International Commission for the Northwest Atlantic Fisheries

Serial No. 5386

ICNAF Res. Doc. 79/VI/47
(2nd Revision)

ANNUAL MEETING - JUNE 1979

Assessment of the Cod Stock in Divisions 2GH

by

S. Gavaris
Newfoundland Environment Center
St. John's, Newfoundland

INTRODUCTION

Exploitation of the 2GH cod stock has been sporadic. Part of the reason for this is that access to the stock in the spring is dependent on ice conditions. It is not clear yet if this stock is separate from the cod stock in 2J-3KL but it is managed as if it were. Slow growth rates suggest that this system may not be as resilient to intervention as more southern stocks. The history of the fishery is summarized in Fig. 1. The status of the stock was assessed by means of a general production analysis.

METHOD

A standardization technique similar to the one used for the cod stock in 3M allowed usuage of almost all of the catch effort data available. An additional category of "power factors" was included to take into account the different divisions within the stock area.

The catch and the standardized effort data were used as input for the PRODFIT computer program (Fox, 1975). Various values of m were tried in the formula

$$C/f = (a + bf)^{\frac{1}{m-1}}$$

RESULTS

The results of the standardization technique showed that there was a wide range in efficiency of different country-gear types (See Table 1). In general, however, larger tonnage class boats were more efficient than smaller ones. There was also large variability in catch rates between months. The early part of the year had higher "powers". Division differences were not significant. The regression from which the power factors were obtained was highly significant ($P<.001$) with a multiple correlation of $R=.66$.

Fig. 2 shows the yield curve obtained with the standardized effort by using a value of $m=1.5$. This value of m gave the most satisfactory fit to the data. The MSY from this analysis was 53,587 tons with an error index of 26.5%. Yield at 2/3 effort MSY was approximately 39,000 tons. For comparison, the yield curve with $m=2$ is shown in Fig. 3. The MSY obtained from this graph was 55,828 tons with an error index of 40.7%.

CONCLUSIONS

The standardization technique points out that catch rates fluctuate substantially through seasons. The high "power" for late winter and early spring coincide with pre-spawning and spawning concentrations.

Caution is dictated by the steep right arm of the yield curve. The indication is that sustained high effort would lead to wild fluctuations in population size. Limited information for 1978 shows that catch rates have remained at about the same level as for the years 1975-77. The stability of the catch rate over the past few years may justify a gradual increase in fishing intensity.

REFERENCES

Fox, W.W. 1975. Fitting the generalized stock production model by least squares and equilibrium approximation. Fish. Bull. 73(1): 23-36.

Table 1. Relative power factors of country-gears and months obtained from a multiplicative model.

Country-Gear				Power	Month	Power
Non-m	OT	GT	1999	1.48	February	1.63
Port	OT	GT	1999		January	
FRG	OT	GT	1999		March	1.00
Icel	OT	500-999			April	
Pold	OT	GT	1999		May	
Port	OT	1000-1999		1.00		
Span	OT	1000-1999			September	0.69
USSR	OT	GT	1999		December	
FRG	OT	1000-1999			June	
Non-m	OT	1000-1999			July	
Norw	OT	150-499		0.71	August	0.38
Norw	OT	1000-1999			October	
USSR	OT	1000-1999			November	
Non-m	OT	500-999		0.61		
Norw	OT	500-999				
UK	OT	500-999		0.55		
UK	OT	1000-1999				
USSR	OT	500-999				
Can M	OT	500-999				
Rom	OT	GT	1999	0.45		
Span	PTB	500-999				

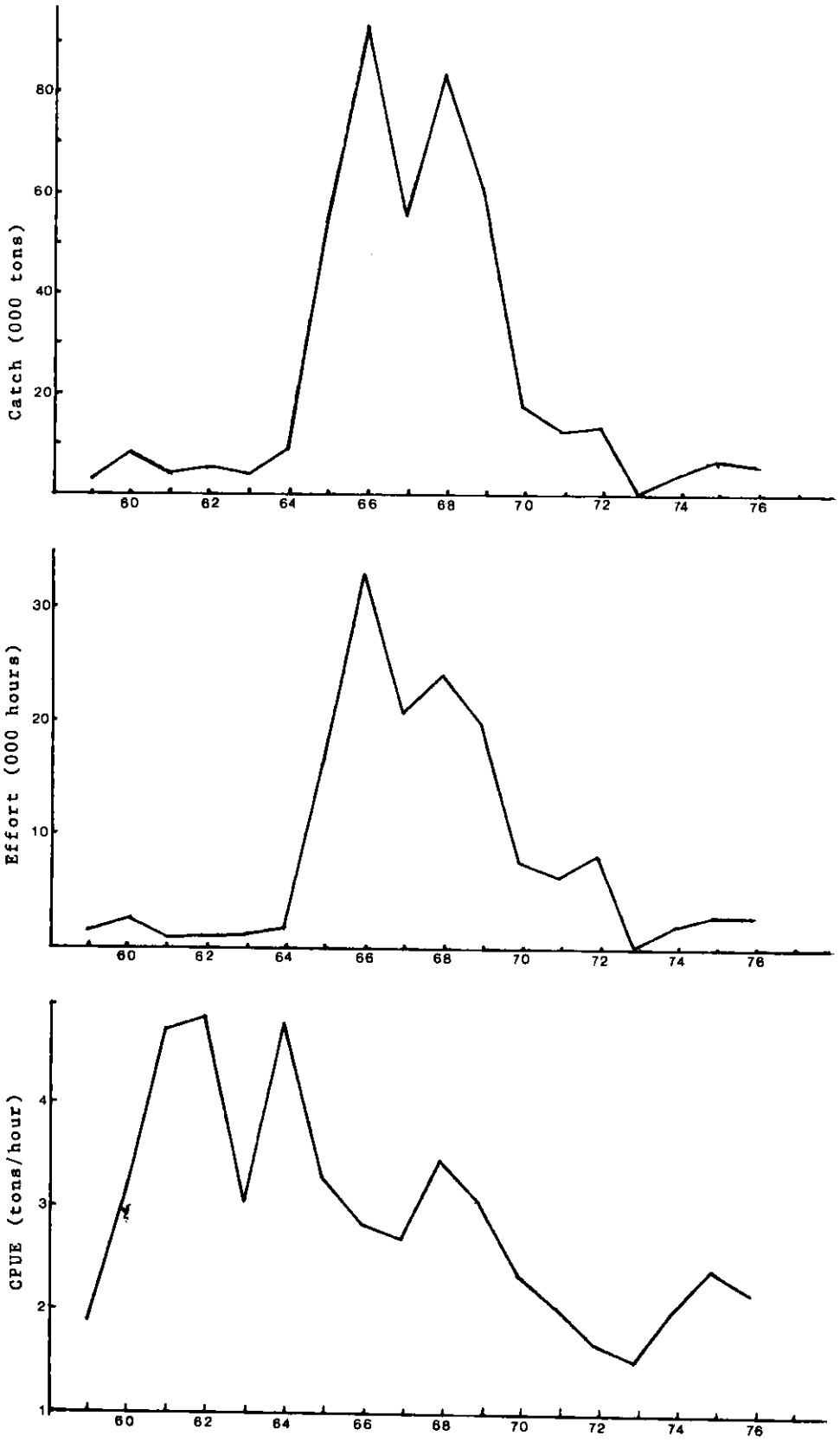

Fig. 1. Trends in catch, standardized effort and catch per unit effort for cod in Div. 2GH, 1959-76. (The standardized CPUE for 1977 was 2.01.)

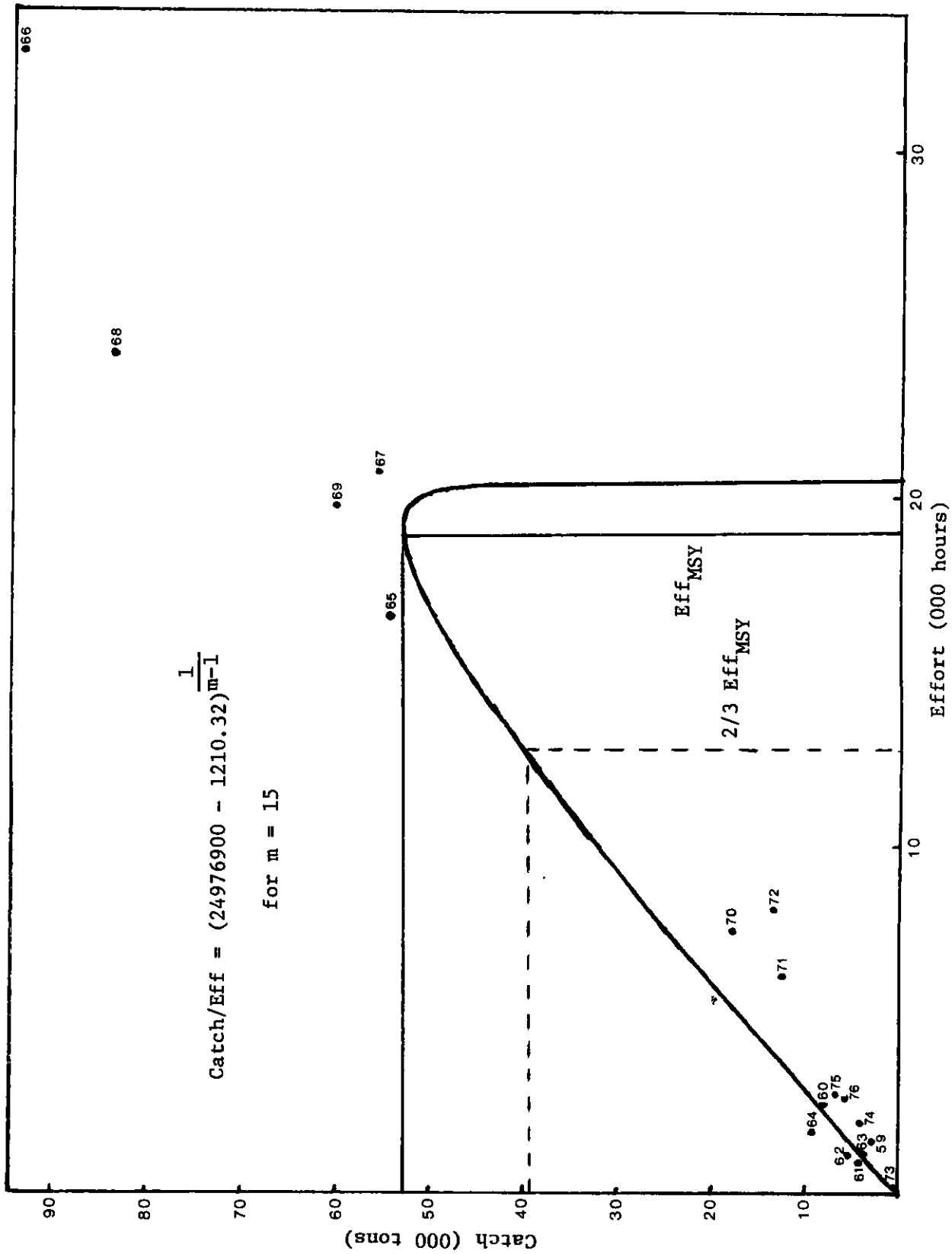

Fig. 2. Yield curve for Div. 2GH cod, with m = 15.

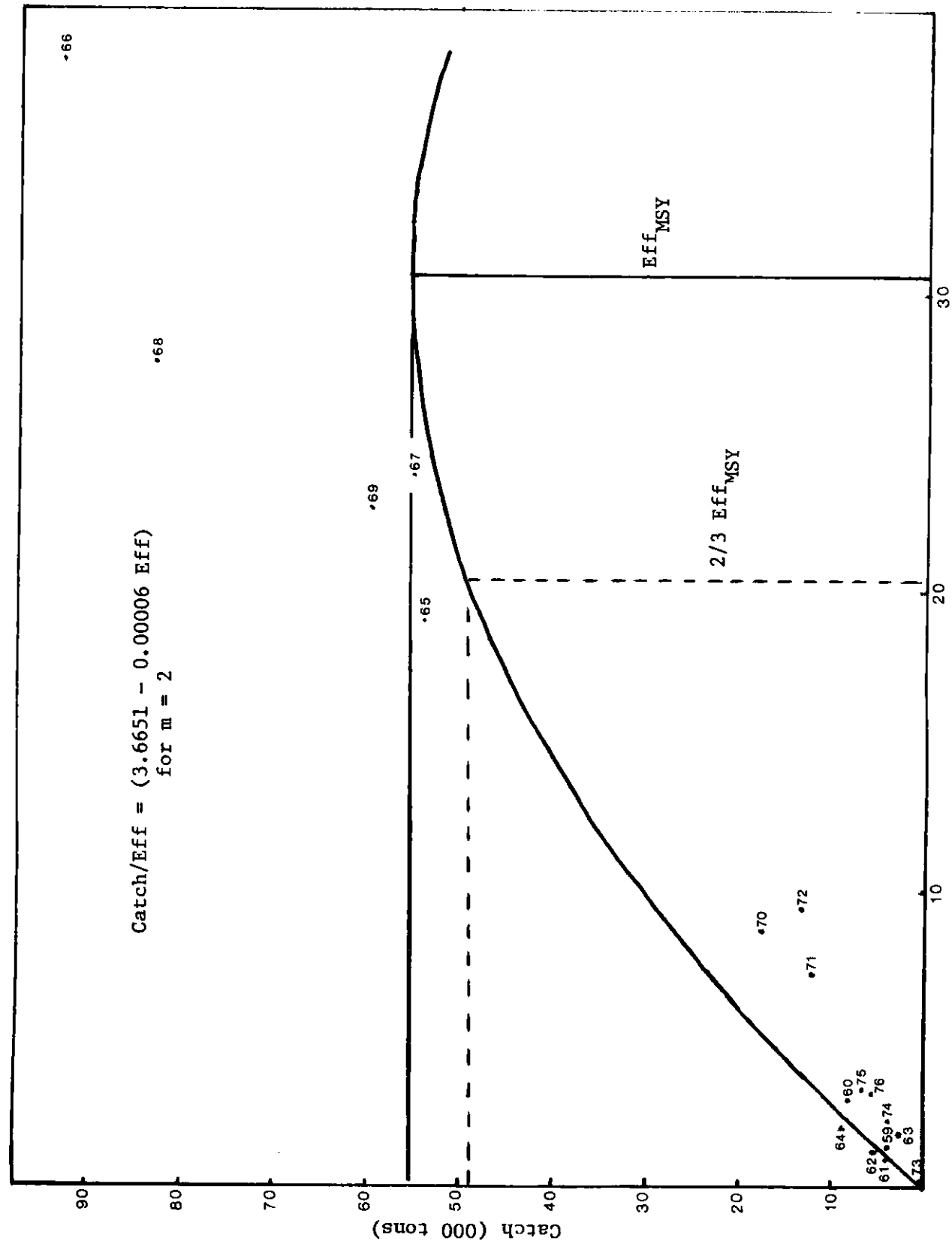

Fig. 3. Yield curve for Div. 2GH cod, with m = 2.