NOT TO BE CITED WITHOUT PRIOR
REFERENCE TO THE AUTHOR(S)

Northwest Atlantic Fisheries Organization

Serial No. N690

NAFO SCR Doc. 83/VI/37

SCIENTIFIC COUNCIL MEETING - JUNE 1983

Roundnose Grenadier in Subareas 0+1 and 2+3

by

D.B. Atkinson
Fisheries Research Branch
Department of Fisheries and Oceans
P.O. Box 5667
St. John's, Newfoundland A1C 5X1

INTRODUCTION

Analytical assessment techniques have not been used in recent years due to the lack of catch at age data. Up until 1979 the general production model was commonly used for the 2+3 stock but since then the regressions of catch rate on effort have not been significant. Much discussion has been centred around the catch rate series which has shown a fairly steady decline since about 1975. USSR scientists have indicated that the declining catches and catch rates are not indicative of stock status but are more reflective of the by-catch restrictions coupled with an increase in the turbot population. In 1982, while acknowledging the comments of the USSR scientists, STACFIS concluded that the continuing downward trend in catch rates could not be ignored. As a result, the TAC was lowered from the 1982 level of 27,000t to 11,000t in 1983.

In recent years the grenadier fishery in Subareas 0+1 has been a by-catch fishery and no updated assessments have been carried out.

METHODS AND RESULTS

Nominal catches for the two stocks are shown in Table 1 and are illustrated in Fig. 1 for the 2+3 stock. In Subareas 0+1 catches peaked at about 12,000t in 1974 but have declined since then to a low of 18t in 1982. Since their imposition in 1975, the TAC's have never been achieved. The fact that there has been little to no directed fishery for grenadier in this area since 1979 precludes any assessment.

Grenadier catches in Subareas 2+3 show a marked drop from 1979 onwards when compared with those of earlier years. This decline is partly related to a decline in the standardized effort as seen in Fig. 2.

The multiplicative model (Gavaris 1980) was again used to standardize the catch rate. The Foreign Observer Program (F.O.P.) data were available for 1982 although they acounted for only 9% of the total reported catch. The results of the regressions (Table 2) indicate that they are significant. The standardized (to 1967) catch rates and effort are shown in Table 3 and Fig 2 and 3. It can be seen that catch rates continued to drop in 1982.

Regressions of CPUE on effort with and without the 1971 point (Table 4a and b respectively) show no correlation and thus once again the general production model cannot be used.

The above data do not provide any new insights into the status of roundnose grenadier in Subareas 2+3 and based upon these no change can be suggested for the 1984 TAC from that of 1983.

REFERENCES

Gavaris, S. 1980. Use of a multiplicative model to estimate catch rate and effort from commercial data. Can. J. Fish. Aquat. Sci. 37: 2272-2275.

Table 1. Roundnose grenadier nominal catches by Subarea and Division, 0+1, 2+3.

Year	0	1	Total 0+1	Subarea/Division 2G	2H	2J	3K	Other	Total 2+3
1967	1,129	6	1,135	-	868	217	16,009	210	17,304
1968	5,996	284	6,280	2,536	4,089	479	23,553	606	31,263
1969	2,642	68	2,710	387	-	264	11,682	-	12,333
1970	545	5,980	6,525	-	-	468	22,267	129	22,864
1971	4,172	4,132	8,304	54,179	2,738	81	18,392	55	75,445
1972	5,783	2,311	8,094	2,161	655	293	21,122	155	24,386
1973	1,054	3,830	4,884	5,880	232	632	10,655	165	17,564
1974	2,661	9,657	12,318	3,220	2,007	333	22,816	40	28,416
1975	204	4,749	4,953	6,489	3,536	1,754	15,388	258	27,425
1976	2,610	5,893	8,503	3,841	1,460	1,381	13,636	275	20,953
1977	721	2,214	2,935	2,597	525	206	11,935	123	15,387
1978	-	5,839	5,839	3,112	1,412	913	15,250	12	20,699
1979	106	6,815	6,921	1,035	3,090	438	3,200	19	7,782
1980	32	1,721	1,753	279	493	726	451	104	2,053
1981	-	392	392	967	1,693	463	3,920	42	7,085
1982[a]			18						3,894

[a]: Provisional

Table 2. REGRESSION OF MULTIPLICATIVE MODEL

MULTIPLE R.....0.678
MULTIPLE R SQUARED.....0.460

ANALYSIS OF VARIANCE

SOURCE OF VARIATION	DF	SUMS OF SQUARES	MEAN SQUARES	F-VALUE
INTERCEPT	1	1.102E1	1.102E1	
REGRESSION	26	3.651E1	1.404E0	5.707
TYPE 1	3	3.433E0	1.144E0	4.650
TYPE 2	5	3.946E0	7.891E-1	3.207
TYPE 3	3	1.995E0	6.651E-1	2.703
TYPE 4	15	1.918E1	1.279E0	5.196
RESIDUALS	174	4.282E1	2.461E-1	
TOTAL	201	9.036E1		

Table 3. PREDICTED RELATIVE POWER

YEAR	TOTAL CATCH	PROP.	RELATIVE POWER MEAN	S.E.	EFFORT
1967	17304	0.890	1.000	0.000	17304
1968	31263	0.070	0.553	0.185	56566
1969	12333	0.551	0.611	0.204	20193
1970	22864	0.953	1.270	0.418	18001
1971	75445	0.932	1.217	0.347	61985
1972	24386	0.752	0.849	0.259	28708
1973	17564	0.489	1.380	0.473	12727
1974	28416	0.418	0.936	0.277	30357
1975	27425	0.311	1.113	0.345	24646
1976	20593	0.456	0.769	0.243	26793
1977	15387	0.812	0.588	0.172	26153
1978	20699	0.721	0.799	0.229	25912
1979	7782	0.793	0.495	0.142	15730
1980	2053	0.842	0.592	0.183	3468
1981	7085	0.718	0.431	0.127	16422
1982	3894	0.092	0.212	0.080	18381

AVERAGE C.V. FOR THE MEAN:0.294

Table 4: Regressions of standardized effort for roundnose grenadier in Subareas 2+3.
a) including 1971

CORRELATION MATRIX (WITH T-VALUES)

1.00000	0.15367
0.58191	1.00000

MEAN OF DEPENDENT VARIABLE 0.80094

VARIABLE	MEAN	ESTIMATED COEFFICIENT	STD. ERROR	T-VALUE
CONSTANT TERM		0.71507	0.17020	4.20128
1	25209.12500	0.00000	0.00001	0.58191

SOURCE OF VARIATION	DF	SUM OF SQUARES	MEAN SQUARE	F-STATISTIC
MEAN	1	10.26401		
REGRESSOR;X 1	1	0.03899	0.03899	0.33861
RESIDUAL	14	1.61188	0.11513	
TOTAL	16	11.91488		

COEFFICIENT OF DETERMINATION (R^2).....	0.0236155965
CORRECTED R^2 ($\bar{R}^2$).....	-0.0461261466
F-STATISTIC FOR SIGNIFICANCE OF REGRESSION(1, 14)	0.338614944
STANDARD ERROR OF THE ESTIMATE.....	0.3393149228
DURBIN-WATSON STATISTIC.....	1.2041432405
COEFFICIENT OF VARIATION (AT THE MEAN OF Y)..(%)	42.3647191938

b) ommiting 1971

CORRELATION MATRIX (WITH T-VALUES)

1.00000	-0.09193
-0.33289	1.00000

MEAN OF DEPENDENT VARIABLE 0.77320

VARIABLE	MEAN	ESTIMATED COEFFICIENT	STD. ERROR	T-VALUE
CONSTANT TERM		0.83105	0.19405	4.28265
1	22757.40000	0.00000	0.00001	-0.33289

SOURCE OF VARIATION	DF	SUM OF SQUARES	MEAN SQUARE	F-STATISTIC
MEAN	1	8.96757		
REGRESSOR;X 1	1	0.01239	0.01239	0.11081
RESIDUAL	13	1.45383	0.11183	
TOTAL	15	10.43380		

COEFFICIENT OF DETERMINATION (R^2).....	0.0084519958
CORRECTED R^2 ($\bar{R}^2$).....	-0.0678209276
F-STATISTIC FOR SIGNIFICANCE OF REGRESSION(1, 13)	0.1108125319
STANDARD ERROR OF THE ESTIMATE.....	0.3344145164
DURBIN-WATSON STATISTIC.....	1.0300880087
COEFFICIENT OF VARIATION (AT THE MEAN OF Y)..(%)	43.2507134561

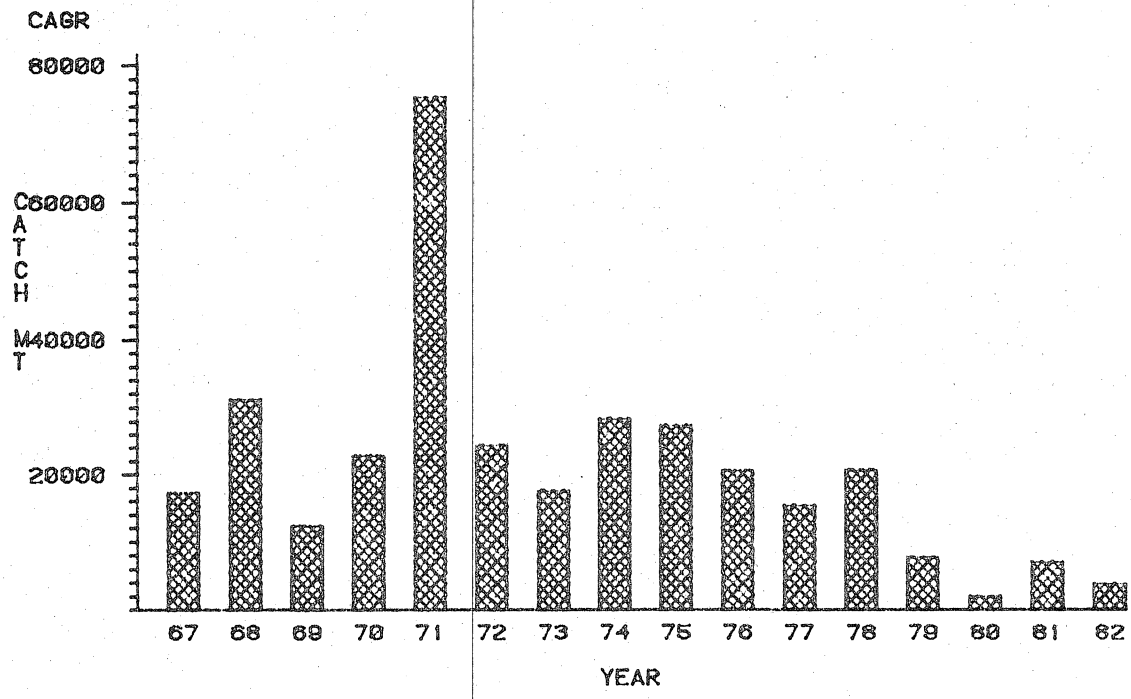

FIG.1: NOMINAL CATCHES OF RNG IN SUBAREAS 2+3
(1982 IS PROVISIONAL)

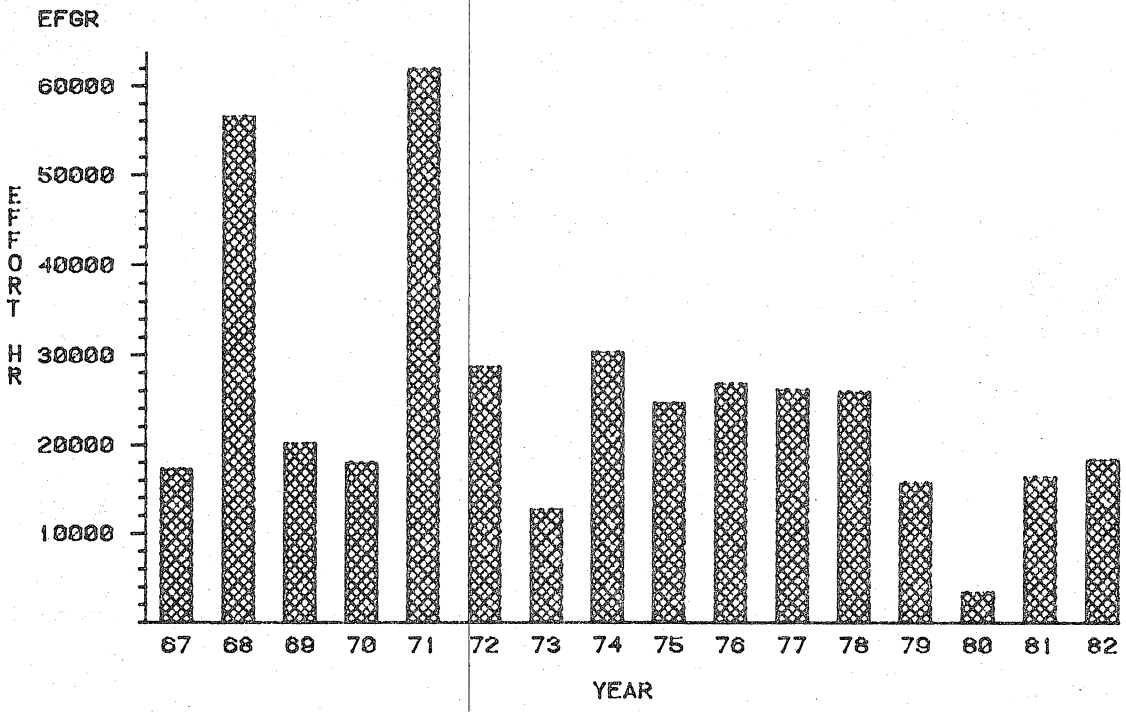

FIG.2: STANDARDIZED EFFORT FOR RNG IN SUBAREAS 2+3

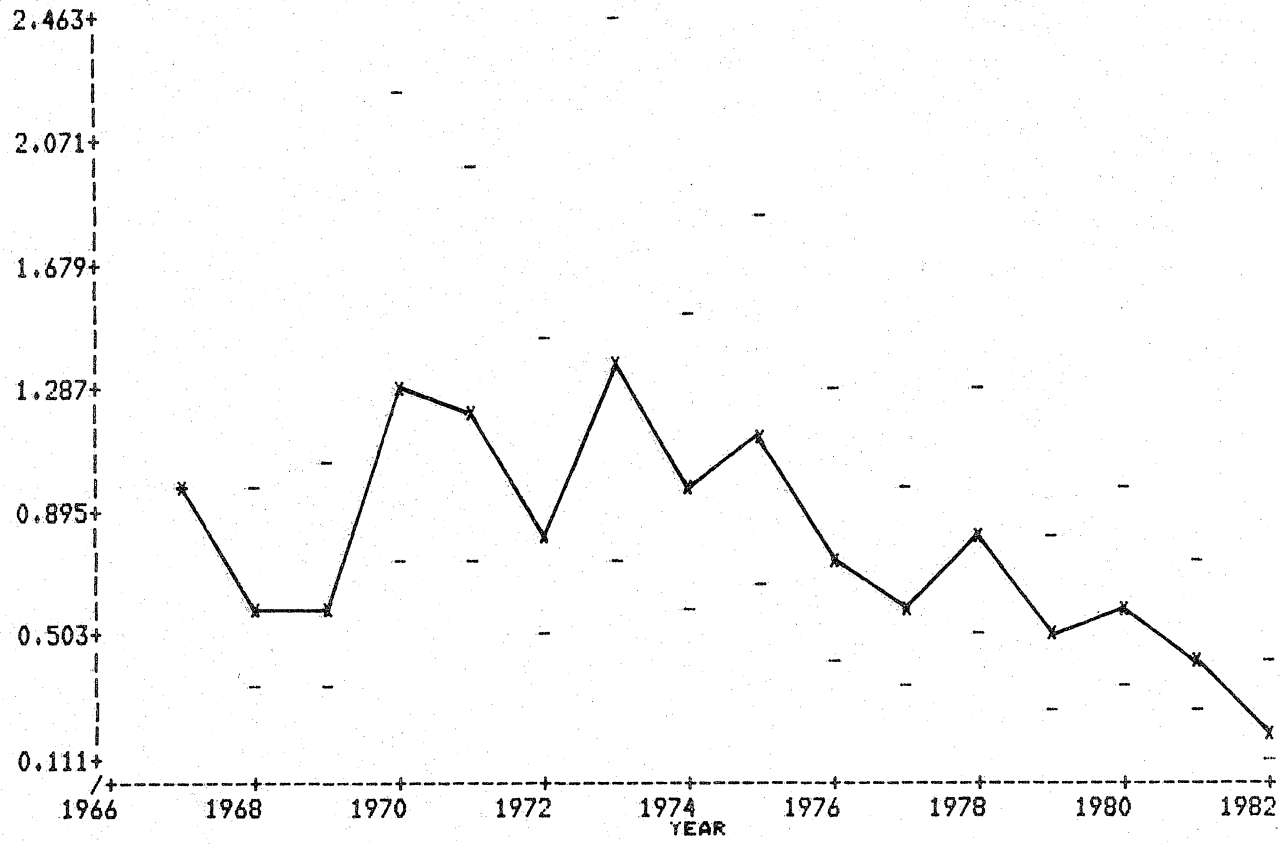

Fig. 3: Standardized CPUE for roundnose grenadier is Subareas 2 & 3.