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The 1984-85, 4Vn Herring Biological Update

by

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ABSTRACT

As in previous years, the 4V herring fishery was restricted to the Sydney Bight area (4Vn) and had both an inshore and purse seine component. Landings by inshore gear (trap and gillnet) amounted to 483 t; the highest since 1962. Reported purse seine landings amounted to 3,925 t. Seven vessels began fishing in November and exceeded the 3,500 t quota within one month. Commercial catch rates were lower than in 1983, but still within the range of recent variation.

The available biological information indicates that this fishery exploits a mixture of stocks. As a result no rigorous biological method can be used in assessment and it is preferable that there be no fishery on the overwintering herring in this area.

RESUME

Comme les années précédentes, la pêche au hareng dans la division 4V a été limitée à la zone Sydney Bight (4Vn) et comportait de la pêche côtière et de la pêche à la senne coulissante. Les débarquements de la pêche côtière (étalière, filet maillant) se sont chiffrés à 483 t; ce sont les plus élevés depuis 1962. Les débarquements de pêche à la senne coulissante ont atteint 3 925 t. En novembre, 7 bateaux sont entrés en activité; en un mois, ils ont dépassé le quota (3 500 t). Le taux de capture de pêche commerciale était plus bas qu'en 1983, mais il se situait quand même entre les limites de variation récemment observées.

D'après les données de biologie qu'on possède sur cette pêche, on y exploiterait un mélange de stocks. Pour cette raison, il est impossible de l'évaluer par des méthodes de biologie rigoureuses et il est préférable que le hareng qui passe l'hiver dans cette zone ne soit pas pêché.

INTRODUCTION

History of the Fishery

The Sydney Bight (area 4Vn) herring fishery has two major components. A fixed gear (trap and gillnet) fishery has historically taken place inshore, including the Bras d'Or Lakes, during the spring and summer. Catches have been relatively small (less than 500 t yr⁻¹; Table 1). A large mobile fishery began in 1968, operating during the late autumn and early winter months. This fishery was dominated by foreign fleets for the first two years but subsequently has been almost exclusively a Canadian purse seine fishery. Annual landings in this segment of the fishery peaked at 17,547 t in 1972/73 but have been less than 4000 t since 1978 (Table 1).

Stock structure

Tagging studies (summarized by Simon and Stobo 1983) indicate that the winter purse seine fishery exploits overwintering herring which are a mixture of Gulf of St. Lawrence (4T), local (4Vn) and Nova Scotia (4WX) stocks. The relative affinity with other stocks was different in fish tagged at different locations within 4Vn. Of those tagged to the north and west of the area (north of Bird Island) a higher proportion was returned from area 4T; of those tagged in the southeast, a higher proportion was returned from area 4WX.

Herring tagged during the spring fishery (April-May; St. Ann's Bay) were returned primarily from 4Vn (including Bras d'Or Lakes) but also from area 4T.

DESCRIPTION OF THE 1984/85 FISHERY

Management Plan

The Scotia-Fundy Region Herring Management Plan limited the purse seine fishery:

- (i) to the period Nov. 7, 1984 - March 1, 1985;
- (ii) to a quota of 3500 t (by Gulf-based vessels); and
- (iii) to the area north and west of a line drawn from Pt. Aconi in Cape Breton to the 3Pn/4Vn intersection.

Inshore effort was not under quota management, except that no effort increase was allowed.

Catch and CPUE

Monthly landings by gear type are presented in Table 2.

The purse seine fishery involved seven vessels and was closed Dec. 6, 1984 after the quota had been exceeded. The total catch (3925 t) was very

near that of the 1983/84 season and similar to annual landings since 1978 (Table 1).

A total catch of 483 t was recorded from inshore gear, 1.41 times that of the previous year and the highest amount since 1963. This was primarily the result of atypical trap catches in September, October and November.

Logbook coverage of the purse seine fishery was good; logs were received from all vessels and accounted for 73% of the total catch. Two indices of CPUE were calculated from logbook information: catch per successful night (45.9 t) and catch per set (36.9 t). Both indices were lower than in the 1983/84 fishery but well within the variation of the CPUE over the past 6 yr (Table 3).

The spatial pattern of catch (by 10' square) was calculated from logbook information and is shown in Fig. 1. As in 1983, catches were concentrated along the north shore of St. Ann's Bay, around Cape Smokey. The Pt. Aconi line of the Management Plan restricts purse seine activity to the northern section of 4Vn, but Stobo and Simon (1982) pointed out that the centre of the fishery had already shifted northward over the historical period of the fishery before the line was imposed.

The purse seine fishery lasted only one month and biological sampling was adequate for the single age length key required to generate numbers at age. Seven detail samples resulted in 288 fish aged and a catch per detail sample ratio of 560 (t/sample). Most (86.5%) of those aged were fall spawners.

Age	Number of fish aged									
	1	2	3	4	5	6	7	8	9	10+
Fall spawners	0	0	25	30	76	34	33	32	12	7
Spring spawners	0	0	4	4	11	4	6	4	2	0

Only 15% of the 3, 4 and 5 year olds were recorded as spring spawners, compared to 60% of those age groups thought to have been spring spawners the previous year (Simon and Campana 1984).

Monthly numbers and weight at age are presented in Table 4, and as in previous assessments, have been adjusted to assume a Nov. 1 birthday. Age 5 herring made up the largest portion of the catch both by number (33.8%) and weight (30.0%); ages 5, 6 and 7 made up 70% of both catch numbers and catch weights (Fig. 2). The historical catch at age matrix is given in Table 5. Weighted mean weights at age are very similar to the historical mean for each age in this fishery (Table 6) but are almost all lower than those presented for the 1983-84 fishery, particularly for lower ages.

No sampling of inshore gear was undertaken.

MANAGEMENT CONSIDERATIONS

The available biological information indicates that the inshore spring and summer fixed gear fishery exploits local stocks, but that the winter purse seine fishery prosecutes a stock mixture which includes fish from other management units (primarily 4T and 4WX). As a result of this mixing, no rigorous biological method can be used to assess the fishery and recommend a TAC.

The quota was exceeded in 1984 but the catch was restricted to less than 4000 t in a fishery that has been as high as 17,000 t. The Pt. Aconi line which restricts fishing to the northwest portion of 4Vn should (based upon tagging results) have decreased the exploitation of 4WX fish and increased the proportion of 4T fish in the 4Vn catch.

Previous advice (e.g. CAFSAC Advisory Doc. 84/15) has stated that based on biological considerations, it would be preferable that there be no fishery on "overwintering" fish in 4Vn.

LITERATURE CITED

- Simon, J., and S. Campana. 1984. The 1983 - 84, 4Vn herring biological update. Can. Atl. Fish. Sci. Advis. Comm. Res. Doc. No. (84/66): 17 p.
- Simon, J., and W. T. Stobo. 1983. The 1982 - 83, 4Vn herring biological update. Can. Atl. Fish. Sci. Advis. Comm. Res. Doc. No. (83/49): 28 p.
- Stobo, W. T., and J. Simon. 1982. Biological update for 4Vn herring, 1981-82. Can. Atl. Fish. Sci. Advis. Comm. Res. Doc. No. (82/39): 23 p.
- Anon. 1984. Advice on the management of herring in Division 4VWX in 1985. Can. Atl. Fish. Sci. Advis. Comm., Advis. Doc. 84/15.

Table 1. Historical annual (Oct.-Oct.) herring landings (t) in area 4Vn by major gear segment. All values for 1962/3 to 1983/4 are as in Simon and Campana (1984) except where marked (*). New data from DFO, Scotia-Fundy Region, Statistics Branch.

Year	Cdn ^a "fixed gear"	Cdn ^b "mobile gear"	Foreign "mobile gear"	Total "mobile gear"	TAC
62-63	492	-	-	-	
63-64	407	-	-	-	
64-65	252	-	18	18	
65-66	91	-	-	-	
66-67	296	-	17	17	
67-68	235	2	-	2	
68-69	225	2044	11465	13509	
69-70	74	5335	11050	16385	
70-71	142	2917	344	3261	
71-72	162	10681	1	10682	
72-73	116	17537	10	17547	
73-74	212	16285	578	16863	
74-75	226	14297	270	14567	
75-76	74	5546	188	5734	
76-77	120	12831	-	12831	
77-78	310	7078	-	7078	11000
78-79	327	3332	-	3332	8000
79-80	261	2865	-	2865	3000
80-81	328	3952	-	3952	4500
81-82	248	3552	-	3552	3000
82-83	342	3648	-	3648	3000
83-84	483	3980*	-	3980*	5000
84-85		3925	-	3925	3500

^aIncludes trap, gillnet and misc. gear types.

^bPurse seine only.

Table 2. Monthly distribution of herring catch (t) by gear type in area 4Vn (source DFO, Scotia-Fundy Region, Statistics Branch; MFD Tape EMF 775).

	1983		1984											
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
4Vn purse seine	2005	1801	174	-	-	-	-	-	-	-	-	-	3372	553
4Vn trap	-	-	-	-	-	-	159	-	-	-	97	97	97	-
4Vn gillnet	-	-	-	-	-	10	8	4	1	-	1	-	-	-
4Vn misc.	-	-	-	-	-	-	9	-	-	-	-	-	-	-

Table 3. CPUE indices for the 4Vn herring purse seine fishery. Values for 1971-84 are as in previous assessments (Simon and Campana 1984).

Year	Catch (t) per successful night	Catch (t) per set
71-72	115.0	-
72-73	90.8	45.4
73-74	82.0	43.2
74-75	85.8	37.8
75-76	52.4	33.5
76-77	78.1	37.7
77-78	70.4	35.0
78-79	23.6	12.8
79-80	77.5	33.7
80-81	45.6	20.6
81-82	31.3	17.4
82-83	58.6	22.5
83-84	73.1	46.3
84-85	45.9	36.9

Table 4. 4Vn herring numbers at age (thousands) and weight at age (g) for the 1984-85 purse seine fishery.

Age ^a	1	2	3	4	5	6	7	8	9	10	11+	Total
Nov./Dec.												
Number	-	-	901	1158	5859	3069	3223	2228	639	98	141	17316
Avg. wt.	-	-	98.32	148.34	200.79	235.05	262.75	288.84	307.24	303.40	386.48	226.73
Catch wt.	-	-	88.59	171.76	1176.43	718.26	846.95	643.48	196.33	29.64	54.49	3926
% numbers	-	-	5.2	6.7	33.8	17.7	18.6	12.9	3.7	0.6	0.8	
% weight	-	-	2.3	4.4	30.0	18.3	21.6	16.4	5.0	0.8	1.4	

^aBirthday November 1.

Table 5. 4Vn purse seine herring catch-at-age matrix (thousands).

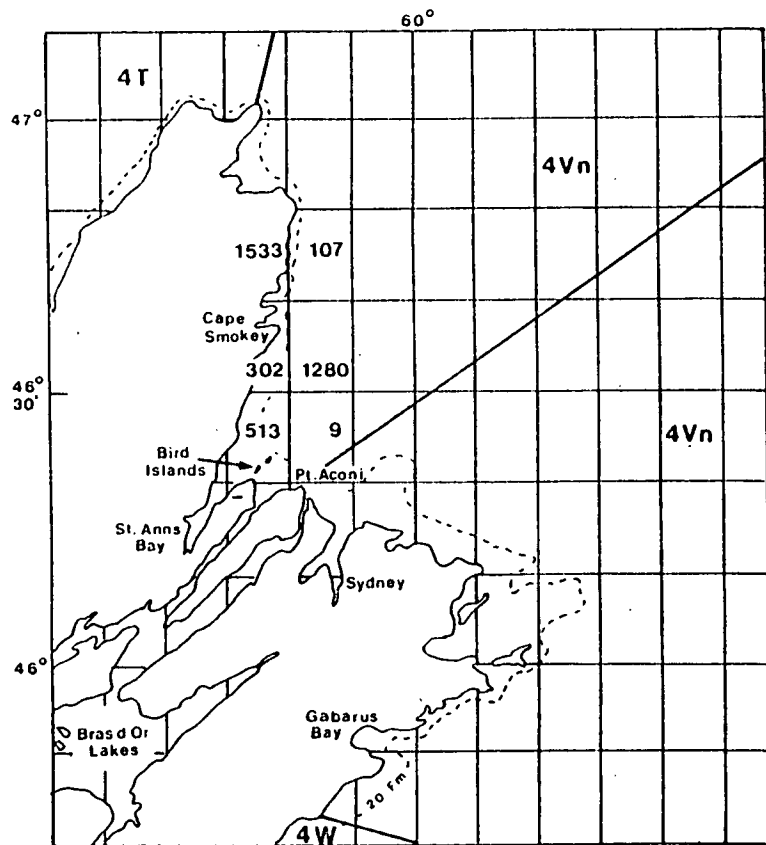
Age ^a	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85
1	0	0	0	0	0	0	0	0	0	0	0	0
2	43	116	1	0	0	0	0	43	104	82	189	0
3	3798	5116	671	16	7	26	3172	518	945	2308	2263	901
4	43737	4156	1544	2986	110	441	3427	3791	1965	2733	5684	1158
5	14264	33189	1848	5103	2377	1413	1671	3946	7192	3359	5078	5859
6	4435	6430	7846	4136	2800	1443	741	1060	2982	5722	3238	3069
7	2955	2417	2571	17602	1442	878	1004	645	844	1798	1559	3223
8	3176	2304	1123	8379	7622	847	607	614	-	816	649	2228
9	2841	2242	892	3401	4056	1701	873	717	77	37	287	639
10	3842	2842	1006	2431	1202	1838	879	1192	77	15	22	98
11+	4969	5401	3461	5451	3098	1915	750	2688	893	150	86	141
Total nos.	84060	64213	20963	49505	22714	10502	13124	15214	15079	17020	19055	17316
Total wt.	16863	14354	5734	12831	7078	3332	2865	3952	3552	3648	4029	3926

^aBirthday November 1.

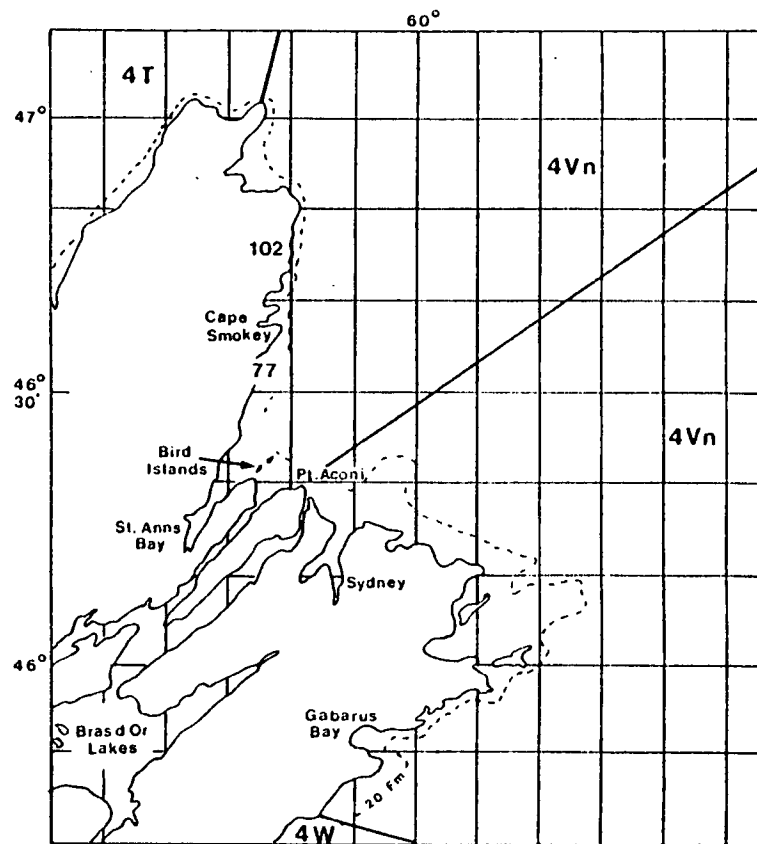
Table 6. 4Vn purse seine herring weight-at-age (g).

Age ^a	73-74	74-75	75-76	76-77	77-78	78-79	79-80	80-81	81-82	82-83	83-84	84-85
1	-	-	-	-	-	-	-	-	-	-	-	-
2	34	52	41	-	-	-	-	36	16	-	108	-
3	85	102	93	105	110	120	103	104	113	107	153	98
4	162	145	157	141	175	189	152	146	182	167	180	148
5	182	203	203	187	220	211	207	201	217	207	217	201
6	218	235	249	219	245	258	255	252	264	247	247	234
7	251	256	273	256	272	289	289	267	310	280	267	263
8	302	287	292	275	308	302	324	332	-	307	287	289
9	325	314	332	295	346	338	366	361	375	362	336	307
10	350	334	361	319	377	376	400	395	375	391	342	303

^aBirthday November 1.



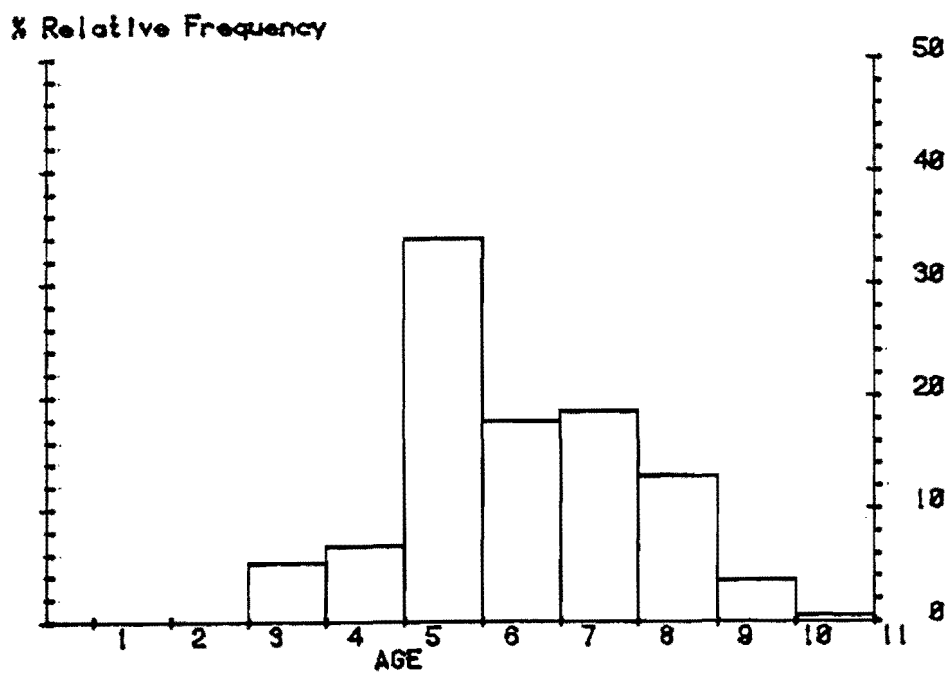
November



December

Fig. 1. Monthly 4Vn herring purse seine catch (t) distribution by 10' square for 1984 (from log books weighted by nominal landings).

1984 4VN Purse Seine Nos. by Age



1984 4VN P. Seine Catch Wt. by Age

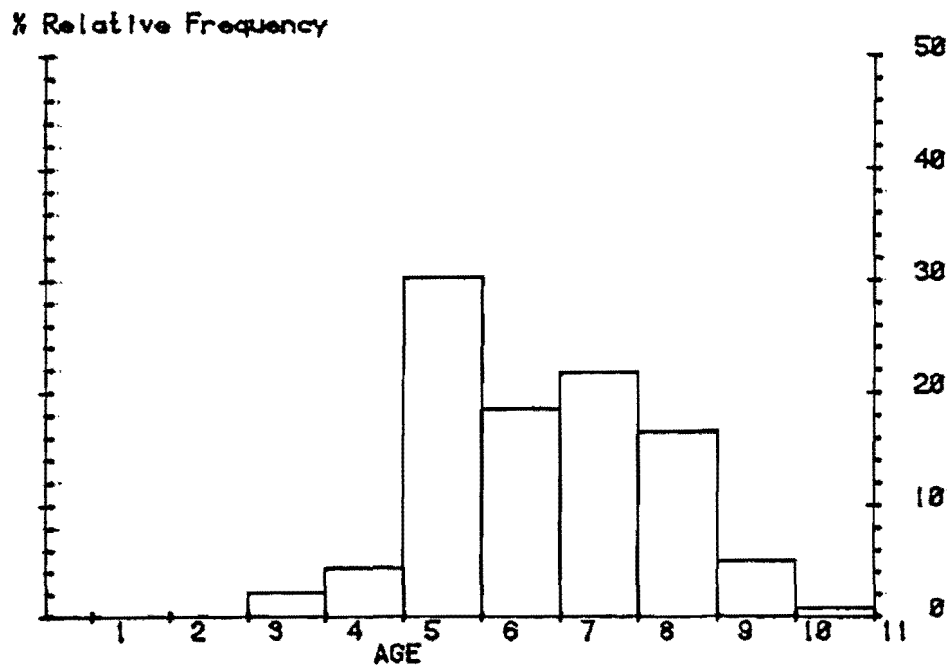


Fig. 2. Relative frequency of numbers and weight by age of the 1984/85 4Vn purse seine fishery.