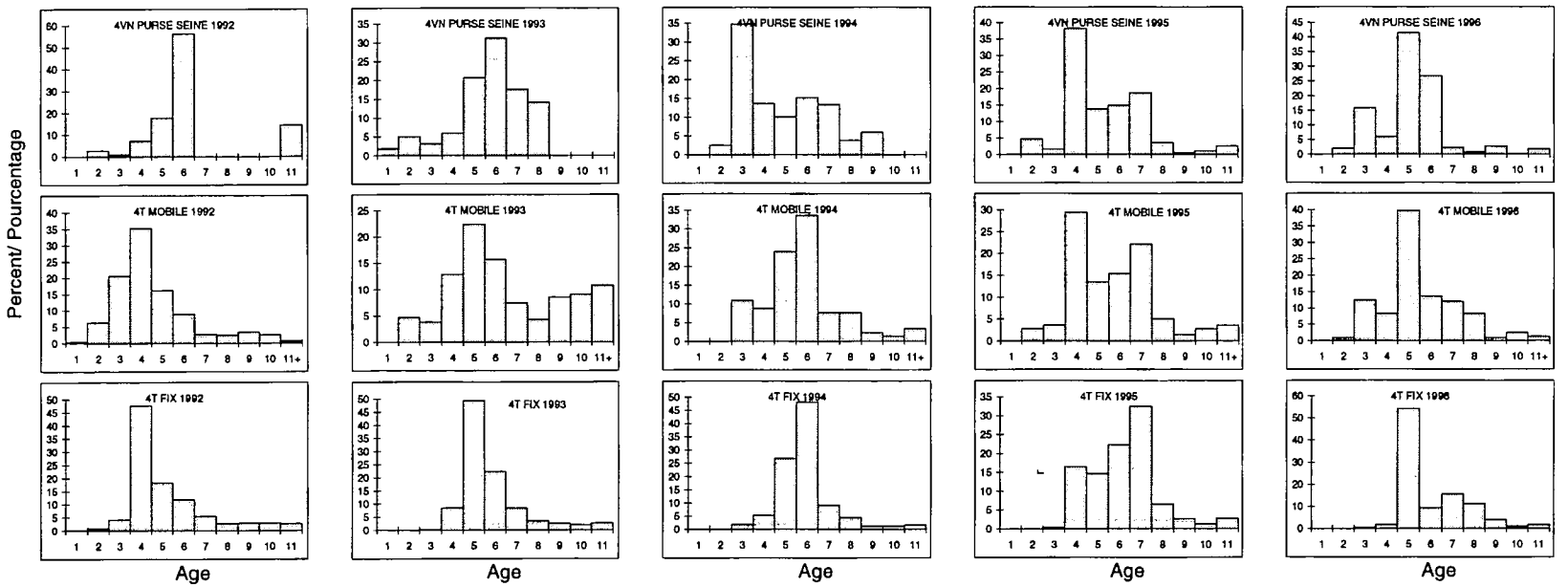

Fig. 24. Age distributions for spring spawner purse seine catch in 4Vn and 4T compared to inshore spring spawner catch in 4T.

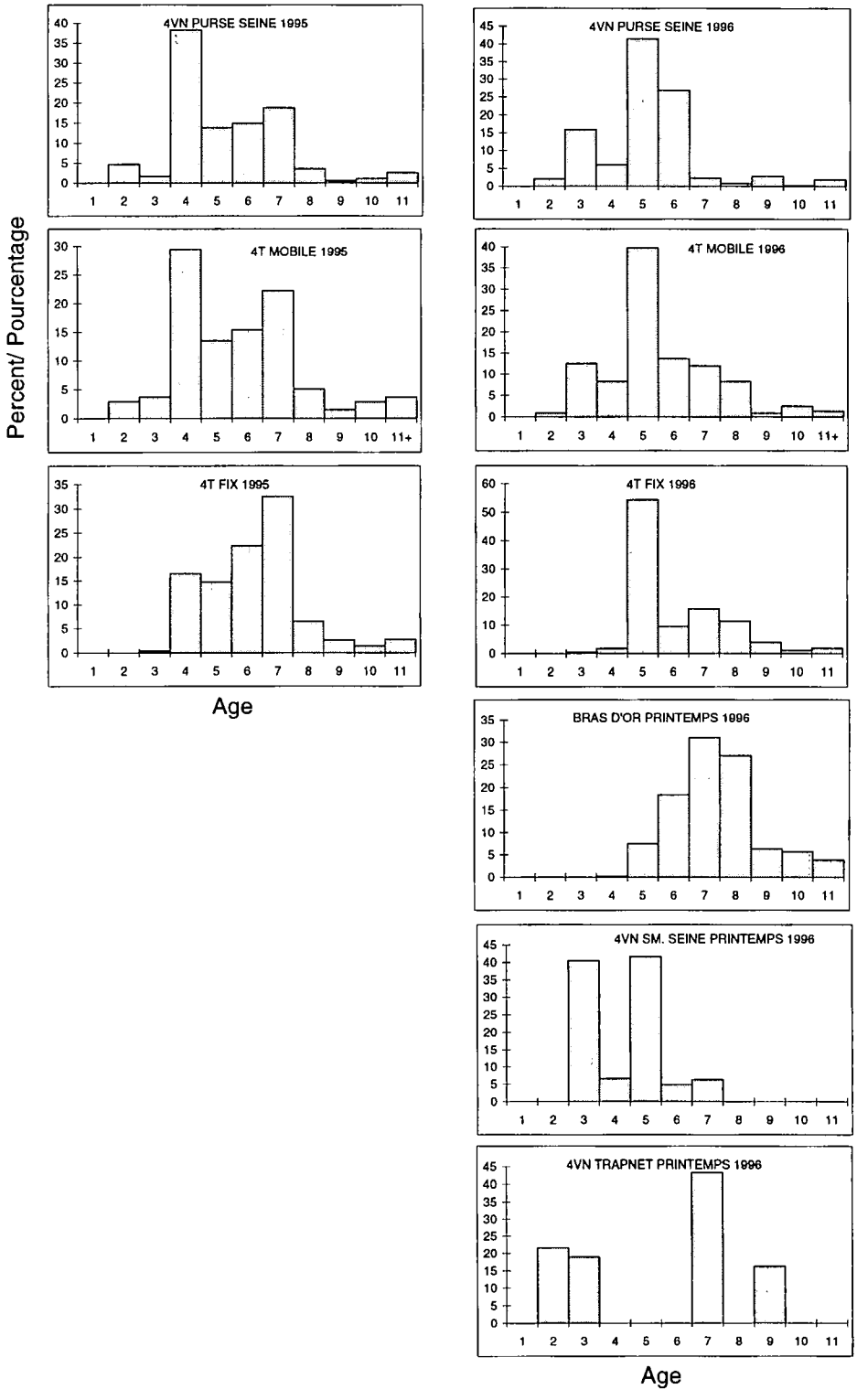

Fig. 25. Comparison of spring spawner catches in purse seine (mobile) and inshore (fixed) gears in 4T and 4Vn in 1995 and 1996.

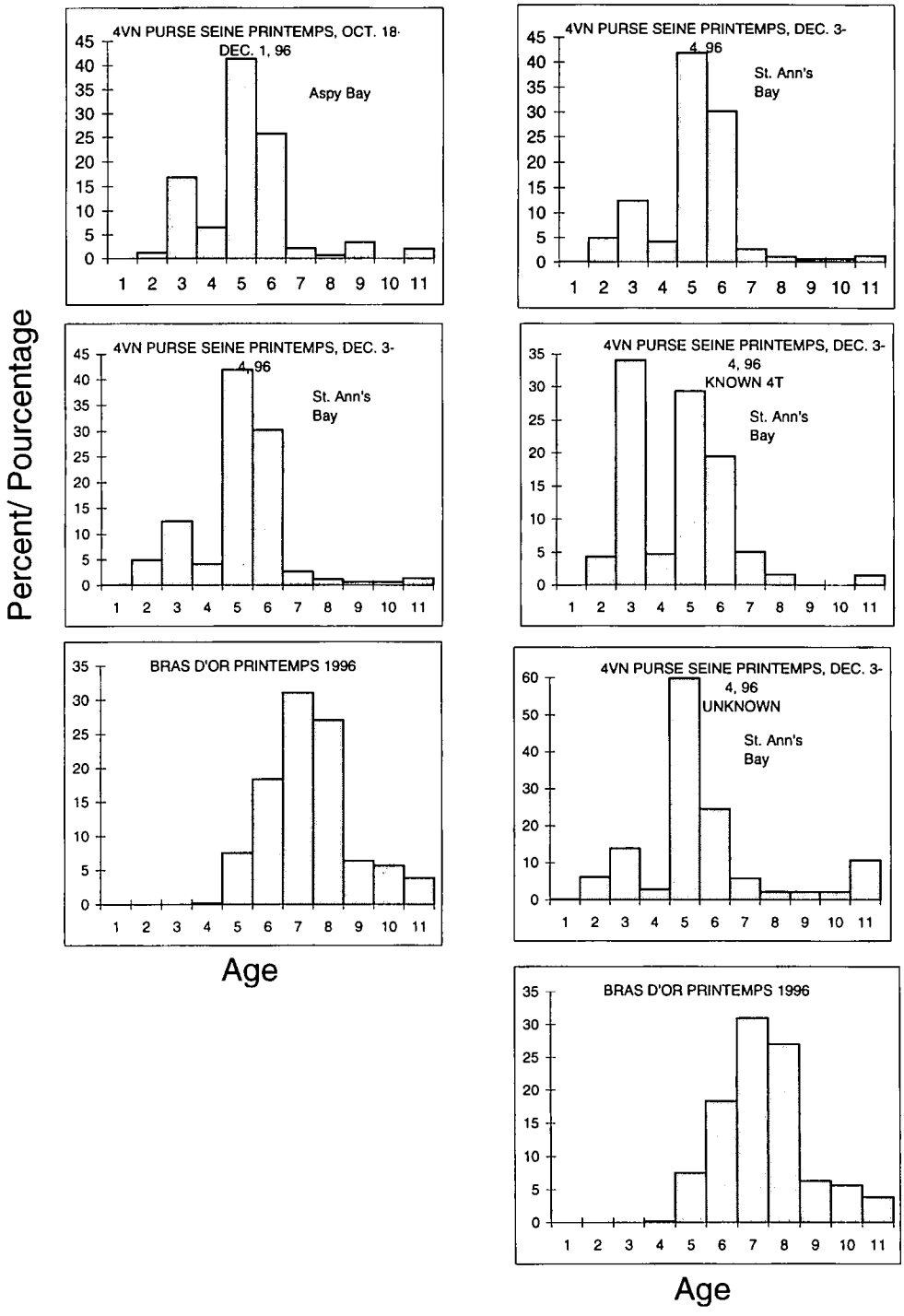

Fig. 26. Comparison of spring spawner catches in purse seine in 4Vn and inshore gears in Bras D'or Lakes in 1996 during the fishery and Dec. 3-4. Percentages are within each category.

Table 1. Foreign fleet mobile gear catches (t) in 4Vn by month from NAFO data files.

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
65	0	0	0	0	18	0	0	0	0	0	0	0	18
66	0	0	0	0	0	0	0	0	0	0	0	0	0
67	0	0	0	17	0	0	0	0	0	0	0	0	17
68	0	0	0	0	0	0	0	87	11378	0	0	0	11465
69	0	0	0	0	0	0	0	696	8300	1865	0	189	11050
70	0	0	0	0	0	0	6	127	173	38	0	0	344
71	0	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	1	0	0	0	0	0	0	5	6
73	5	0	0	0	0	0	557	0	0	21	0	0	583
74	0	0	0	0	0	0	1	0	0	2	2	265	270
75	0	0	0	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	65	0	0	0	0	0	65

Table 2. Canadian fleet mobile gear catches (t) in 4Vn by month using NAFO data files.

Year	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Total
63	0	0	0	0	0	35	0	0	0	0	0	0	35
64	0	0	0	1	3	1	0	0	0	0	0	0	5
65	0	0	29	0	0	0	0	0	0	0	0	0	29
66	0	0	0	30	10	0	9	0	0	0	0	0	49
67	0	0	0	0	0	0	0	0	0	0	0	0	0
68	0	0	0	2	0	0	271	0	102	136	687	848	2046
69	0	0	0	0	0	0	443	0	0	1431	1624	0	3498
70	1827	0	0	0	0	10	0	0	0	1569	1348	0	4754
71	0	0	0	0	0	0	17	849	7448	1897	0	0	10211
72	370	44	0	0	0	0	0	4283	5631	4610	0	0	14938
73	883	2329	67	1	0	0	1	5103	9004	257	0	0	17645
74	0	0	0	0	0	0	29	5119	6571	811	0	0	12530
75	0	213	0	0	0	0	3	2409	3038	0	0	0	5663
76	0	0	0	6	0	0	195	3830	6334	0	0	0	10365
77	0	0	0	0	0	0	0	3438	3632	3562	0	0	10632
78	0	0	5	0	0	0	0	2247	603	0	0	0	2855
79	0	0	0	3	0	0	0	5	798	2220	0	0	3026
80	0	0	0	16	0	0	0	1215	2313	323	0	0	3867
81	0	0	0	0	0	0	0	2482	951	0	0	0	3433
82	0	0	0	0	0	0	0	237	3283	0	0	0	3520
83	0	0	0	0	0	0	0	2005	1802	174	0	0	3981
84	0	0	0	0	0	0	0	3371	554	0	0	0	3925
85	0	0	0	0	0	0	0	2522	948	0	0	0	3470
86	0	0	0	0	0	0	0	2547	1805	0	0	0	4352
87	0	0	0	0	0	0	0	1873	500	0	0	0	2373
88	0	0	0	0	0	0	0	1091	1983	0	0	0	3074
89	0	0	0	0	0	0	0	296	1821	0	0	0	2117
90	0	0	0	0	0	0	0	4711	0	0	0	0	4711
91	0	0	0	0	0	0	0	4789	0	0	0	0	4789
92	0	0	0	0	0	0	0	4228	0	0	0	0	4228
93	0	0	0	0	0	0	8	3947	0	0	0	0	3955
94	0	4	2	0	0	0	0	3176	8	0	0	0	3190
95	0	0	0	0	0	0	0	3988	0	0	0	0	3988
96	0	0	0	0	0	0	162	3590	524	0	0	0	4276

Table 3. Large seiner fleet catches (t) in 4Vn by spawning group from 1978 to 1996.

Year	Spawning Group		Total	TAC	Percent Fall
	Fall	Spring			
78	1833	808	2641	8000	69
79	1418	1496	2913	3000	49
80	2981	870	3852	4500	77
81	2120	1162	3282	3000	65
82	2150	1373	3523	3000	61
83	2808	1167	3976	5000	71
84	3000	1004	4005	3500	75
85	2822	778	3600	3500	78
86	3105	1214	4319	4200	72
87	2093	279	2372	4200	88
88	2438	138	2576	4200	95
89	1959	159	2117	4200	93
90	3942	721	4663	4200	85
91	3871	921	4792	4200	81
92	3955	292	4247	4200	93
93	3722	219	3940	4200	94
94	2968	276	3244	4200	91
95	3990	153	4142	4200	96
96	3543	734	4276	6423	83
Ave. 78-96	2843	724	3567		80
Ave. 83-96	3158	575	3734		85
Ave. 91-95	3701	372	4073		91
Ave. 90-96	3713	474	4186		89

Table 4. Catch composition in 4Vn large seiner fishery by spawning group, Oct. 18-Dec. 4, 1996.

			Numbers x 1000			Biomass (t)			Percent Fall Spawners	
Date	Location	Type	Spring	Fall	Total	Spring	Fall	Total	Numbers	Biomass
Oct. 18-22	Aspy	Test	35	764	799	8	154	162	96	95
Oct. 31- Nov. 8	Aspy	Fishery	452	6614	7066	106	1263	1368	94	92
Nov. 13-14	Aspy	Test	10	53	62	2	13	15	85	84
Nov. 21-24	Aspy	Fishery	1958	9142	11101	403	1447	1850	82	78
Nov. 25- Dec. 1	Neil's	Fishery	242	1789	2031	47	310	357	88	87
Dec. 3-4	St. Ann's	Fishery	781	1932	1932	167	357	524	71	68
Total			3477	20294	22990	732	3544	4276	85	83

Table 5. Numbers, weight, and length-at-age by spawning group for large seiner catch in 4Vn in 1996.

	Fall Spawners				Spring Spawners		
Age	No.	Wt.(kg)	Lth (cm)	Age	No.	Wt.(kg)	Lth (cm)
1	0	0.000	0.00	1	0	0.070	22.00
2	237	0.085	23.16	2	72	0.103	24.46
3	1335	0.122	26.55	3	551	0.136	26.31
4	7966	0.146	28.21	4	209	0.183	28.82
5	2560	0.165	29.63	5	1442	0.221	30.40
6	3309	0.186	30.82	6	932	0.228	30.66
7	1657	0.206	31.63	7	79	0.265	32.00
8	1176	0.228	32.68	8	27	0.324	33.90
9	887	0.238	32.97	9	96	0.310	33.46
10	579	0.263	34.42	10	4	0.314	33.59
11	589	0.322	36.68	11	64	0.318	33.71
Totals	20294	0.175	29.82	Totals	3477	0.211	29.81

Table 6. Catch-at-age for fall spawners caught by purse seines in 4Vn, 1978-1996.
Tableau 6. Prises selon l'âge pour les géniteurs d'automne capturés à l'aide de sennes coulissantes dans 4Vn, 1978-1996.

Numbers x 1000																				
AGE	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0	0	0	0	0	0	0	0	5	20	12	0	0	0	0	0	0	0	0
2	42	5827	628	377	1888	1352	997	827	604	816	441	26	0	0	0	25	15	14	237
3	563	2622	2865	541	3147	4652	3551	1987	2533	1613	833	559	697	2105	20	159	280	137	1335
4	1601	656	2602	6800	3103	3651	4271	3920	5162	4138	1103	1408	2264	5406	1096	456	1964	551	7966
5	1092	167	888	693	1428	2114	2790	2982	2394	1413	3328	1130	1524	2547	3273	1814	722	4374	2560
6	842	100	655	591	359	584	775	927	1375	735	2394	2443	413	750	1427	4357	2426	1266	3309
7	628	324	663	0	158	218	377	590	1770	1040	575	460	2716	856	1474	1687	3193	3844	1657
8	366	0	636	206	40	50	66	66	967	620	734	684	642	1266	990	1473	984	3294	1176
9	449	0	905	236	47	83	58	130	245	165	346	429	857	1309	1379	1594	695	967	887
10	280	0	638	0	0	0	0	0	75	75	183	123	1686	539	983	1564	829	909	579
11+	156	0	493	0	57	38	19	48	7	22	79	292	3033	1699	4317	2587	1689	1732	589
Total	6019	9696	10973	9444	10227	12742	12904	11477	15137	10657	10028	7554	13833	16478	14959	15716	12798	17086	20294
Weight (kg)																			
AGE	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0378	0.0389	0.0349	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	0.1934	0.1067	0.1302	0.0803	0.1175	0.1409	0.1258	0.1144	0.0889	0.0750	0.0960	0.1197	0.0000	0.0000	0.0000	0.0280	0.0912	0.0854	0.0847
3	0.1832	0.1755	0.1648	0.1901	0.1951	0.1900	0.1992	0.2011	0.1481	0.1446	0.1589	0.1642	0.1726	0.1443	0.1322	0.1180	0.1393	0.1275	0.1216
4	0.2471	0.2262	0.2328	0.2089	0.2360	0.2382	0.2405	0.2471	0.1838	0.1862	0.2085	0.2077	0.2025	0.1915	0.1796	0.1531	0.1608	0.1609	0.1459
5	0.3042	0.2741	0.3035	0.2807	0.2571	0.2621	0.2655	0.2693	0.2202	0.2111	0.2395	0.2361	0.2240	0.2229	0.2087	0.1783	0.1800	0.1915	0.1651
6	0.3323	0.2979	0.3374	0.3149	0.2943	0.2957	0.2934	0.2983	0.2535	0.2543	0.2605	0.2743	0.2646	0.2477	0.2381	0.2044	0.2121	0.2131	0.1855
7	0.3562	0.3459	0.3655	0.0000	0.3250	0.3238	0.3194	0.3166	0.2601	0.2606	0.2943	0.2905	0.2924	0.2626	0.2468	0.2270	0.2295	0.2201	0.2055
8	0.3744	0.0000	0.3917	0.4284	0.3612	0.3602	0.3543	0.3513	0.2930	0.2968	0.3190	0.3096	0.3150	0.2972	0.2758	0.2455	0.2466	0.2490	0.2280
9	0.3880	0.0000	0.4000	0.4137	0.3958	0.4046	0.3591	0.3794	0.3277	0.3301	0.3331	0.3406	0.3360	0.3073	0.2856	0.2686	0.2822	0.2674	0.2385
10	0.3990	0.0000	0.4136	0.0000	0.0000	0.0000	0.0000	0.0000	0.3203	0.3179	0.3521	0.3371	0.3416	0.3206	0.2853	0.2827	0.2988	0.2898	0.2627
11+	0.4294	0.0000	0.4349	0.0000	0.4205	0.4193	0.4078	0.4213	0.4458	0.3924	0.3700	0.3477	0.3468	0.3544	0.3295	0.3105	0.3240	0.3392	0.3220
Mean	0.3045	0.1462	0.2717	0.2245	0.2102	0.2204	0.2325	0.2459	0.2051	0.1964	0.2431	0.2593	0.2850	0.2349	0.2644	0.2368	0.2319	0.2335	0.1746
Catch Biomass (t)																			
Age	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2	8	622	82	30	222	190	125	95	54	61	42	3	0	0	0	1	1	1	20
3	103	460	472	103	614	884	707	400	375	233	132	92	120	304	3	19	39	17	162
4	396	148	606	1421	732	870	1027	969	949	770	230	292	458	1035	197	70	316	89	1162
5	332	46	270	195	367	554	741	803	527	298	797	267	341	568	683	323	130	838	423
6	280	30	221	186	106	173	227	277	349	187	624	670	109	186	340	891	515	270	614
7	224	112	242	0	51	71	120	187	460	271	169	134	794	225	364	383	733	846	341
8	137	0	249	88	14	18	23	23	283	184	234	212	202	376	273	362	243	820	268
9	174	0	362	98	19	34	21	49	80	54	115	146	288	402	394	428	196	259	211
10	112	0	264	0	0	0	0	0	24	24	64	41	576	173	280	442	248	264	152
11+	67	0	214	0	24	16	8	20	3	9	29	102	1052	602	1422	803	547	587	190
Total	1833	1418	2981	2120	2150	2808	3000	2822	3105	2093	2438	1959	3942	3871	3955	3722	2968	3990	3543

Table 7. Catch-at-age for spring spawners caught by purse seines in 4Vn, 1978-1996.
Tableau 7. Prise selon l'âge pour les géniteurs de printemps capturés à l'aide de sennes coulissantes dans 4Vn, 1978-1996.

Numbers x 1000 AGE	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	58	5679	349	595	1525	302	522	615	117	73	0	0	8	0	0	16	0	0	0
2	809	5007	2614	2829	3074	3383	1759	953	929	226	214	0	218	167	28	43	35	36	72
3	978	383	901	1833	1994	1561	1702	1129	4064	827	132	105	552	108	11	27	474	13	551
4	358	0	143	0	667	526	636	636	1466	441	145	180	608	990	74	51	187	289	209
5	330	0	117	438	362	289	371	418	0	0	127	99	701	289	182	176	138	104	1442
6	455	298	277	0	0	0	0	0	265	64	0	219	333	134	573	265	208	113	932
7	0	0	0	0	0	0	0	0	0	0	59	0	218	381	0	150	183	141	79
8	114	0	43	0	0	0	0	0	413	67	29	109	35	1157	0	120	53	27	27
9	14	0	17	0	0	0	0	0	0	0	0	0	47	186	0	0	83	4	96
10	0	0	0	0	0	0	0	0	0	0	0	0	99	186	0	0	0	8	4
11+	32	0	55	0	0	0	0	0	0	0	0	0	0	194	148	0	0	20	64
Total	3148	11367	4516	5695	7622	6061	4990	3751	7254	1698	706	712	2821	3790	1016	848	1362	755	3477
Weight (kg) AGE	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	0.0707	0.0966	0.1099	0.1057	0.0995	0.1183	0.0991	0.0895	0.0557	0.0571	0.0000	0.0000	0.0785	0.0000	0.0000	0.0586	0.0000	0.0000	0.0704
2	0.1738	0.1538	0.1556	0.1823	0.1655	0.1679	0.1693	0.1684	0.1207	0.1214	0.1230	0.0000	0.1571	0.0941	0.1402	0.0991	0.1511	0.1079	0.1033
3	0.2279	0.1809	0.2149	0.2299	0.2211	0.2198	0.2235	0.2342	0.1557	0.1579	0.1813	0.1447	0.2170	0.1126	0.1785	0.1631	0.1494	0.1262	0.1363
4	0.2903	0.0000	0.2753	0.0000	0.2517	0.2536	0.2571	0.2633	0.1920	0.1878	0.1976	0.1772	0.2421	0.1807	0.2072	0.2216	0.1947	0.1774	0.1827
5	0.3226	0.0000	0.3141	0.3689	0.2889	0.3005	0.2996	0.3125	0.0000	0.0000	0.2415	0.2127	0.2785	0.2277	0.2433	0.2329	0.1870	0.1994	0.2211
6	0.3702	0.3639	0.3833	0.0000	0.0000	0.0000	0.0000	0.0000	0.2279	0.2279	0.0000	0.2744	0.2802	0.2448	0.2938	0.2690	0.2203	0.2179	0.2284
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2872	0.0000	0.3185	0.2653	0.0000	0.2962	0.2959	0.2412	0.2648
8	0.3627	0.0000	0.3868	0.0000	0.0000	0.0000	0.0000	0.0000	0.2926	0.2941	0.3899	0.2785	0.2791	0.2824	0.0000	0.3421	0.2536	0.2394	0.3238
9	0.4796	0.0000	0.4831	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3604	0.3349	0.0000	0.0000	0.2955	0.3214	0.3103
10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3409	0.3349	0.0000	0.0000	0.0000	0.3165	0.3135
11+	0.4330	0.0000	0.4411	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.3287	0.3919	0.0000	0.0000	0.3140	0.3178
Mean	0.2568	0.1316	0.1927	0.2040	0.1802	0.1926	0.2013	0.2074	0.1674	0.1645	0.1952	0.2227	0.2555	0.2430	0.2873	0.2579	0.2030	0.2024	0.2110
Catch Biomass (t) AGE	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
1	4	549	38	63	152	36	52	55	7	4	0	0	1	0	0	1	0	0	0
2	141	770	407	516	509	568	298	160	112	27	26	0	34	16	4	4	5	4	7
3	223	69	194	421	441	343	380	264	633	131	24	15	120	12	2	4	71	2	75
4	104	0	39	0	168	133	164	167	281	83	29	32	147	179	15	11	36	51	38
5	106	0	37	162	105	87	111	131	0	0	31	21	195	66	44	41	26	21	319
6	168	108	106	0	0	0	0	0	60	15	0	60	93	33	168	71	46	25	213
7	0	0	0	0	0	0	0	0	0	0	17	0	69	101	0	44	54	34	21
8	41	0	17	0	0	0	0	0	121	20	11	30	10	327	0	41	13	7	9
9	7	0	8	0	0	0	0	0	0	0	0	0	17	62	0	0	25	1	30
10	0	0	0	0	0	0	0	0	0	0	0	0	34	62	0	0	0	3	1
11+	14	0	24	0	0	0	0	0	0	0	0	0	0	64	58	0	0	6	20
Total	808	1496	870	1162	1373	1167	1004	778	1214	279	138	159	721	921	292	219	276	153	734

Table 8. Catch (t) of immature herring caught in 4T and 4Vn compared to 4T target catch of immature herring in 1996.

Spawning Group	CATCH (t)			
Immature	4T	4VN	TOTAL	TARGET
Fall	278	256	534	576
Spring	93	29	122	269
Total	371	285	656	845

Table 9. Catch (tonnes) of herring in 4Vn by large seiners by maturity stage from 1992 to 1996. Numbers differ slightly from Table 3 because of rounding off effects associated with using different categories for estimating numbers in each case.

	Year				
Maturity Stage	92	93	94	95	96
Immature	59	26	308	0	285
Fall Spawners					
Maturing	89	201	670	120	381
Spawning	0	26	0	0	5
Spent	3871	3517	1756	3903	2899
Spring Spawners					
Maturing	208	193	509	120	707
Total	4227	3963	3243	4143	4277

Table 10. Percent immature herring by weight in 4Vn large seiner catch by fishing activity period.

Fishing Period	Percent Immature
Oct 18-22	2
Oct. 31-Nov. 8	11
Nov. 13-14	2
Nov. 21-24	4
Nov 25-Dec 1	8
Dec. 3-4	4

Table 11. Cumulative percent at total length in large seiner 4Vn catch by number from 1993 to 1996.

Length (cm)	93	94	95	96	93-95
20	0	0	0	0	0
20.5	0	0	0	0	0
21	0	0	0	0	0
21.5	0	0	0	0	0
22	0	0	0	0	0
22.5	0	0	0	1	0
23	0	0	0	1	0
23.5	0	0	0	1	0
24	0	0	0	2	0
24.5	0	0	0	2	0
25	1	0	0	3	0
25.5	1	1	0	4	1
26	1	2	1	6	1
26.5	2	3	1	9	2
27	2	5	1	14	3
27.5	3	8	2	19	4
28	3	12	3	26	6
28.5	4	16	4	33	8
29	5	19	6	41	10
29.5	7	23	10	49	14
30	10	28	20	57	19
30.5	14	34	30	65	26
31	19	41	41	73	34
31.5	27	50	51	78	43
32	35	58	60	84	51
32.5	43	65	68	87	59
33	51	71	75	91	65
33.5	57	76	80	93	71
34	62	79	83	95	75
34.5	68	83	86	96	79
35	73	86	89	97	83
35.5	78	89	91	98	86
36	84	92	93	98	89
36.5	88	95	95	99	93
37	92	97	97	99	95
37.5	95	99	98	100	97
38	98	99	99	100	99
38.5	99	100	100	100	100
39	100	100	100	100	100
39.5	100	100	100	100	100
40	100	100	100	100	100

Table 12. Biomass estimates in tonnes from July and September bottom trawl surveys and October - December acoustic surveys in 4Vn from 1970-1996.

	Trawl Biomass		Acoustic	
Year	July	Sep	Biomass	Dates
70	6155			
71	2459			
72	1835			
73	10968			
74	No Est.			
75	739			
76	0			
77	667			
78	31			
79	0			
80	No Sets			
81	0			
82	0			
83	0			
84	1940		75724	Nov 17-26
85	0		106865	Nov 23-26
86	230		127708	Dec 1-12
87	39345		443058	Nov 17-24
88	81		172886	Nov 21-22
89	0			No survey
90	9		135249	Nov 4-8
91	4997		4418	Oct. 21-23
92	0		44845	Oct. 14-22
93	417		12512	Oct 15-20
94	8788	8773		No survey
95	1773	5201	5295	Sep 24-26
96	0		21804	Oct. 14-16

Table 13. Acoustic abundance indices by strata for Cape Breton in 1995 and 1996.

	Survey Dates	
Location	Sep. 24-26, 1995	Oct. 14-16, 1996
Aspy Bay	2700	11800
Wreck Cove	416	290
St. Ann's	136	70
Haddock Bank	60	1500
Sydney	1400	7200
New Waterford	583	944
Total	**5295**	**21804**

Table 14. Percent of herring below and above 30 cm total length by week in Chaleur fishery in 1995.

Week	Percent <=30	Percent >30
Aug. 27-Sep.2	62	38
Sep. 3-9	63	37
Sep. 10-16	71	29
Sep. 17-23	71	29
Sep. 24-30	77	29
Oct. 1-7	71	29
Oct. 8-14	79	21
Oct. 15-21	87	13

Table 15. Percent of herring below and above 30 cm total length by week in 4Vn fishery in 1995.

Week	Percent <=30	Percent >30
Oct. 29-Nov. 4	21	79
Nov. 5-11	26	74
Nov. 12-18	18	82
Nov. 19-25	14	86

Table 16. Number (x 1000) and biomass (t) of catch on Dec. 3-4 near St. Anns Bay by large seiners by spawning group and stock origin.

	Number	Wt (kg)	Lth (cm)	Biomass
Fall Spawners 4T				
Immature	153	0.1255	26.3	19
Maturing	113	0.1780	29.7	20
Spawning	0	0.0000	0.0	0
Spent	1705	0.1865	30.0	318
Total				357
Spring spawners 4T				
Immature	18	0.1080	24.8	2
Maturing	303	0.2050	29.6	62
Total				64
Spring spawners Unknown				
Immature	13	0.1010	24.4	1
Maturing	447	0.2267	30.6	101
Total				103
Spring Spawner Total				167
Printemps + Automne				524

Appendix 1. Comparison of total length and fork length (cm).

Length		
Total	Fork	Difference
19.0	17.06	1.94
19.5	17.51	1.99
20.0	17.95	2.05
20.5	18.40	2.10
21.0	18.85	2.15
21.5	19.30	2.20
22.0	19.75	2.25
22.5	20.20	2.30
23.0	20.64	2.36
23.5	21.09	2.41
24.0	21.54	2.46
24.5	21.99	2.51
25.0	22.44	2.56
25.5	22.89	2.61
26.0	23.33	2.67
26.5	23.78	2.72
27.0	24.23	2.77
27.5	24.68	2.82
28.0	25.13	2.87
28.5	25.57	2.93
29.0	26.02	2.98
29.5	26.47	3.03
30.0	26.92	3.08
30.5	27.37	3.13
31.0	27.82	3.18
31.5	28.26	3.24
32.0	28.71	3.29
32.5	29.16	3.34
33.0	29.61	3.39
33.5	30.06	3.44
34.0	30.51	3.49
34.5	30.95	3.55
35.0	31.40	3.60

Appendix 2. July survey bottom trawl results for herring from 1970 - 1996.

Year	Cruise	Number of sets Total	with Herring	Number Total	Number Std. Error	Number per tow	Number Std. Error	Weight Total Weight	Weight Std. Error	Weight per tow	Weight Std. Error
70	A175/176	11	4	15,409,196	11,711,605	54.10	41.12	6,155,255	4,683,895	21.61	16.45
71	A188/189	6	1	5,327,590	5,327,547	18.71	18.71	2,458,888	2,458,867	8.63	8.63
72	A200/201	6	2	4,360,294	4,321,409	15.31	15.17	1,835,059	1,835,044	6.44	6.44
73	A212/213	8	1	23,065,330	23,065,142	80.98	80.98	10,968,568	10,968,477	38.51	38.51
74	A225/226	9	1	41,785	41,785	0.15	0.15				
75	A236/237	9	2	2,662,756	2,605,217	9.35	9.15	739,423	710,931	2.60	2.50
76	A250/251	5	0	0							
77	A265/266	9	2	1,876,778	1,648,232	6.59	5.79	667,378	590,756	2.34	2.07
78	A279/280	9	1	30,895	30,895	0.11	0.11	30,895	30,895	0.11	0.11
79	A292/293	9	0	0							
80	A305/306	0	0	NO SETS							
81	A321/322	9	0	0							
82	H080/081	9	0	0							
83	N012/013	9	0	0							
84	N031/032	9	7	4,573,473	3,546,209	16.06	12.45	1,940,015	1,690,630	6.81	5.94
85	N049/049	12	0	0							
86	N065/066	15	2	565,930	422,815	1.99	1.48	230,079	169,348	0.81	0.59
87	N85/86/87	15	2	141,200,864	108,953,320	495.76	382.54	39,345,240	32,698,934	138.14	114.81
88	N105/106	17	2	279,064	261,729	0.98	0.92	81,182	81,180	0.29	0.29
89	N123/124	13	0	0							
90	N139/140	15	1	23,678	23,678	0.08	0.08				
91	N154/H231	14	3	12,214,459	11,952,931	42.89	41.97	4,997,256	4,903,313	17.55	17.22
92	N173/174	15	0	0							
93	N189/190	13	4	1,070,794	729,833	3.76	2.56	416,927	307,443	1.46	1.08
94	N221/222	15	4	26,460,278	26,229,668	92.90	92.09	8,787,702	8,748,364	30.85	30.72
95	N226/227	15	6	7,847,600	7,245,658	27.55	25.44	1,773,281	1,616,214	6.23	5.67
96	N246/247	15	0	0							