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A summary of the 1989 4Vn herring fishery

by

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Abstract

The major component of this fishery was a purse seine fleet of five vessels which reported landings of 2078 mt in a 2-wk period from Nov. 27 to Dec. 7, 1989. Fishery Officer hauls corresponded closely to these catches and the decrease of about 500 mt over 1988 was attributed to a late start in the fishery. Logbooks accounted for 64% of purse seine catches and showed a similar spatial distribution to previous years. Other catches of herring by inshore gear accounted for 114 mt, a decrease from 1988 but within the range of recent years' landings. Biological sampling showed that the 1983 year-class (age 6) dominated the catch in numbers and weight for the fourth successive year (since age 3). A re-evaluation of tagging results did not change the conclusion that the winter fishery in 4Vn exploits a mixture of stocks and that, as a result, an analytical assessment of 4Vn herring is not possible.

Résumé

La principale composante de cette pêcherie était une flotte de cinq bateaux de pêche à la senne coulissante qui a signalé des débarquements de 2 078 t au cours d'une période de deux semaines entre le 27 novembre et le 7 décembre 1989. Les communiqués des agents des pêches correspondaient étroitement à ces prises et la diminution d'environ 500 t par rapport à 1988 a été attribuée à un lent départ de la pêche. Les journaux de bord rendent compte de 64 % des prises à la senne coulissante et indiquent une répartition spatiale semblable à celle des années précédentes. La pêche au hareng par des engins côtiers a donné lieu à ces prises de 114 t, une diminution par rapport à 1988, mais une valeur qui se situe dans la gamme observée pour les débarquements au cours des dernières années. Un échantillonnage biologique a révélé que la classe d'âge 1983 (âge 6) a dominé les prises en nombre et en poids pour la quatrième année consécutive (depuis l'âge 3). Une réévaluation des résultats du marquage n'a pas changé la conclusion selon laquelle la pêcherie d'hiver dans la zone 4Vn exploite un mélange de stocks et, en conséquence, une évaluation analytique du hareng de 4Vn est impossible.

Introduction

History of the Fishery

The Sydney Bight herring fishery has two components. A relatively small (less than 500 t yr⁻¹; Table 1) trap and gillnet fishery has historically taken place inshore, including the Bras d'Or Lakes, during the spring and summer. A large vessel mobile fishery began in 1968. This was dominated by foreign fleets for the first 2 yr but subsequently has been almost exclusively a Canadian purse seine fishery operating during the late autumn and early winter months. Annual landings peaked at 17,547 t in 1972/73 but, with TAC regulation, have been less than 5000 t since 1978 (Table 1).

A review of statistics resolved a discrepancy concerning landings from the 1988 fishery noted in the previous Research Document (Stephenson and Power 1989). The hail total of 4837 t included some duplication and was later revised to 2572, which matched purchase slips (A. MacIsaac, DFO, pers. comm.).

Stock Structure

Previous tagging studies (summarized by Simon and Stobo 1983) indicated 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 1989 Fishery

Management Plan

The 1990 Scotia-Fundy Region Herring Management Plan limited the 4Vn purse seine fishery:

- (i) to the period Nov. 1, 1989-Mar. 1, 1990;
- (ii) to a TAC of 4200 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 (trap and gillnet) effort was not under TAC 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 five vessels and took place between Nov. 27 and Dec. 7, 1989. Total reported landings amounted to 2078 t, a reduction of almost 500 t from 1988 and the lowest in 20 yr. Fishery Officer hauls (from quota reports = 2096 mt) support this figure. This decrease is attributed to the late start of the fishery.

A total catch of 114 t was recorded from inshore gear in 1989, approximately one-third that of the previous year but within the range observed over the past decade.

Logbook coverage of the purse seine fishery included all vessels but accounted for only 64% of the total nominal catch (Table 3).

The spatial pattern of catch (by 10' square) was calculated from logbook information and is shown in Fig. 1. As in recent years (1983-present), 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 and before the line was imposed.

The purse seine fishery was concentrated within a 2-wk period. Biological sampling was adequate for a single age length key to generate numbers at age. Three detail samples resulted in 125 fish aged and a catch per detail sample ratio of 16.6 (t/detail fish).

Monthly catch numbers and weight at age are presented in Table 4. The 1983 year-class (age 6) again dominated in number and also in weight. The historical catch at age matrix is given in Table 5, and mean weights at age weighted by numbers caught in Table 6.

Recent reanalysis of tagging results from the late 1970s and early 1980s (W.T. Stobo, S.C. Courtenay and J. Gagne, DFO, pers. comm.) confirmed an earlier conclusion that the summer fixed gear fishery exploits local stocks but that the winter purse seine fishery is on a mixture of stocks. Although regulatory restriction of the fishery to the northern part of 4Vn undoubtedly increases the 4T and reduces the 4WX contribution, the proportions cannot be quantified from existing tagging data. As stated previously (since 1981), there is insufficient information to assess local stocks supporting the inshore fishery, and because of stock mixing in the winter fishery, an analytical assessment of 4Vn herring is not possible.

Literature Cited

- Simon, J., and W. T. Stobo. 1983. The 1982-83, 4Vn herring biological update. Can. Atl. Fish. Sci. Advis. Comm. Res. Doc. 83/49: 28 p.
- Stephenson, R. L., and M. J. Power. 1989. The 1988 4Vn herring fishery: biological update. Can. Atl. Fish. Sci. Advis. Comm. Res. Doc. 89/61.
- Stobo, W. T., and J. Simon. 1982. Biological update for 4Vn herring, 1981-82. Can. Atl. Fish. Sci. Advis. Comm. Res. Doc. 82/39: 23 p.

Table 1. Historical annual (Oct.-Oct.) herring landings (t) in area 4Vn by major gear segment. All values prior to 1989 are as in Stephenson and Power (1989). New data from DFO, Scotia-Fundy Region, Statistics Division.

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
85 ^c	200	3470	-	3470	3500 ^d
86	123	4352	-	4352	4200 ^d
87	103	2372	-	2372	4200 ^d
88	340	2572	-	2572	4200 ^d
89	114	2078	-	2078	4200 ^d

^aIncludes trap, gillnet and misc. gear types.

^bPurse seine only.

^cCalendar year.

^dTAC for period Nov.-Mar.

Table 2. Monthly distribution of herring catch (t) by gear type in area 4Vn (source DFO, Scotia-Fundy Region, Statistics Division).

	1988			1989											
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
4Vn purse seine	-	1088	1484	-	-	-	-	-	-	-	-	-	-	296	1782
4Vn trap/misc.	-	-	-	-	-	-	-	63	1	4	-	-	2	-	-
4Vn gillnet	-	-	-	-	-	-	-	23	14	6	1	-	-	-	-

Table 3. CPUE indices for the 4Vn herring purse seine fishery. Values for 1971-88 are as in previous assessments (Stephenson and Power 1989).

Year	Logged catch (t)	Logged number (sets)	Days fished	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
85-86	3511	46	32	108.4	76.3
86-87	4486	64	42	106.8	70.1
87-88	1751	40	25	70.0	43.8
88-89	2168	38	28	77.4	57.1
89-90	1330	26	16	83.1	52.4

Table 4. 4Vn herring numbers at age (thousands) and weight at age (g) for the 1989 purse seine fishery.

Age		1	2	3	4	5	6	7	8	9	10	11+	Total
Numbers ('000)		0	16	499	1175	946	2579	455	885	723	215	433	7926
Weight (t)		0	2	78	234	214	696	128	261	244	73	148	2078
Avg. wt (g)		0	114	157	119	226	270	280	295	338	338	341	
Avg. length (cm)		-	25.0	27.9	30.1	31.5	33.4	33.8	34.4	36.1	36.1	36.2	
% numbers	(85)	-	6.8	6.6	10.1	24.3	27.5	13.7	8.0	1.7	0.4	0.9	
	(86)	-	5.6	30.3	25.4	8.3	14.4	8.7	4.6	1.8	0.3	0.2	
	(87)	1.0	7.2	18.3	36.3	12.0	6.4	9.7	6.2	1.5	0.9	0.5	
	(88)	0.1	4.4	9.9	12.9	29.7	21.8	6.0	7.7	4.1	2.6	0.8	
	(89)	-	0.2	6.3	14.8	11.9	32.5	5.7	11.2	9.1	2.7	5.5	
% weight	(85)	-	2.6	4.3	7.9	24.3	29.3	16.9	10.2	2.3	0.6	1.7	
	(86)	-	2.7	23.1	23.7	8.8	17.6	12.3	7.1	3.0	0.4	1.4	
	(87)	0.3	3.1	13.7	34.5	13.0	8.1	12.7	9.6	2.5	1.5	1.0	
	(88)	0.0	2.0	6.5	10.9	29.1	23.4	7.2	10.1	5.7	3.8	1.3	
	(89)	-	0.1	3.8	11.3	10.3	33.5	6.2	12.6	11.7	3.5	7.1	

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	85-86	86-87	87-88	88-89	89-90
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	125	6	0
2	43	116	1	0	0	0	0	43	104	82	189	901	1019	1251	887	476	16
3	3798	5116	671	16	7	26	3172	518	945	2308	2263	1158	998	6801	2253	1071	499
4	43737	4156	1544	2986	110	441	3427	3791	1965	2733	5684	5859	1515	5696	4470	1389	1175
5	14264	33189	1848	5103	2377	1413	1671	3946	7192	3359	5078	3069	3657	1863	1473	3204	946
6	4435	6430	7846	4136	2800	1443	741	1060	2982	5722	3238	3223	4137	3225	786	2350	2579
7	2955	2417	2571	17602	1442	878	1004	645	844	1798	1559	2228	2068	1962	1196	648	455
8	3176	2304	1123	8379	7622	847	607	614	-	816	649	639	1210	1023	769	830	885
9	2841	2242	892	3401	4056	1701	873	717	77	37	287	98	251	401	188	443	723
10	3842	2842	1006	2431	1202	1838	879	1192	77	15	22	128	54	60	114	278	215
11+	4969	5401	3461	5451	3098	1915	750	2688	893	150	86	13	142	163	63	89	433
Total nos.	84060	64213	20963	49505	22714	10502	13124	15214	15079	17020	19055	17316	10551	22445	12324	10784	7926
Total wt(t)	16863	14354	5734	12831	7078	3332	2865	3952	3552	3648	4029	3926	3470	4350	2372	2572	2078

^aResults prior to 1983/84 are presumed to be based upon Nov. 1 birthday. Since 1984, Jan. 1 birthday has been assumed.

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	85-86	86-87	87-88	88-89	89-90
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	55	32	0
2	34	52	41	-	-	-	-	36	16	-	108	98	89	93	82	108	114
3	85	102	93	105	110	120	103	104	113	107	153	148	149	148	144	156	157
4	162	145	157	141	175	189	152	146	182	167	180	201	182	181	183	202	199
5	182	203	203	187	220	211	207	201	217	207	217	234	230	205	210	234	226
6	218	235	249	219	245	258	255	252	264	247	247	263	245	237	246	256	270
7	251	256	273	256	272	289	289	267	310	280	267	289	283	273	252	285	280
8	302	287	292	275	308	302	324	332	-	307	287	307	292	301	296	314	295
9	325	314	332	295	346	338	366	361	375	362	336	303	321	326	310	332	338
10	350	334	361	319	377	376	400	395	375	391	342	378	377	320	316	347	338

^aResults prior to 1983/84 are presumed to be based upon Nov. 1 birthday. Since 1984, Jan. 1 birthday has been assumed.

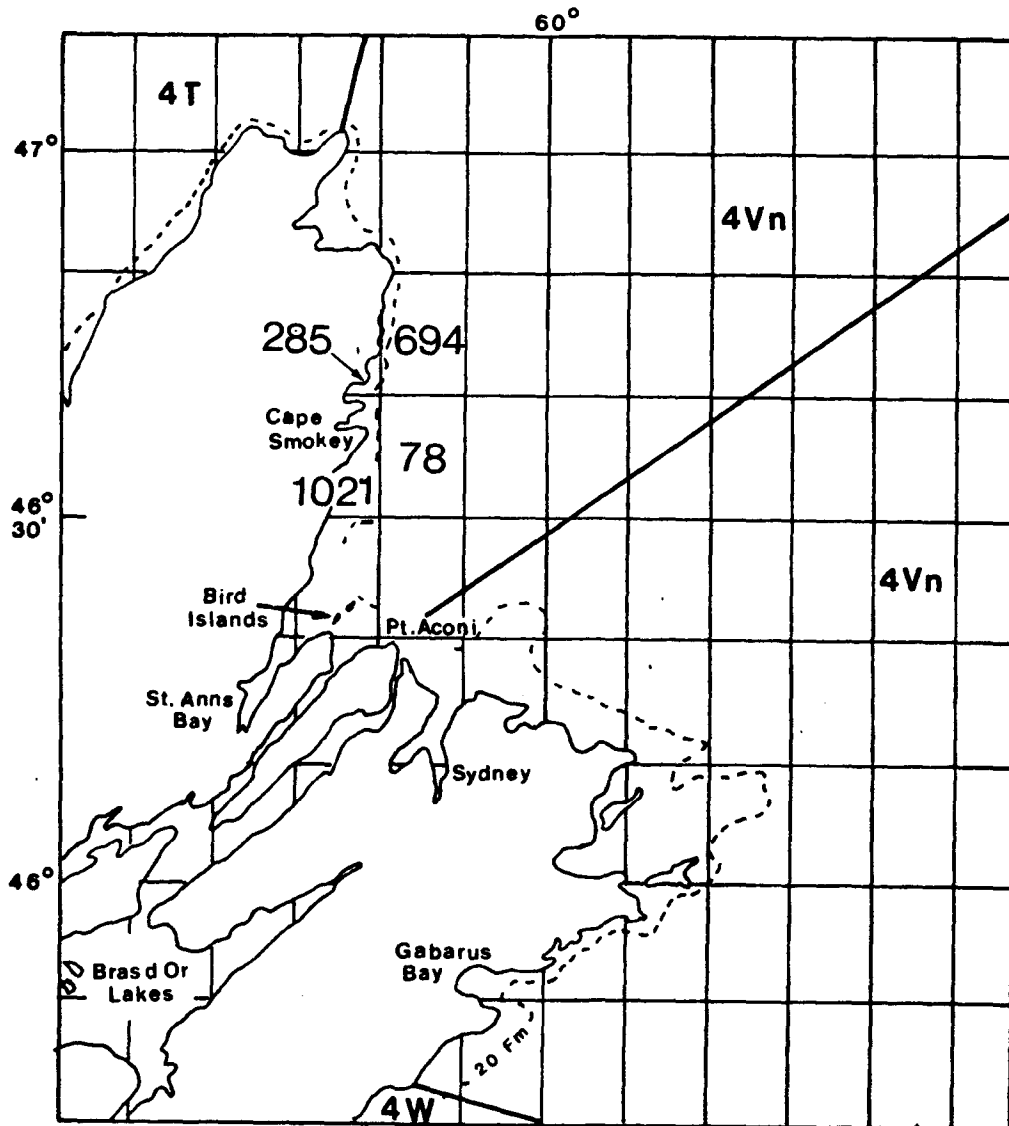


Fig. 1. 4Vn herring purse seine catch (t) by 10' square in 1989 (from logbooks weighted by nominal landings).