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By-catch Levels of Greenland Halibut in the Roundnose Grenadier Directed Fishery of NAFO Subareas 2+3

by

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Introduction

Nominal catches of roundnose grenadier in NAFO Subareas 2 and 3 ranged from 12,000 to 28,000 t during 1967-78 with the exception of a 75,000 t catch in 1971. Catches from 1979-82 averaged about 5000 t with provisional statistics indicating about 4000 t being caught in 1982. The major prosecutors of the roundnose grenadier fishery are the Soviet Union and the German Democratic Republic. These countries report that the low catches in recent years have been due to by-catch constraints and not because of low abundance of the directed species. They have emphasized that the allowable 10% by-catch of Greenland halibut is too low in order to catch roundnose grenadier in areas of highest concentration. They have further contended that one of the main reasons for low catch rates recently is because of having to fish smaller concentrations of roundnose grenadier in order to avoid Greenland halibut catches in excess of 10%.

This document will present the available information on by-catches of Greenland halibut in the roundnose grenadier fishery by GDR and the USSR as reported by the Foreign Observer Program, Newfoundland Region, in 1981 and 1982. Data obtained from research vessel surveys will also be discussed.

Materials and Methods

Foreign Observer Program

These data were collected by Canadian observers placed upon foreign vessels participating in the directed roundnose grenadier fishery. The data were recorded for each NAFO Division by month or quarter. The catches were recorded as well as catch per unit effort and mean depth over the number of sets observed. The percentage catch of roundnose grenadier and Greenland halibut were then calculated. The results are presented in Tables 1 and 2 for the GDR and USSR, respectively.

Research vessel data

Since 1977, groundfish surveys have been conducted in selected areas of NAFO Subareas 2 and 3 by the Canadian research vessel GADUS ATLANTICA. The surveys in NAFO Division 2J and 3K have all been carried out according to a stratified-random design while those in NAFO Divisions 2G and 2H were conducted according to the placement of fixed stations. For all NAFO Divisions attempts were made to include fishing stations beyond 1000 m in depth.

Results and Discussion

Foreign Observer Program

Observations were available from GDR vessels for Div. 2H and 2J in quarter 3 of 1981. The percentage by-catch of Greenland halibut ranged from 14% to 22% with a weighted mean of 19% (Table 1). The depth fished ranged from 556-683 m with a mean of 532 m. The mean percentage catch of roundnose grenadier was 52%. This would indicate an average of 30% by-catch other than Greenland halibut, most likely redfish given the depth range. In 1982 observations were available for Div. 3K in September and Div. 2H in October. For Div. 3K at a mean depth of 1015 m the Greenland halibut by-catch was 15% with 75% roundnose grenadier in the catch. For Div. 2H at a mean depth of 959 m, the Greenland halibut by-catch was 33% with only 45% roundnose grenadier.

For the USSR, 1981 data were available for Div. 2G, 2H, and 3K (Table 2). For Div. 3K, the mean depth was 1017 m yielding a mean catch of 80% roundnose grenadier and a mean by-catch of 13% Greenland halibut. For Div. 2G at a mean depth of 810 m the catch was comprised of 47% roundnose grenadier and 44% Greenland halibut. In Div. 2H at a mean depth of 740 m, the mean catch consisted of 51% roundnose grenadier and 38% Greenland halibut. For 1982, observations were available for Div. 2H, 2J, and 3K although results for Div. 2H and 2J were based on only 10 and 4 sets, respectively (Table 2). In Div. 2H at a mean depth of 966 m the mean catch consisted of 57% roundnose grenadier and 38% Greenland halibut. At a mean depth of 1000 m in Div. 2J the mean catch was 76% roundnose grenadier and 20% Greenland halibut. Division 3K yielded 87% roundnose grenadier with only a 5% by-catch of Greenland halibut at a mean depth of 1090 m.

Research vessel data

The research vessel data were summarized by trip and NAFO Division. The sets where roundnose grenadier occurred were compiled according to three depth ranges, 500-700 m, 701-1000 m, and greater than 1000 m. The percentages of Greenland halibut occurring in these depth ranges were then calculated with the results shown in Table 3. These data were further summarized by NAFO Division over the same depth ranges and presented in Table 4.

For NAFO Div. 2G there was a 39% by-catch of Greenland halibut in the 500-700 m range compared to 50% in the greater than 1000 m depth range (Table 4). However, the latter was based on only one small catch. In NAFO Div. 2H the shallow zone produced a 54% by-catch of Greenland halibut compared to systematic reduction to 23% in the deepest zone. In NAFO Div. 2J the shallow zone indicated a 52% by-catch with an increase to 60% in 700-1000 m and declined to 20% in the deepest zone. In NAFO Div. 3K Greenland halibut accounted for 35% of the catch at 500-700 m, 40% in 700-1000 m, and down to 26% at the deepest zone.

In general, it would appear from the data available here that the best catch rates for roundnose grenadier are at depths in excess of 1000 m (Tables 1 and 2) while the by-catch of Greenland halibut is generally the least beyond 1000 m. It is also evident that the by-catch of Greenland halibut in the deeper waters is lower in the more southerly areas. For NAFO Div. 3K the by-catch of Greenland halibut in both sets of commercial data ranges from 5-15%, compared to 26% in the research vessel data. For all areas north of NAFO Div. 3K the mean by-catch of Greenland halibut was 36% for depths greater than 1000 m in the combined commercial data (Tables 1 and 2). From research vessel data, the mean percentage by-catch of Greenland halibut for NAFO Subarea 2 was 21% for depths greater than 1000 m.

Table 1. Summary of catch data of roundnose grenadier and Greenland halibut in the directed roundnose grenadier fishery by the GDR in 1981-82 as taken from foreign observer reports.

NAFO Div.	Month	Catch(MT) RNG	Catch(MT) / Hr. RNG	Sets Observed	Mean Depth	% RNG	% G. Halibut
Year - 1981							
2H	Q3	18.8	0.570	14	556	68	20
2H	Q3	19.0	0.806	11	583	60	22
2H	Q3	37.8	0.671	25	569	64	21
2J	Q3	1.0	0.029	11	627	5	17
2J	Q3	5.5	0.168	11	683	32	14
2J	Q3	6.5	0.097	22	656	18	15
2HJ	Q3	24.3	0.335	27	582	46	18
2HJ	Q3	50.5	0.359	53	601	46	18
2HJ	All	163.4	0.485	174	532	52	19
Year - 1982							
3K	Sept.	32.5	0.850	12	1015	75	15
2H	Oct.	54.3	0.485	37	959	45	33

Table 2. Summary of catch data of roundnose grenadier and Greenland halibut in the directed roundnose grenadier fishery by the USSR in 1981-82 as taken from foreign observer reports.

NAFO Div.	Month	Catch(MT) RNG	Catch(MT) / Hr. RNG	Sets Observed	Mean Depth	% RNG	% G. Halibut
Year - 1981							
3K	July	151.3	0.770	56	1063	87	7
2G	Aug.	165.2	0.552	97	982	50	47
2H	Aug.	524.3	0.739	288	769	51	38
3K	Aug.	412.9	1.036	117	1052	86	7
2G	Sept.	82.5	0.383	80	637	40	52
2H	Sept.	46.2	0.449	32	711	53	38
3K	Sept.	540.6	0.855	214	935	73	19
3K	All	1104.8	0.911	387	1017	80	13
2G	All	247.7	0.496	177	810	47	44
2H	All	570.5	0.714	320	740	51	38
Year - 1982							
2H	Aug.	10.0	0.432	10	966	57	38
2J	Aug.	1.5	0.138	4	1000	76	20
3K	Aug.	250.9	0.690	109	1108	88	5
3K	Sept.	57.3	0.563	32	1072	85	7
3K	All	308.2	0.666	141	1090	87	5

Table 3. Relative proportion of Greenland halibut to roundnose grenadier, by depth, from catches of the research vessel GADUS ATLANTICA during stratified-random groundfish surveys.

Trip	Date	Div.	(500-700) WT R.N. Gren.	%G.Hal of TC 500-700	(701-1000) WT R.N. Gren.	%G.Hal of TC 701-1000	(>1000) WT R.N. Gren.	%G.Hal of TC >1000
3	Nov./Dec. 1977	2J	133.02	512	840.36	49	899.83	19
12	July/Aug. 1978	2J	586.45	136	306.63	59	621.34	22
		3K	420.86	20	180.90	66	778.60	11
13	Sept./Oct. 1978	2H	122.58	91	207.48	50	637.42	23
		2G	1717.94	46	-	-	40.40	50
24	Aug. 1979	2H	1364.31	111	378.19	46	-	-
		2G	353.67	225	-	-	-	-
26	Sept. 1979	2J	135.24	239	1102.71	61	2923.18	20
		3K	91.64	107	783.97	54	345.95	48
27	Sept./Oct. 1979	2J	317.72	85	-	-	175.09	16
		3K	-	-	1970.78	12	146.18	20
42	Oct. 1980	2J	2035.00	31	82.00	82	-	-
		3K	315.50	53	270.00	58	310.50	26
57	Oct./Nov. 1981	2J	2.00	4375	-	-	-	-
		2H	63.80	329	1633.00	18	-	-
		2G	2338.50	52	-	-	-	-
58	Nov. 1981	3K	280.80	61	-	-	-	-
		2J	70.25	944	196.20	66	23.00	41
59	Dec. 1981	3K	-	-	66.20	74	-	-
71	Oct./Nov. 1982	2J	16.40	1065	197.50	62	-	-
72	Nov./Dec. 1982	3K	58.40	187	243.70	50	-	-

Table 4. Relative proportion of Greenland halibut to roundnose grenadier, by depth, from catches of the research vessel GADUS ATLANTICA during stratified-random groundfish surveys.

Div.	Total WT G.Hal.	Total WT R.N. Gren.	%G.Hal. of TC 500-700	Total WT G.Hal.	Total WT Gren.	%G. Hal. of TC 700-1000	Total WT G. Hal.	Total WT Gren.	%G.Hal of TC >1000
2G	2800.55	4410.11	39	-	-	-	40.86	40.40	50
2H	1834.41	1550.69	54	881.09	2218.67	28	186.59	637.42	23
2J	3634.96	3296.08	52	4007.83	2725.40	60	1193.97	4642.44	20
3K	627.50	1167.20	35	2340.45	3515.55	40	559.09	1581.23	26