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Assessment of the Redfish Stock in ICNAF Division 3M

by

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Abstract

In the present paper, the status of the redfish stock in Div. 3M is evaluated using a modified production model. Estimates of maximum sustainable yield for the stock ranged from 17,290 to 19,700 tons. It was found that the drastic reduction of standardized CPUE in 1966-1967 was preceded by greater values of fishing effort.

Introduction

The status of the redfish fisheries in the above mentioned division has been analyzed in the last year by different authors, all of them considering the three reported species comprising the catch as a single stock. In the present paper,an analysis for the period 1956-1977 is made, using the Schaefer (1954) production model as modified by Gulland (1961) in order to obtain estimates of sustainable yield at different exploitation levels.

Materials and Methods

The catch and effort data were obtained from the Statistical Bulletin for the 1956-1976 period and the advance release of 1977 catch and effort data from the ICNAF Secretariat, broken down by country, month and vessel tonnage class. Fishing effort was standardized on the basis of tonnage class. Catch rates for vessels of 151-500 tons were adjusted to those of vessels over 1800 tons using the factor 0.36 of Mari and Terre (1977).

Trends in Catch, Effort and Catch Per Unit Effort

A directed fishery for redfish in Div. 3M commenced in 1957 when a total catch of 32,000 tons was reported by the vessels fishing on the ground. The catch reached 54,000 tons in 1958, decreasing to 7,000 tons in the years 1962-1963. The catches rose abruptly in 1972 and 1974 to over 42,000 and 34,000 tons respectively, while in the years 1975, 1976 and 1977 the catch remained around 17,500 tons under quota regulations (Fig. 1).

The peaks in effort in the historical series behaved similarly to the peaks in catch,i.e. maximum in fishing effort in the years 1959 and 1965 coincided with the peak catch. The CPUE had its peaks in 1958, 1972 and 1977 (preliminary data), coinciding with increase in catch. The high CPUE in 1977 was due to the considerable increase of OT-7 (USSR) catch rates during January-July.

Yield-Effort Relationship

Schaefer (1954) production model with Gulland (1961) modification was used to derive estimates of maximum sustainable yield. Linear regressions were computed, relating the catch per day fished to the fishing effort for the 6 and 10 year running averages for the redfish in Div. 3M (Fig. 2) and were converted to the parabolas of the equilibrium yield versus effort. The results obtained are depicted in Table I.

Discussion

The yield parabolas derived offered estimates of maximum sustainable yield which ranged from 19,700 to 17,290 tons. During the 21 year period analyzed in this paper, the behavior of catch, effort and CPUE has not been very close to the theoretical equilibrium values given by the model, with the result that the values for the period 1975-1977 are close to the curve. From the model, the fishing effort during these years, exceeded notably the level of f(MSY) suggested by the computation, with the exception of the last three years where it was close to the theoretical value. However, taking into account the trends of CPUE, effort and catch during the last few years, it is considered that a TAC ranging from 20,000 to 17,000 tons in Div. 3M would not affect the redfish stock.

References

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Table 1. Summary of determined parameters of the production model.

Year average	Correlation coefficient (r)	MSY		
		Catch(tons)	effort (days fished)	CPUE
6	0.72	17,290	1,050	16.5
10	0.75	19,700	990	19.9

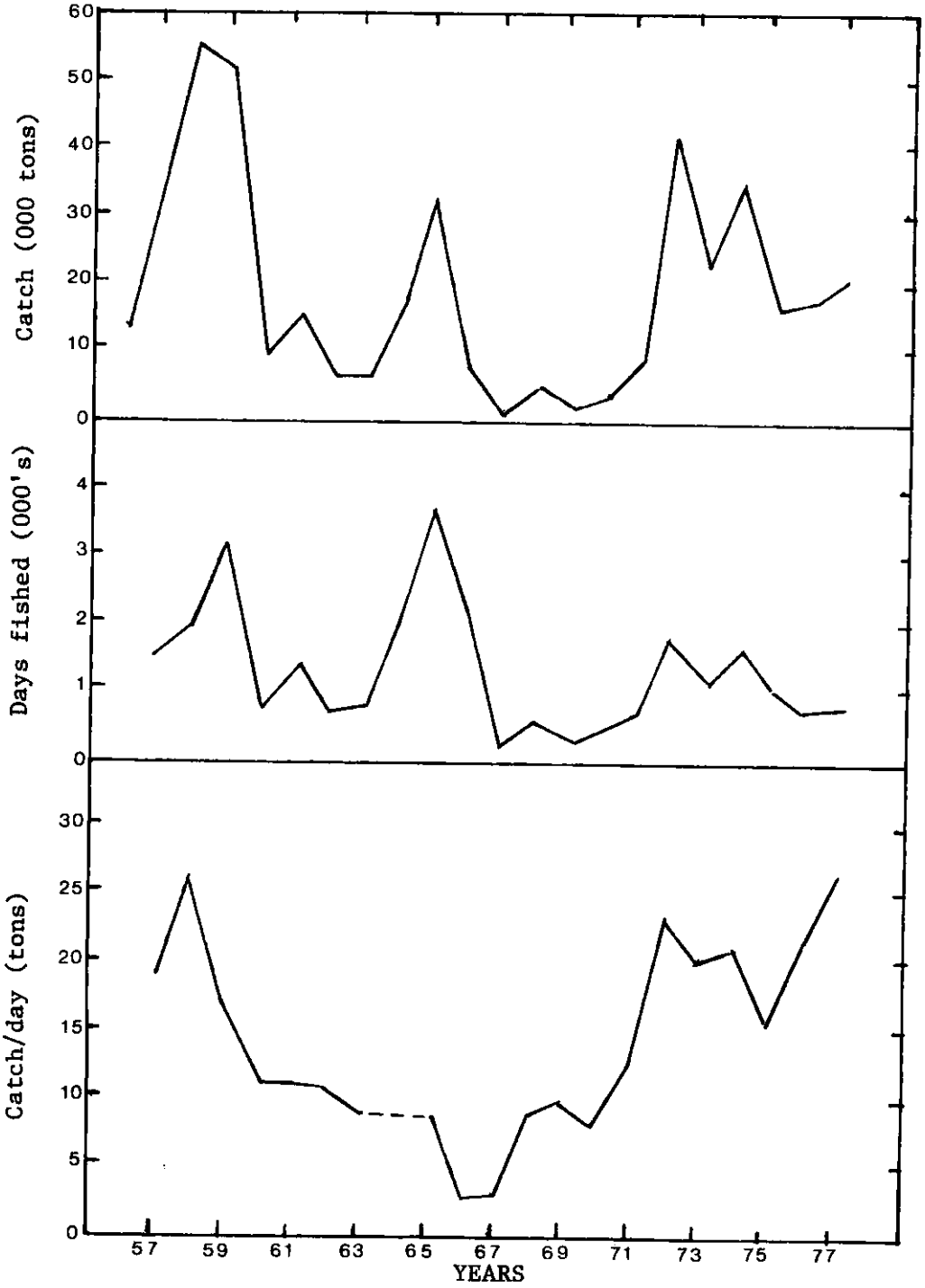

Fig. 1. Trends in nominal catch, effort and catch per unit effort in standard trawlers units - vessels over 1800 tons - for redfish in Div. 3M.

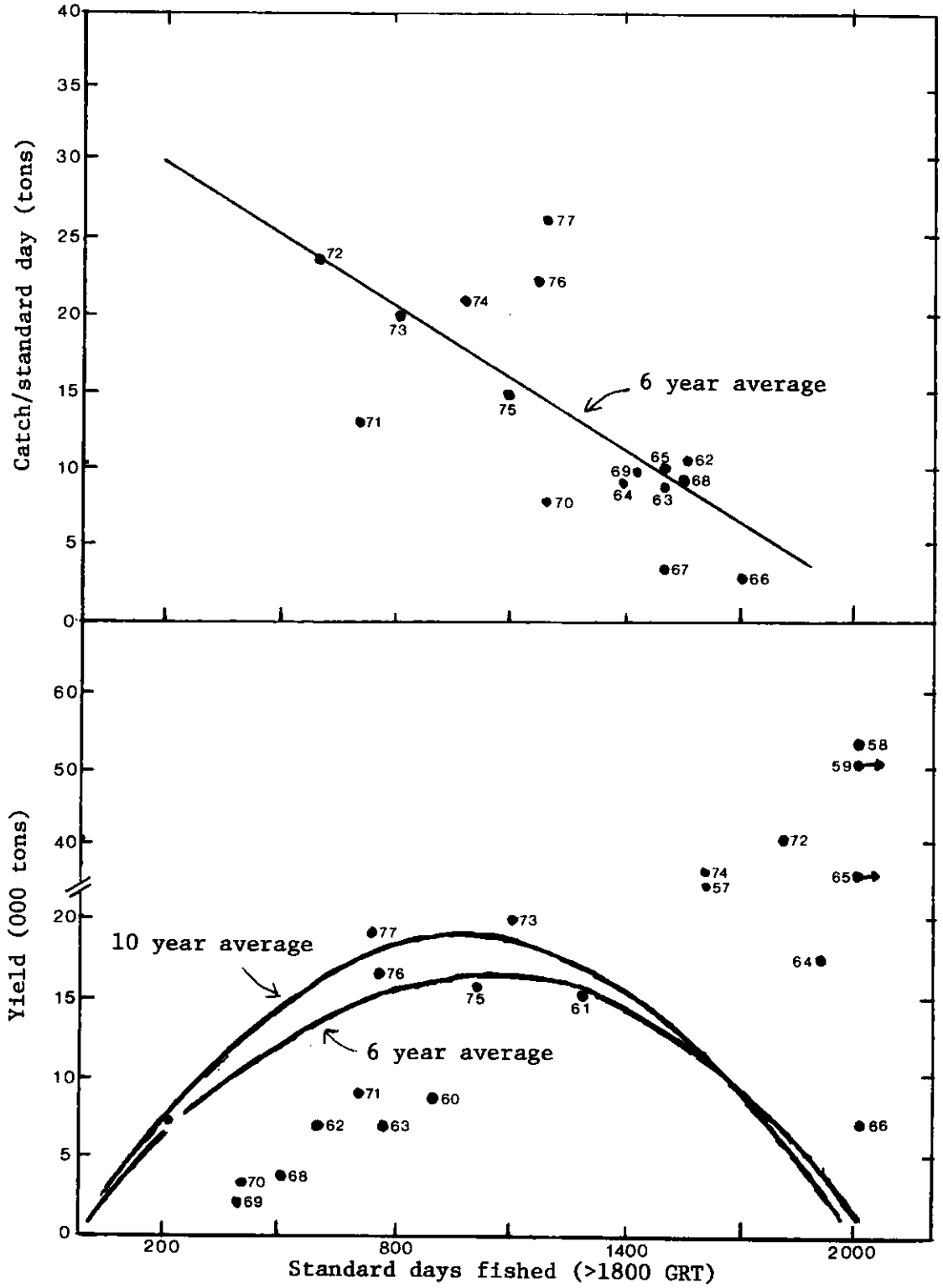

Fig. 2. Catch per standard day fished versus 8 and 10 years running average. Yield curves derived from the catch per unit effort/ effort relationship.