Northwest Atlantic Fisheries Organization

Serial No.N155

NAFO SCR Doc. 80/VI/100

SCIENTIFIC COUNCIL MEETING - JUNE 1980

Assessment of the Roundnose Grenadier Stocks in Subareas 0+1 and 2+3

by

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Introduction

Pinhorn (1974) presented the first preliminary assessment of roundnose grenadier in SA 2+3. Since then, Borrmann (1976, 1978) has presented assessments of both stocks based upon cohort analyses; and Parsons et al (1978) and Atkinson (1979) presented assessments based upon the general production model (Schaefer, 1954). To date insufficient data are available to the Canadian Department of Fisheries and Oceans through NAFO to carry out an analytical assessment and thus this paper describes an updated general production assessment based upon a modified effort standard.

Materials and Methods

Previously (Parsons et al, 1978, Atkinson, 1979), tonnage class 7 stern trawlers (all countries OTB 1) have been used as the effort standard in both SA 0+1 and 2+3. In recent years, with the expansion of this fishery to include a wider variety of countries, tonnage classes and gears, it was thought appropriate to modify the effort standard so that as many of the categories as possible could be taken into consideration. Catches constituting >50% of the total were considered to be grenadier directed.

Catch rates in SA 0+1 and 2+3 were standardized using a multiplicative model as employed by Gavaris (1980). The category types used were country-gear combinations, area, month and years. The data were weighted by a) unadjusted effort, and b) catch.

The modified effort data were then applied to the Schaefer general production model (Schaefer, 1954). Running averages were not used because of the small data base. The 1971 catch effort data for SA 2+3 were not used and in SA 0+1 in 1978 the effort base was lost as the grenadier fishery was made up entirely of by-catches.

Results and Discussion

SA 0+1

Trends in catch, effort and catch per unit effort (standardized, weighted by effort) can be seen in Table 1 and Figure 1. Catches have averaged in the area of 6,000 mt since 1968 with a peak of 12,000 mt in 1974 and a low of 3,000 mt in 1977. Effort, after showing a steady increase in earlier years has dropped from 10,000 standard hours in 1974 to 2,000 standard hours in 1977. Catch per unit effort dropped after the first 3 years of reported fishing then held fairly steady until 1976 when it again increased to a level slightly below that of the early years. These higher catch rates were maintained in 1977.

The regression of CPUE on effort and the resulting Schaefer parabola can be seen in Fig. 3. The regression correlation is not very good ($r^2 = 0.4861$) but the standardization procedure did improve this correlation from that presented previously (Atkinson, 1979). The suggested MSY is 9,000 mt and the yield at 2/3 F_{MSY} is 8,000 mt. Based upon the general production model and the apparent recovery in catch per unit effort it is suggested that the 1981 TAC remain at the 1980 level of 8,000 mt.

SA 2+3

Table 2 and Figure 3 show the trends in catch, effort and catch per unit effort (standardized, weighted by catch) in this area. Catches have averaged in the range of 20,000 mt with a peak of 75,000 mt in 1971 (due to an unusually high catch of 54,000 mt in 2G in contrast to the long term average of approximately 6,000 mt) and a low of 7,500 mt in 1979 (provisional). Effort has fluctuated greatly but appears to be leveling off in recent years. Catch rates can be seen to fluctuate but tend to show a

gradual decline from 1977 to the present.

Figure 4 shows the regression of CPUE on effort (1971 point excluded) and the general production parabola. Again it can be seen that the regression correlation is poor ($r^2 = 0.3537$). The standardization procedure as presented did not result in an improved correlation over that determined using the old standard.

The general production model suggests an MSY of 30,000 mt and a yield at 2/3 F_{MSY} of 26,000 mt.

Gneral

For both areas it has been pointed out that the correlation coefficient between CPUE and effort is not good. It is felt that a partial reason for this exists in the presentation of data in the ICNAF Statistical Bulletins in that except for rare incidents directed fisheries are listed as "Groundfish" or "mixed" rather than "roundnose grenadier" thus masking some of the data. Also, on certain occasions, capelin directed fisheries have reported >50% grenadier catches. Because of this it is proposed that countries participating in this fishery be strongly encouraged to report grenadier directed effort whenever appropriate.

References

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Table 1. Catch, effort (standaradized) and CPUE for roundnose grenadier in SA 0+1.

Year	Catch (mt)	Effort (hr)	CPUE
1968	6284	3106	2.023
1969	3068	1574	1.949
1970	6980	3286	2.124
1971	8132	7481	1.087
1972	8094	6950	1.163
1973	4884	4687	1.042
1974	12318	10646	1.157
1975	4953	7056	0.702
1976	8503	5210	1.632
1977	2935	2003	1.465
1978[1]	5807		
1979[2]	5602		

[1] No directed effort.

[2] Provisional.

Table 2. Catch, effort (standardized) and CPUE for roundnose greandier in SA 2+3.

Year	Catch (mt)	Effort (hr)	CPUE
1967	17304	9435	1.834
1968	31263	27304	1.145
1969	12333	10043	1.228
1970	22864	9283	2.463
1971	75445	34278	2.201
1972	24386	14379	1.696
1973	17564	8061	2.179
1974	28416	19927	1.426
1975	27425	14986	1.830
1976	20593	11030	1.867
1977	15386	11754	1.309
1978	20702	14016	1.477
1979[1]	7537		

[1] Provisional.

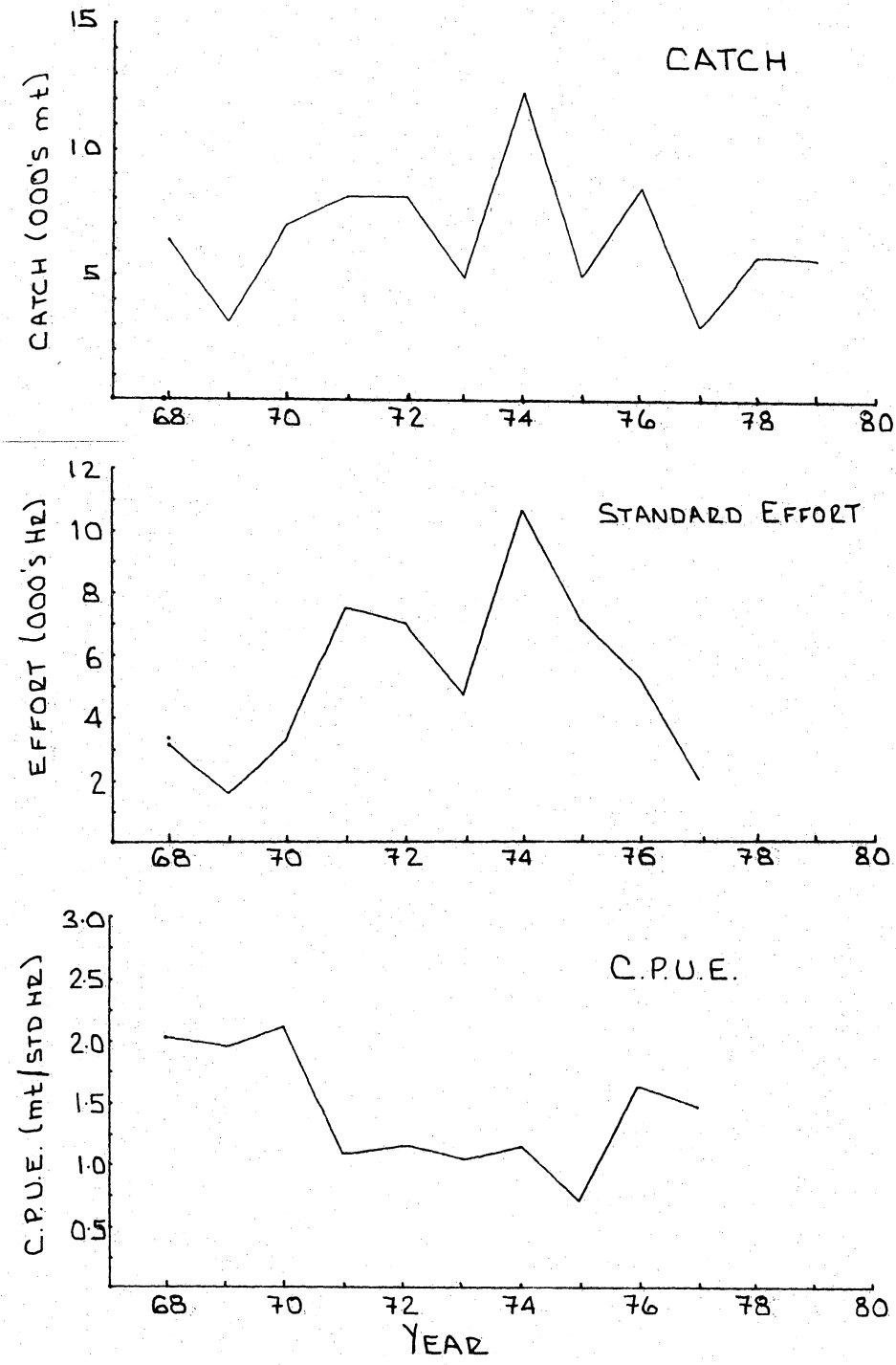

Fig. 1. Catch, effort, and CPUE for roundnose grenadier in SA 0+1, 1968-77.

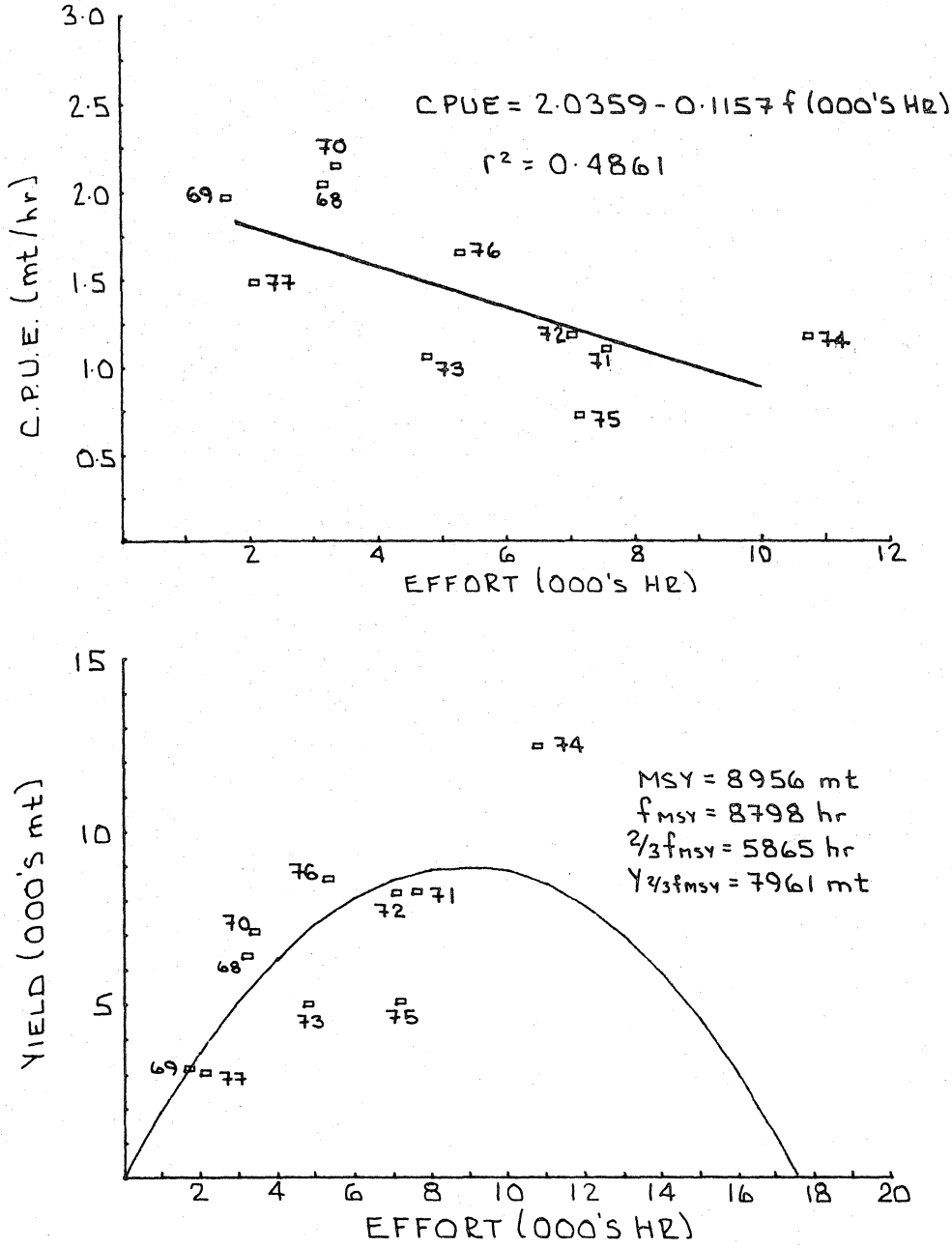

Fig. 2. Regression of CPUE on effort and resulting Schaefer parabola for roundnose greanadier in SA 0+1.

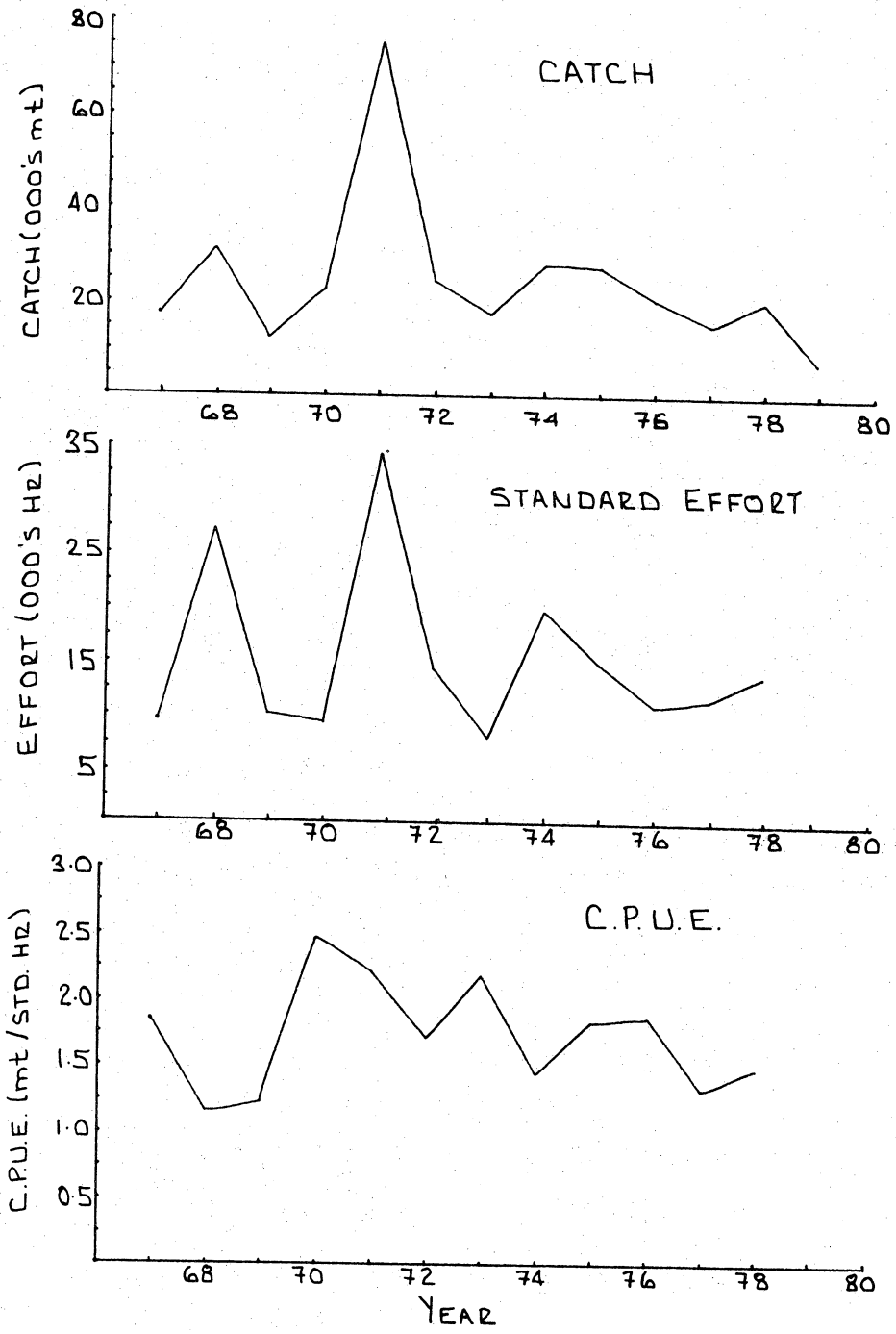

Fig. 3. Catch, effort and CPUE for roundnose grenadier in SA 2+3, 1967-78.

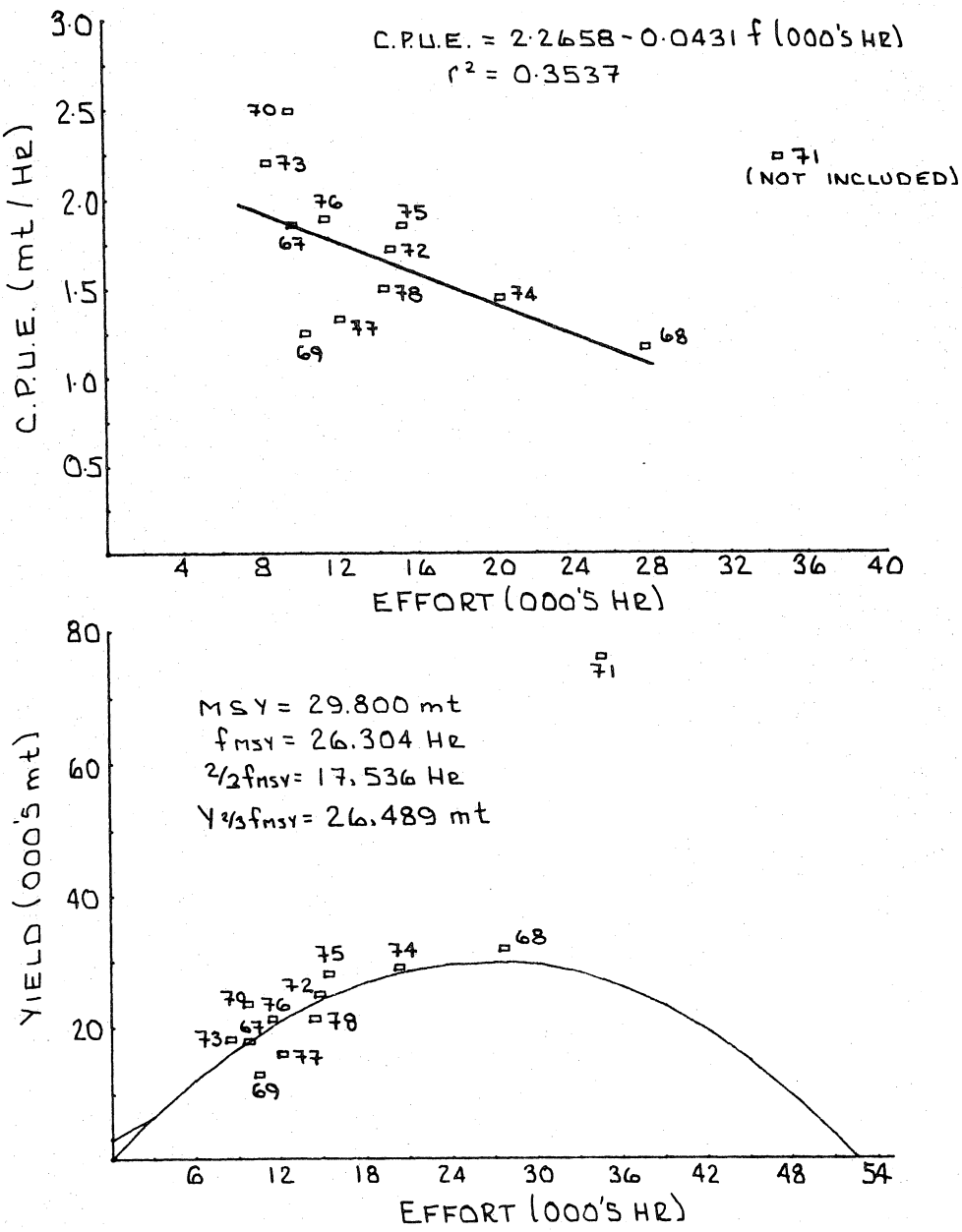

Fig. 4. Regression of CPUE on effort and resulting Schaefer parabola for roundnose grenadier in SA 2+3.