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Canadian Atlantic Fisheries
Scientific Advisory Committee

CAFSAC
Research Document 82/19

Summary of discarding and estimates of total removals
by Canadian trawlers during the 1981 Divisions 3LNO
American plaice fishery

by

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Abstract

The results of a program aimed at monitoring the discarding of American plaice by Canadian (Nfld.) otter trawlers in Div. 3LNO during 1981 is presented. Estimates indicate that the discarding of undersized American plaice was significant, with an overall discard rate for Div. 3LNO of 13.1% by weight and 31.6% by numbers. This estimate amounts to some 27.0 million fish weighing about 6,400 t being discarded during 1981.

Résumé

Le présent article expose les résultats d'un programme d'étude du rejet à la mer de la plie canadienne par les chalutiers canadiens (T.-N.) dans les div 3LNO en 1981. D'après nos estimations, le rejet des petites plies canadiennes a été important, soit, pour l'ensemble de ces divisions, 13,1 % en poids et 31,6 % en nombre. Ce qui signifie qu'environ 27,0 millions de poissons, pesant environ 6 400 t ont été rejetés à la mer en 1981.

Introduction

Results of surveys begun in 1978 and aimed at monitoring the discarding of American plaice in Div. 3LNO by Canadian (Nfld.) trawlers indicated that the discarding of small fish was significant (Stevenson 1980 and 1981). A discard survey program was again carried out during 1981 to continue monitoring this problem. It involved sending pairs of observers out on seven Canadian (Nfld.) trawlers during regular 10-12 day fishing trips to determine the numbers and weights of fish discarded at sea and to obtain length and age data on these fish.

Results obtained from these trips are applied to the total Canadian (Nfld.) otter trawl fishery and estimates of total catch removals by weight, numbers, size and age composition made. These estimates are compared to actual Canadian (Nfld.) landings (by weight) and to estimates of these landings in terms of numbers, size and age composition based on the results of the survey trips.

Methods

Set and catch details were collected on a set by set basis onboard the trawlers. The discard portions of the catches were actually weighed, while the market portions were estimated for each set. These estimates were adjusted on the basis of actual turnout weights at the end of each trip.

Length frequencies of market and discarded fish were determined separately and whenever possible corresponding market and discard frequencies were completed for a particular set. Average weights were obtained for each sample completed by actual weighings. Some 16,900 discard and 27,700 market length measurements were collected during 1981. A summary of sampling by division is given in Table 1.

In arriving at catch estimates for the total Canadian (Nfld.) fishery, sets were first of all combined for each month within a unit area and discard rates calculated. These discard rates were applied to the actual Canadian (Nfld.) landings for the corresponding months and unit areas. The resulting catch estimates were combined to give weighted annual catch estimates for each unit area. Unit area catch estimates were then combined to arrive at final weighted annual catch estimates for each division. Figure 1 shows the months and unit areas for which data were available.

In arriving at estimated catch length frequencies for the total Canadian (Nfld.) fishery, market and discard frequencies were weighted by set and combined separately for each month within a unit area. These market and discard frequencies were then combined on the basis of discard rates to give estimated catch frequencies which were applied to the estimated Canadian (Nfld.) catches for each month within a unit area. Monthly frequencies were combined to give weighted annual catch frequencies for each unit area. Unit area frequencies were then combined to give a final weighted annual catch frequency for each division.

Age keys used in estimating age compositions were composite keys, combining otoliths collected from discarded fish at sea with otoliths collected from landings onshore for a particular division.

Results and Discussion

Discard rates (by weight) and estimates of Canadian (Nfld.) American plaice otter trawl catches based on these rates are presented in Table 2. The overall discard rate in Div. 3LNO was 13.1%, with the highest rate occurring in Div. 3L (16.1%). The 0.0% discard rate in Div. 30 was based on results obtained on one trip during which an unusually large mesh codend was used (152 + mm as compared to the 133-137 mm used by the other vessels surveyed). The larger mesh codend probably had some effect on the lack of discards in this division, however, historically discarding in this area has been fairly low. Even if the discard rate is underestimated, landings in Div. 30 during 1981 were very low (1,761 t) and a higher discard estimate would not have greatly affected the overall picture in Div. 3LNO. A discard rate of 0.0% in Div. 30 is therefore assumed in this paper, even though it is probably an underestimate. A comparison of catch and landing estimates indicate some 6,400 t of undersized American plaice being discarded in Div. 3LNO during 1981.

Estimates of numbers of Div. 3LNO American plaice landed and caught by Canadian (Nfld.) otter trawlers based on discard survey results are presented in Table 3. It is estimated that 31.6% (by numbers) of the Div. 3LNO American plaice caught were discarded during 1981 which would have amounted to 27.0 million undersized fish being thrown overboard with an average weight of .24 kg.

Compared to estimates derived from previous years' surveys (Table 4), the overall discarding of American plaice in Div. 3LNO during 1981 has increased from the 1980 level of 8.1% by weight (20.2% by numbers) and was close to the 1979 level of 14.0% by weight (30.9 by numbers).

Percentage length compositions of 1981 American plaice catch estimates, with discarded and market portions indicated, are given in Fig. 2. A higher proportion of males than females was discarded in all divisions, which is consistent with previous results (Stevenson 1980 and 1981). Overall, an estimated 40.2% of the males and 24.2% of the females were discarded in Div. 3LNO during 1981. Discarding generally began at around 35-40 cm for both sexes with almost all fish below 30 cm being discarded, which is consistent with the minimum acceptable commercial size at most Newfoundland processing plants of 33-34 cm.

A comparison of 1981 American plaice catch and landing age composition estimates for the Canadian (Nfld.) otter trawl fishery in Div. 3LNO is presented in Table 5. These estimates are based entirely on the results of the discard survey trips. Ninety-one percent of the males discarded and 89% of the females discarded were between ages 7 and 11. The average age for discarded males was 8.8 years, while for females it was 9.2 years. Catch/landing ratios by age group and based on these estimates are also presented in Table 5.

Conclusions

Estimates derived from 1981 discard survey trips indicate that the discarding of undersized American plaice by Canadian (Nfld.) trawlers fishing in Div. 3LNO continues to be significant. Results of these trips indicate an overall discard rate for Div. 3LNO of 13.1% by weight and 31.6% by numbers. This estimate amounts to some 27.0 million fish weighing about 6,400 t being discarded during 1981. In order to monitor this problem and to obtain a time series of age composition data which takes into account the discard portions of the catches, a program aimed specifically at monitoring the discarding of undersized American plaice in this area should be continued.

References

Stevenson, S. C. 1980. Summary of discarding and estimates of the total removals by Canadian trawlers during the 1978 and 1979 Divisions 3LNO American plaice fishery. NAFO SCR Doc. 80/VI/86.

1981. Summary of discarding and estimates of total removals by Canadian trawlers during the 1980 Divisions 3LNO American plaice fishery. NAFO SCR Doc. 81/VI/55.

Table 1. Summary of Div. 3LNO American plaice sampling during 1981 discard survey.

Division	Number of trips: 7			Tonnage class: 5 (500-999 t)		
	Discards		No. samples	Market		No. samples
	Male # meas.	Female # meas.		Male # meas.	Female # meas.	
3L	8,997	6,305	74	7,427	12,104	75
3N	925	684	8	2,012	2,602	20
3Ø	-	-	-	554	2,966	9
Total	9,922	6,989	82	9,993	17,672	104

Table 2. Comparison of total Canadian (Nfld.) American plaice otter trawler landings from Div. 3LNO with catch estimates derived from 1981 discard survey results.

Division	Total Can(N) OT landings (t)	Estimated Can(N) OT catch (t)	% Catch discarded by weight	Observed number of sets (hrs. fishing)
3L	31,393	37,435	16.1	84 (216.4)
3N	9,139	9,471	3.5	59 (141.1)
3Ø	1,761	1,761	0.0	18 (34.5)
3LNØ (combined)	42,293	48,667	13.1	161 (392.0)

Table 3. Estimates of numbers of Div. 3LNØ American plaice landed and caught by Canadian (Nfld.) otter trawlers based on 1981 discard survey results (X 10³).

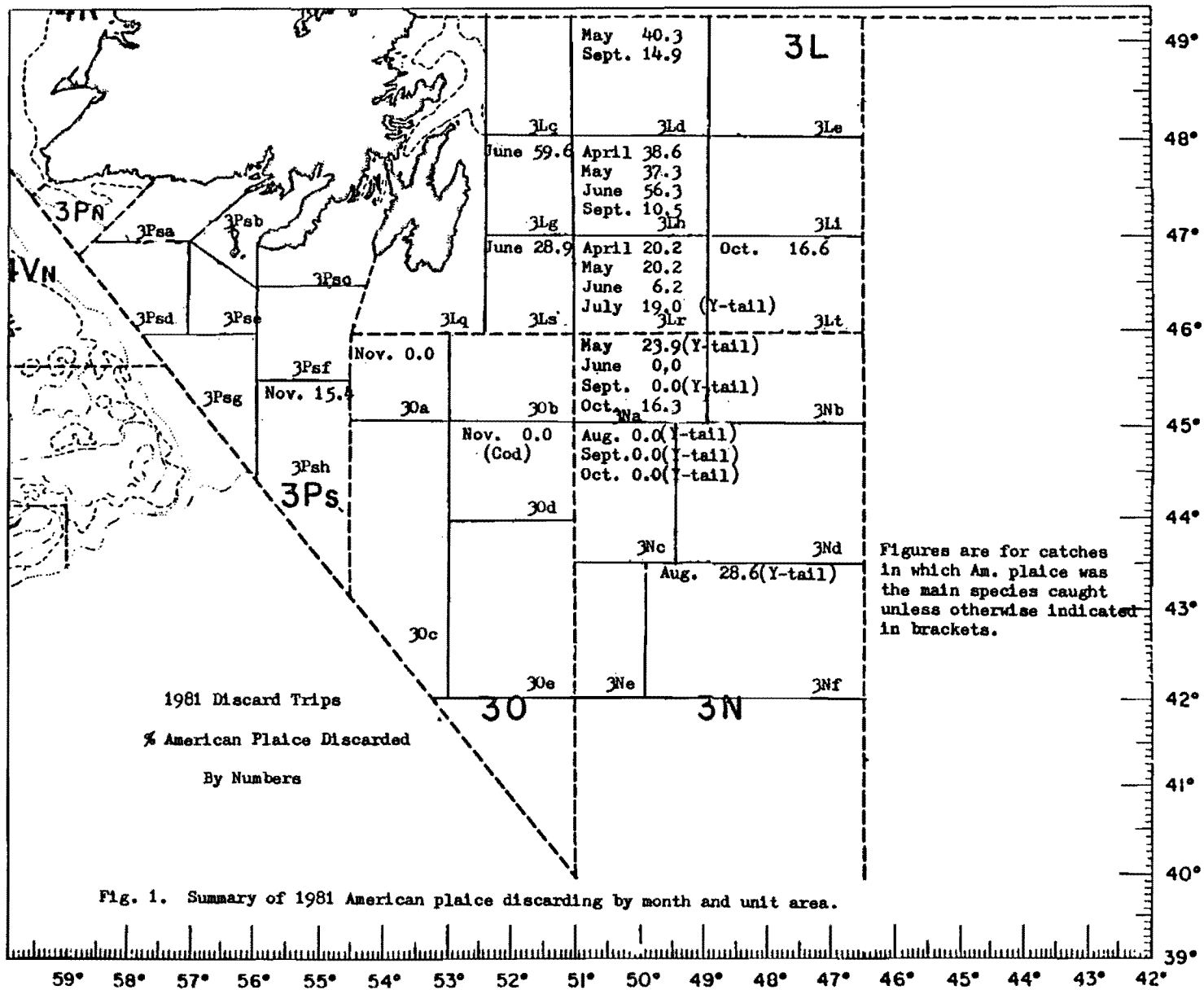
Division	Male			Female			Male + female	
	Est. # landed	Est. # caught	% Discarded	Est. # landed	Est. # caught	% Discarded	% Discarded	
3L	18,428	33,515	45.0	27,768	38,290	27.5	35.7	
3N	4,851	5,587	13.2	5,824	6,470	10.0	11.5	
3Ø	309	309	0.0	1,327	1,327	0.0	0.0	
3LNØ (combined)	23,588	39,411	40.2	34,919	46,087	24.2	31.6	

Table 4. Comparison of Div. 3LNO American plaice discard rate estimates by Canadian (Nfld.) otter trawlers for years 1978-81.

Year	3L		3N		3Ø		Total	
	% by weight	% by number	% by weight	% by number	% by weight	% by number	% by weight	% by number
1978	11.5	28.0	2.6	6.6	7.3	18.1	8.6	22.0
1979	12.9	29.4	18.6	37.1	3.4	10.3	14.0	30.9
1980	4.8	13.7	13.9	30.8	4.2	9.4	8.1	20.2
1981	16.1	35.7	3.5	11.5	0.0	0.0	13.1	31.6

Table 5. 1981 Div. 3LNO American plaice catch and landing age composition estimates for Canada (N) otter trawl fishery based on discard survey results ($\times 10^3$).

Age	3L			3N			3O			3LNO (combined)		
	Catch	Landings	$\frac{\text{Catch}}{\text{Landings}}$	Catch	Landings	$\frac{\text{Catch}}{\text{Landings}}$	Catch	Landings	$\frac{\text{Catch}}{\text{Landings}}$	Catch	Landings	$\frac{\text{Catch}}{\text{Landings}}$
<u>Males</u>												
3	2			54						56		
4	26			94	6	15.67				120	6	20.00
5	103			91	27	3.37				194	27	7.19
6	588	138	4.26	177	133	1.33	3	3	1.00	768	274	2.80
7	2788	742	3.76	689	524	1.31	26	26	1.00	3503	1292	2.71
8	5044	1661	3.04	1284	1106	1.16	54	54	1.00	6382	2821	2.26
9	6570	2662	2.47	1202	1112	1.08	50	50	1.00	7822	3824	2.05
10	7659	4713	1.63	939	899	1.04	76	76	1.00	8674	5688	1.53
11	5761	4055	1.42	420	408	1.03	57	57	1.00	6238	4520	1.38
12	3361	2906	1.16	355	355	1.00	27	27	1.00	3743	3288	1.14
13	1074	1015	1.06	197	196	1.01	15	15	1.00	1286	1226	1.05
14	397	394	1.01	56	56	1.00	1	1	1.00	454	451	1.01
15	131	131	1.00	28	28	1.00				159	159	1.00
16	11	11	1.00	1	1	1.00				12	12	1.00
Total	33515	18428		5587	4851		309	309		39411	23588	
<u>Females</u>												
3				24						24		
4	45			69	3	23.00				114	3	38.00
5	126			46	14	3.29				172	14	12.29
6	219	51	4.29	139	81	1.72				358	132	2.71
7	1102	288	3.83	398	280	1.42	13	13	1.00	1513	581	2.60
8	2755	695	3.96	840	653	1.29	93	93	1.00	3688	1441	2.56
9	4827	2163	2.23	1107	1020	1.09	173	173	1.00	6107	3356	1.82
10	6459	4243	1.52	1276	1225	1.04	280	280	1.00	8015	5748	1.39
11	6877	5195	1.32	880	860	1.02	234	234	1.00	7991	6289	1.27
12	6022	5439	1.11	590	586	1.01	200	200	1.00	6812	6225	1.09
13	4226	4091	1.03	386	386	1.00	124	124	1.00	4736	4601	1.03
14	3023	3001	1.01	308	309	1.00	96	96	1.00	3427	3406	1.01
15	1514	1509	1.00	145	145	1.00	62	62	1.00	1721	1716	1.00
16	676	674	1.00	138	138	1.00	33	33	1.00	847	845	1.00
17	250	250	1.00	55	55	1.00	11	11	1.00	316	316	1.00
18	116	116	1.00	40	40	1.00	7	7	1.00	163	163	1.00
19	34	34	1.00	25	25	1.00	1	1	1.00	60	60	1.00
20	15	15	1.00	4	4	1.00				19	19	1.00
21	4	4	1.00							4	4	1.00
Total	38290	27768		6470	5824		1327	1327		46087	34919	
Weight (t) M+F	37435	31393		9471	9139		1761	1761		48667	42293	



1981 American Plaice

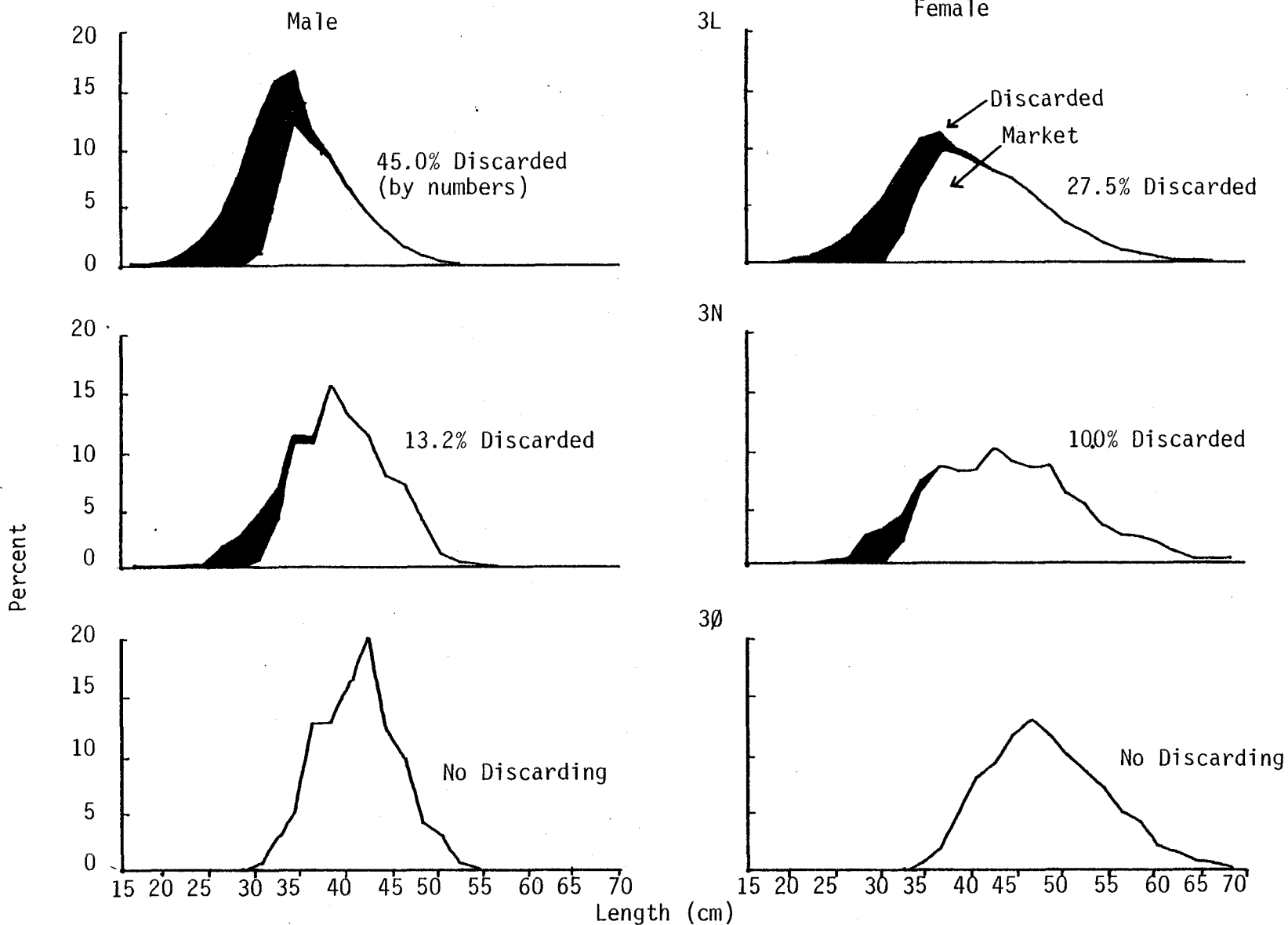


Fig. 2. Composite length composition of market and discarded American plaice on Canada(N) trawlers in 1981.