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Summary of Discarding and Estimates of Total Removals by Canadian Trawlers During the 1980 Divisions 3LNO American Plaice Fishery

by

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INTRODUCTION

Results of 1978 and 1979 surveys aimed at monitoring the discarding of American plaice in Div. 3LNO by Canadian (Nfld.) trawlers showed that the discarding of small fish was significant (Stevenson 1980). A discard survey program was again carried out during 1980 in order to continue monitoring of the problem. It involved sending pairs of observers out on five 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 on 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 compositions based on the results of the survey trips. Factors suitable for converting numbers at age for landings derived from port sampling to numbers at age for catches are also presented.

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.

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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 15,200 discard and 25,000 market length measurements were collected during 1980. 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 by weight and numbers calculated. Figure 1 shows the months and unit areas for which data were available. Monthly discard rates were applied to the actual Canadian (Nfld.) landings for the corresponding months to give monthly catch estimates for the fishery. These monthly catch estimates were combined to give a weighted annual catch estimate for a particular unit area. Unit area catch estimates were then combined to arrive at final weighted annual catch estimates for each division.

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 Canadian (Nfld.) 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 and time of year.

RESULTS AND DISCUSSION

Discard rates (by weight) as derived from 1980 discard survey trips 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 8.1% with the highest rate occurring in Div. 3N (13.9%). A comparison of catch and landing estimates show some 3600 t of undersized American plaice being discarded by Canadian (Nfld.) trawlers fishing in Div. 3LNO during 1980.

Estimates of numbers of 3LNO American plaice landed and caught by Canadian (Nfld.) otter trawlers based on discard survey results are presented in Table 3. In terms of numbers, 20.2% of the 3LNO American plaice caught were discarded during 1980. This amounted to an estimated 15.3 million undersized fish being thrown overboard.

Compared to estimates derived from 1978 and 1979 discard surveys (Table 4) the overall discarding of American plaice in Div. 3LNO during 1980 has decreased from the 1979 level of 14.0% by weight (30.9% by number) to close to the 1978 level of 8.6% by weight (22.0% by number). This decrease could have been influenced by the fact that during 1980 four of the five vessels observed had slightly increased mesh sizes (from the 130-133 mm used in 1978-79 to 134-138 mm in 1980). Not enough trips were completed to do any reasonable comparison of discarding in terms of mesh size.

Percentage length compositions of 1980 American plaice catch estimates, with the 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 1978 and 1979 results (Stevenson 1980). Overall, 25.2% of the males and 15.8% of the females were discarded in Div. 3LNO during 1980. Discarding generally began at around 35-40 cm for both sexes with almost all fish below 30 cm being discarded. This is because 33-34 cm is the minimum acceptable commercial size for American plaice at most Newfoundland processing plants.

A comparison of 1980 American plaice catch and landing age composition estimates for the Canadian (Nfld.) otter trawl fishery is presented in Table 5. These estimates are based wholly on the results of the discard survey trips. Ninety percent of the males discarded and 83% of the females discarded were between ages 5 and 10. The average age for discarded males was 7.36 years, while for females it was slightly higher at 7.45 years. Catch/landing ratios by age group are also presented in Table 4. These ratios are in a form suitable for converting numbers at age derived from port sampling to total removals at age based on the comparison of catch and landing age compositions derived from discard trips. દ્રાર્થ કરવા

CONCLUSIONS

Estimates derived from 1980 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 8.1% by weight and 20.2% by number. This would have amounted to some 15.3 million fish weighing about 3600 t being discarded during 1980. Thus, by not taking the discard portion of the catches into account, the numbers of younger fish (especially those between 5 and 10 years old) would be seriously underestimated.

A trend towards an increase in mesh size from the 130-133 mm range to the 134-138 mm range by some Canadian (Nfld.) trawlers fishing in Div. 3LNO for American plaice may possibly be alleviating the problem, however, even with this increase in mesh size the discarding of undersized fish seems significant. In order to monitor the 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 Div. 3LNO will be continued for at least the near future.

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.

		of trips: scards	5		Tonna	age class: Marke	5 (500-999 t) t
Division	Male (#meas.)	Female (#meas.)	N	o.samples	(#meas.)	(#meas.)	No. samples
3L	7,121	3,423		50	9,350	8,225	55
ЗN	2 ,5 45	2,040		25	3,009	4,234	24
30	44	46		1	114	143	1
Total	9,710	5,509		76	12,473	12,602	80
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Table 1. Summary of Divisions 3LNO American plaice sampling onboard Canada (N) otter trawlers during 1980 discard survey.

Table 2. Comparison of total Canadian (N) American plaice OT landings with catch estimates derived from 1980 discard survey results.

Division	Total Can (N) OT landings (mt)	Estimated Can (N) OT catch (mt)	% Of catch discarded (by weight)	Observed no. sets (hrs fishing)
3L	25,123	26,402	4.8	60 (174)
3N	14,069	16,341	13.9	51 (122)
30	1849	1930	4.2	5 (12)
3LNO (combined)	41,041	44,673	8.1	116 (308)

Table 3. Estimates of numbers of 3LNO American plaice landed and caught by Canadian (N) otter trawlers as derived from 1980 discard survey results (X 10^3).

		Male			Female		Male + Female
Division	Est. no. landed	Est. no. caught	Discarded	Est. no. landed	Est. no. caught	% Discarded	% Discarded
3L	16,766	20,528	18.3	20,228	22,352	9.5	13.7
3N	8597	13,663	37.1	11,836	15,886	25.5	30.8
30	1283	1429	10.2	1606	1759	8.7	9.4
3LNO (combined)	26,646	35,620	25.2	33,670	39,997	15.8	20.2

Table 4. Comparison of Divisions 3LNO American plaice discard rate estimates by Canada(N) trawlers for years 1978, 1979 and 1980.

	3L	·	3N		30		Tot	al
Year	% 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

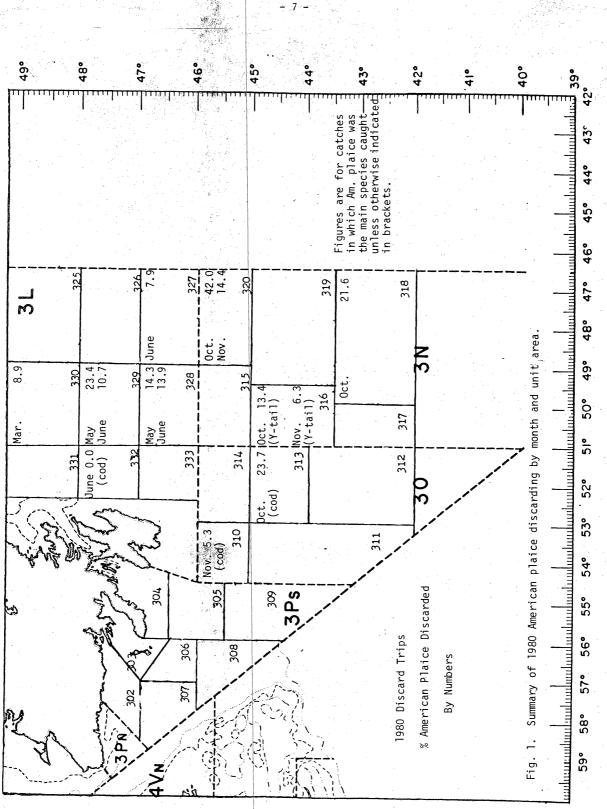
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l) Catch Tandings	? ? 6.29 6.29 1.15 1.15 1.10 1.00 1.00	89.80 3.47 3.47 3.47 1.186 1.14 1.10 1.00 1.00 1.00 1.00
<u>3LNØ (combined)</u> h Landings	151 151 1129 1317 5367 5367 5367 5368 1668 142 142 142 142 142 142 26,646	226 226 31078 31078 31078 4004 4064 4064 5105 5105 701 3370 260 3370 260 3370 38 38 38 38 38 38 38 38 38 38 38 38 38
3LN(Catch	35,620 350 3402 3402 3402 66883 66883 66842 66842 6659 6659 6659 6659 1199 1199 1199 1199	42 449 45708 4573 4573 45717 5453 45717 5453 45448 701 1663 701 38 38
Catch Tandings	• • • • • • • • • • • • • • • • • • •	3.44 3.44 1.15 1.00 1.00 1.00 1.00 1.00 1.00 1.00
3ø Landings	5 69 175 172 172 172 172 172 172 172 172 172 172	2233 192 192 181 181 181 181 181 181 181 181 181 18
Catch	222 6 90 90 90 166 135 135 135 135 135 135 1429	254 31 254 198 206 206 181 181 181 207 21 207 21
Males <u>Catch</u> landings	? 5.70 3.02 1.82 1.02 1.00 1.00 1.00 1.00 1.00 Females	100 100 100 100 100 100 100 100
3N Landings	138 673 673 673 685 1610 689 139 139 139 14	199 887 887 887 887 25334 7693 1693 1693 1693 1693 151 151 32
Catch	102 334 3375 3375 3975 3570 1709 1709 1209 140 140 140	42 42 426 426 426 426 10336 1153 1153 1153 1153 1153 1153 1153 1
Catch Tandings	7. 75 1. 24 1. 23 1. 12 1. 12 1. 00 1. 00	14.00 3.78 3.78 3.78 3.78 1.15 1.15 1.00 1.00 1.00 1.00 1.00 1.00
3L Landings	8 387 1929 2302 3602 3502 1329 1288 1288 1288 1288 1288 1268 1268 16,766	11158 11158 11158 11158 11158 11584 12529 125529 125529 125559 125559 12555555
Catch	142 704 2386 291 4594 4594 1524 1524 1524 128 20,528	14 68 290 290 2506 3506 140 2506 2506 1393 1393 2528 1393 2528 1393 2528 2528 2528 2528 2528 2528 2528 252

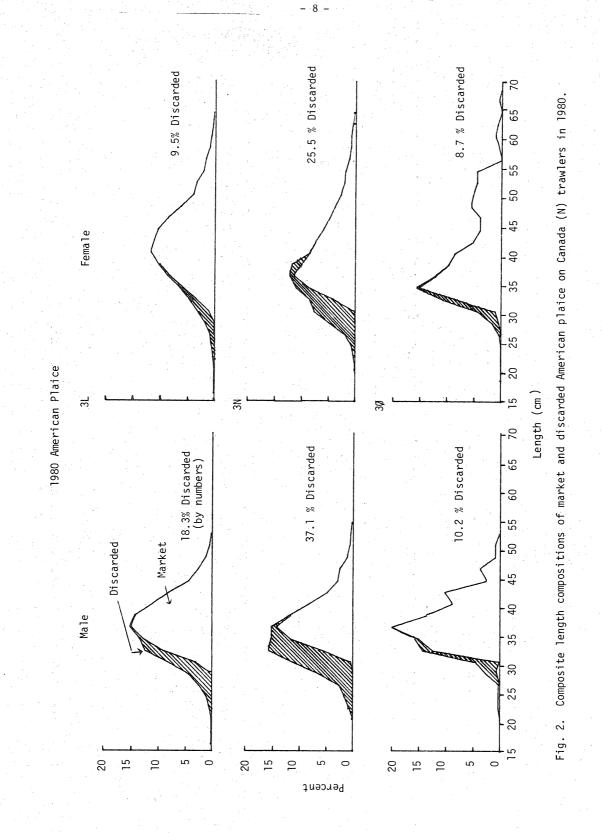
Table 5. 1980 Divisions 3LNO American plaice catch and landing age composition estimates for Canada (N) otter trawl fishery based on discard •

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