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An Update on Roundnose Grenadier (*Coryphaenoides rupestris*)
NAFO Subareas 2+3 with Information on Roughhead Grenadier
(*Macrourus berglax*)

by

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Introduction

A commercial fishery for roundnose grenadier in NAFO Subareas 2+3 began in 1967 based on the results of exploratory fishing by the USSR during the late 1950s and early 1960s. The first reported catch was about 17,000 t. From then until extension of jurisdiction by Canada in 1977, nominal catches were greater than 20,000 t in most years (Table 1, Fig. 1). During this period, most of the annual catch was taken in Div. 3K with the exception of 1971 when over 50,000 t was reported from Div. 2G.

Catches declined to only about 2,000 t in 1980, but increased somewhat during the 1980s to about 7,000 t in 1986 and 1987 due to increased catches by the USSR and to some extent, GDR (Table 2). Catches have declined again since then as a result of declines in catches by 'traditional' countries in 'traditional' areas, and since beginning in 1993 there has been no allocation to non-Canadian vessels inside the Canadian zone. Thus the only remaining catches are restricted to by-catch associated with the Greenland halibut fishery primarily prosecuted by non-Canadian fleets outside 200 miles in Div. 3LMNO.

Previous assessments (e.g., Atkinson et al. MS 1993) indicated that although catches by "traditional" countries declined since 1989, average catches remained between 4,000-5,000 t. This was because EU members such as Portugal reported increased catches during this period. It had been recognized for a number of years that the reported catches most likely represented a mixture of both roundnose and roughhead grenadiers. Atkinson et al. (MS 1994) revised the catch records based on information from Spain and Portugal on the species mix in the catches (Table 1). Portugal reported that all of their catch was roughhead grenadier. Beginning in 1990, more roughhead grenadier have been caught than roundnose (Table 1).

During the years of the directed fishery for roundnose grenadier, most of the catch was taken during the second half of the year (Table 3). The distribution of actual roundnose grenadier catches by area and season in the Regulatory Area in recent years has not been confirmed, but based on reports to NAFO, catches have been taken primarily during the first half of the year corresponding with the period of the most effort for Greenland halibut.

Although Canada requests the Scientific Council of NAFO to provide information on the resource inside the Canadian Zone, the absence of any fishery makes this increasingly difficult. Deepwater surveys have been conducted by Canada (directed at Greenland halibut) in 1991, 1994 and 1995 in Div. 3K and south, and the limited information is restricted to results of these. Information from these surveys pertaining to roughhead grenadiers is also presented and compared to catches in the Regulatory Area.

Methods and Results

Atkinson et al. (MS 1994) reported on the results of Canadian deepwater surveys (750-1500 m) in 1991 and 1994. Another survey was conducted by Canada in the spring of 1995 (see Bowering et al. MS 1995). All 3 surveys showed a concentration of roundnose grenadier on the 'traditional' grounds of Div. 3K at about 51° N (Atkinson et al. MS 1994, Bowering et al. MS 1995). There was a decline in the size of catches in this area between 1994 and 1995. Concentrations in the Sackville Spur area of Div. 3L, across the north of Flemish Cap, and in Flemish Pass were not as great as those in Div. 3K. Catch rates declined between 1994 and 1995 in these areas as well. Estimates of trawlable biomass of roundnose grenadier from these two surveys (Table 4a) indicate a decline in Div. 3K between 1994 and 1995, but declines occurred in both 3L and 3M from 1991 to 1995. The biomass by Division is lowest in Div. 3N, and did not appear to change between 1994 and 1995.

The estimates of biomass for roughhead grenadiers (Table 4b) were lower than for roundnose in Div. 3K, and did not change from year to year. The biomass estimates for Div. 3L have increased somewhat, while those for Div. 3M have increased dramatically. The biomass in Div. 3N in 1994 was the lowest of the 3 divisions, but was about 6 times higher than the estimate for roundnose grenadier.

Comparison of reported catches of roundnose and roughhead grenadiers in the Regulatory Area with the survey results is as follows:

Species	1991	1994
Roundnose Grenadiers	4%	32%
Roughhead Grenadiers	38%	22%

Based on these comparisons, the exploitation rate of roundnose grenadier has increased, whereas that on roughheads has decreased.

Discussion

Because of a cessation of fishing for roundnose grenadier within the Canadian Zone, the commercial database can no longer be used to evaluate the resource in this area. Deepwater surveys in Div. 3K in 1991 and 1994 suggested no change in status in Div. 3K during this time period, but a decline of about 70% was noted in 1995. The current TAC for all of Subareas 2+3 inside the Canadian zone (3 000 tons) is about 15% of the estimated biomass for Div. 3K in 1991 and 1994, where the traditional fishery was primarily prosecuted, and previously did not appear to be excessive (NAFO Sci. Coun. Rep., 1994, page 113). This current TAC for the area inside the Canadian zone is about 50% of the 1995 estimated biomass, and if the observed decline between 1994 and 1995 is real, may be excessive.

The estimated biomass in Div. 3LMN in 1995 declined by about 45% compared to 1994. The observed decline could have been the result of excessive fishing pressure, but it is not possible to verify this.

The biomass estimates of roughhead grenadier appear to have increased even though fishing pressure may be relatively high. The potential impact of this fishing pressure cannot be determined.

Since there is no directed fishery for either species in the Regulatory Area at present, and they are taken only as by-catch in the Greenland halibut fishery. The reduced effort directed at Greenland halibut should also result in reductions in catch of the grenadiers.

References

Anon. 1994. NAFO Sci. Coun. Rep., 1994, page 113.

Atkinson, D.B. and D. Power, and J. Morgan. MS 1994. Roundnose Grenadier (*Coryphaenoides rupestris*) and Roughhead Grenadier (*Macrourus berglax*) in NAFO Subareas 2+3. NAFO SCR Doc. 94/48. Ser. No. N2419. 11p.

Bowering, W.R., D. Power and M.J. Morgan. MS 1995. Distribution and Abundance of Five Major Groundfish Species at the Continental Slope of Divisions 3KLMN Based upon Canadian Deepwater Surveys in 1991, 1994 and 1995. NAFO SCR Doc. 95/51. Ser. No. N2562. 26p.

Table 1: Summary of nominal catches (t) of roundnose grenadier by Subarea and Division.

Year	2G	2H	2J	3K	Other	Total	TAC	Roughhead Grenadier
1966								
1967	-	868	217	16,009	210	17,304		
1968	2,536	4,089	479	23,553	606	31,263		
1969	387	-	264	11,682	-	12,333		
1970	-	-	468	22,267	129	22,864		
1971	54,179	2,738	81	18,392	55	75,445		
1972	2,161	655	293	21,122	155	24,386		
1973	5,880	232	632	10,655	165	17,564		
1974	3,220	2,007	333	22,816	40	28,416	32,000	
1975	6,489	3,536	1,754	15,388	258	27,425	32,000	
1976	3,841	1,460	1,381	13,636	275	20,593	32,000	
1977	2,597	525	206	11,935	123	15,386	35,000	
1978	3,112	1,412	913	15,250	15	20,702	35,000	
1979	1,035	3,090	438	3,200	18	7,781	35,000	
1980	279	493	726	451	104	2,053	30,000	
1981	967	1,693	463	3,920	42	7,085	27,000	
1982	719	734	182	2,709	-	4,344	27,000	
1983	140	1,390	36	1,916	87	3,569	11,000	
1984	107	289	3	3,362	112	3,873	11,000	
1985	-	80	13	4,642	213	4,948	11,000	
1986	-	117	53	7,222	32	7,424	11,000	3
1987	80	254	213	6,682	68	7,297	11,000	1,001
1988	329	226	9	4,658	160	5,382	11,000	911
1989	32	202	47	4,361	24	4,666	11,000	290
1990	86	52	2	606	73	819	11,000	3,211
1991	0	0	45	89	18	627	11,000	4,486
1992 *	1	1	0	0	2,429	2,912	11,000	4,585 a
1993 *	125	2	0	0	4,281	4,408	11,000	6,347 b
1994 *	0	0	0	0	3,369	3,369	3,000	4,835 c
1995							3,000	

* Provisional (1991 catch could not be well estimated; based on revised data is estimated to be 5,000-10,000 t).
 1994 and 1995 TACs for Canadian zone only
 1991 total includes 475 t from Division 'unknown'
 1992 total includes 481 t from Division 'unknown'
 Catches reported from 'Other' since 1987 contain a mix of roundnose and roughhead grenadiers.

NOTE: Portugal has indicated that catches from 1988 onwards previously reported as roundnose grenadier were actually roughhead grenadier. The table shows the revised estimates with Portugal removed. Spain has estimated that their 1992 reported roundnose grenadier catch was actually about 52% roughhead grenadier (about 2,585 t). The table has been adjusted for this.

a includes estimated roughhead catches of 2,585 t by Spain and 2,000 t by Portugal.
 b includes estimated roughhead catches of 4,378 t by Spain and 1,969 t by Portugal.
 c includes estimated roughhead catches of 4,789 t by Spain and 46 t by Portugal.

1994 Catch Estimates

	3L	3M	3N	3O	Total
Roundnose	285	2,097	860	127	3,369
Roughhead	1,315	890	2,528	102	4,835

Table 2: Nominal catches (t) of roundnose grenadier in Subarea 2+3 by country and year.

Country	1983	1984	1985	1986	1987	1988	1989	1990	1991*	1992*	1993*	1994*
Canada	-	-	-	9	10	2	20	155	150	449	-	-
FRG	-	23	178	13	-	8	-	-	11	34	-	-
GDR	2,586	3,650	3,740	4,571	4,469	3,380	2,352	1	-	-	-	-
Poland	50	51	12	17	1	17	17	-	-	-	-	-
Spain	-	-	-	-	-	-	-	-	-	2,386	4,281	3,369
USSR	933	147	1,018	2,801	2,725	1,890	2,230	538	286	-	-	-
Russia	-	-	-	-	-	-	-	-	-	30	-	-
Japan	-	2	-	13	79	85	46	125	157	80	127	-
EEC	-	-	-	-	-	-	-	-	-	-	-	-
Portugal	-	-	-	-	-	-	-	-	-	-	-	-
Faroese	-	-	-	-	9	-	-	-	-	1	-	-
Norway	-	-	-	-	-	-	1	-	23	-	-	-
Cuba	-	-	-	-	4	-	-	-	-	-	-	-
Den(Green)	-	-	-	-	-	-	-	-	-	2	-	-
TOTAL	3,569	3,873	4,948	7,424	7,297	5,382	4,666	819	627	2,982	4,408	3,369

* Provisional.

Note: Totals reflect information that Portuguese catches were roughhead grenadiers.

Table 3: Nominal catches (t) of roundnose grenadier in Subarea 2+3 by month and year.

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1983	3	18	4	-	3	1	1	74	1,292	861	866	446	3,569
1984	31	13	6	19	-	5	-	45	460	3,018	123	153	3,873
1985	44	7	1	96	73	-	54	873	1,869	1,361	537	33	4,948
1986	6	5	-	-	-	-	117	2,818	2,093	1,555	494	336	7,424
1987	6	1	0	0	16	0	15	2,691	1,633	1,249	1,181	505	7,297
1988	2	0	6	-	8	16	783	834	661	1,381	1,538	153	5,382
1989	1	12	4	17	0	4	545	1,497	692	879	945	70	4,666
1990	4	12	22	-	2	-	121	363	21	71	61	21	819 a
1991	-	3	45	5	9	8	8	31	26	16	2	1	627 b
1992	173	634	740	606	928	606	194	255	399	208	155	112	5,567 c
1993	0	235	356	336	336	248	184	25	93	103	29	62	4,408 d

* Provisional.

a includes 121 t from month 'unknown'

b includes 473 t from month 'unknown'

c includes 557 t from month 'unknown', and monthly totals represent a mix of the two species

d includes 2,401 t from month 'unknown'

Note: Totals reflect information that Portuguese catches were roughhead grenadiers.

Table 4: Stratified-random estimates of biomass and abundance from Canadian deepwater surveys (from Atkinson et al. MS 1994, and Bowering et al., MS 1995).

a) Roundnose grenadier

<u>Division</u>	1991		1994		1995*	
	<u>Numbers</u>	<u>Weights (t)</u>	<u>Numbers</u>	<u>Weights (t)</u>	<u>Numbers</u>	<u>Weights (t)</u>
3K	48,252,576	19,822	70,550,664	21,397	32,811,000	6,630
3L	17,065,958	4,394	8,495,133	1,546	5,453,000	888
3M	38,655,104	11,576	33,031,109	8,475	21,939,000	4,415
3N	not surveyed		2,211,571	516	1,942,000	479
Total	103,973,638	35,791	114,288,477	31,935	62,145,000	12,412

b) Roughhead grenadier

<u>Division</u>	1991		1994		1995*	
	<u>Numbers</u>	<u>Weights (t)</u>	<u>Numbers</u>	<u>Weights (t)</u>	<u>Numbers</u>	<u>Weights (t)</u>
3K	6,983,663	4,273	7,488,857	4,137	14,243,000	5,659
3L	11,154,304	6,354	14,347,454	8,960	38,242,000	11,528
3M	8,655,487	5,588	17,814,038	10,465	19,005,000	22,176
3N	not surveyed		4,848,764	3,028	9,957,000	6,122
Total	26,793,454	16,214	44,499,113	26,589	81,447,000	45,485

* From Bowering et al., 1995

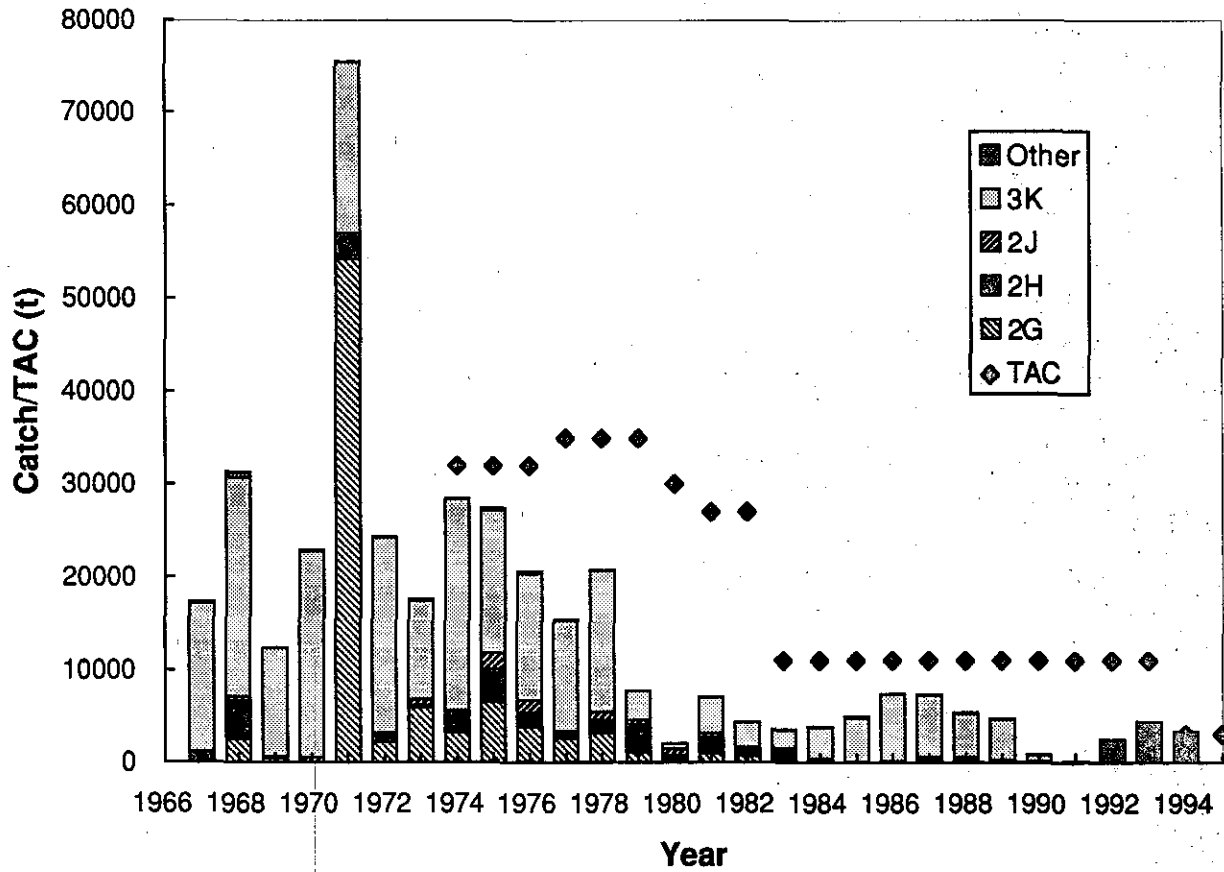


Figure 1: Catches of roundnose grenadier in SA 2+3 after adjustment for estimates of roughhead grenadier catch previously reported as roundnose grenadier by Spain and Portugal.