

Division 30 Redfish Assessment

by

W.D. McKone
Department of Fisheries and Environment
Fisheries and Marine Service
Research and Resource Services
St. John's, Newfoundland

Introduction

At the 1977 Annual Meeting of ICNAF the total allowable catch for 1978 was set at 20,000 m tons. This document presents some general observations on the current status of Division 30 redfish and attempts to evaluate the condition of the stock based on the simple Schaefer-type analysis of catch and effort data. The model used does not include any time lag for response of the stock to sudden changes in fishing pressure or recruitment, and thus over-estimates the MSY.

Methods

During the late 50's and 60's Canada (Nfld) tonnage class 4 otter trawl was the most consistently represented in the redfish effort data for 30 and the catch per hour of class 4 vessels was used as the standard unit of effort. Due to the absence of tonnage class 4 vessels in the 1970-76 period, the USSR class 7 vessel was used by adjustment of 0.81 calculated from regression of Canadian class 4 on USSR class 7 vessels.

Landings and catch per unit effort were tabulated from ICNAF Statistical Bulletin (Vol. 26) but catch per unit effort was further refined by considering only catches in which 50% or greater of the fish caught was redfish. The standard effort in hours fished was determined by dividing the adjusted catch per unit effort into the total catch. Canadian commercial and research length frequency data available were plotted to ascertain possible trends in recruitment and distribution by length with depth.

Results and Discussion

The total catch declined from 19,000 tons in 1971 to 9,000 tons in 1973 but since has increased to 13,000 tons in 1974, 15,000 tons in 1975 and 17,000 tons in 1976 (Fig. 1). The latter three years have been regulated by a TAC of 16,000 tons but catches fell short of the TAC in 1974-75 and exceeded the TAC by 1,000 tons in 1976.

Catch per unit effort has increased from 0.710 tons per hour in 1971 to 1.209 in 1974 and 1.474 tons per hour in 1976 (Fig. 1). Effort, however, has declined from 27,876 hrs in 1971 to 7,925 hrs in 1973 but increased slightly to 10,855 hrs in 1974, 13,625 hrs in 1975 and decreased to 11,532 hrs in 1976 (Fig. 1).

The simplified general production model used for Division 30 gives an estimate of 19,000 tons for the maximum sustainable yield (MSY) and the equilibrium yield at 2/3 effort is 17,000 tons (Fig. 2). In recent years all the yield points fall above the line scribed by the yield parabola and to the left of the MSY point and from 1973-76 the yield has approximately doubled for little change in effort.

Canadian (Nfld) commercial length frequency data indicate a variety of length classes were caught in the early part of 1977 as presented in Figure 3 and these findings are similar to those found in 1976 by McKone and Parsons (1977). Later in the year, however, after July modal lengths for males of 23 cm in August, 24 cm in September and 25 cm for females in both months are the most predominant in the catch. The more general rule over the years in this fishery has been to take smaller fish in the 22-27 cm size range and the depth fished usually has been shallower than 250 fath.

Canadian research length frequencies were collected from the Nfld. Hawk, a commercial fishing vessel chartered by the Fisheries and Marine Service during October and November 1977 (Fig. 4). These frequencies indicate a marked increase in the size of fish beyond 200 fath. The modal sizes range from 24 cm for males in 101-150 fath to 39 cm in 301-400 fath. Therefore, from the research length frequencies there is every indication the commercial fishery this year and historically has not been fishing the older larger fish at the greater depths in Division 30 with the exception of early in the year when it appears some of the larger fish move into shallower water. This appears to be caused by changes in availability of the larger fish as the bottom beyond 200 fath is exceedingly rough making it almost impossible to fish with the exception of a few isolated places. The older larger fish thus appear to have a refuge which may help to preserve the spawning stock if sufficient numbers of young fish escape to the deeper depths.

In summary there are indications that the Division 30 stock is in good condition, catch per unit effort has been increasing while the effort has decreased. From the general production model, catches

have been greater than expected at equilibrium yield for the effort expended throughout the 1970's. Additionally, length frequencies indicate the commercial fishery prosecutes mainly the smaller fish and larger older fish, an important part of the spawning stock, are not exploited if they remain at depths greater than 250 fath. The TAC was increased in 1978 because of the apparent healthy condition of Division 30 stock and in view of present data there are no indications that the TAC should be changed from 20,000 tons for 1979.

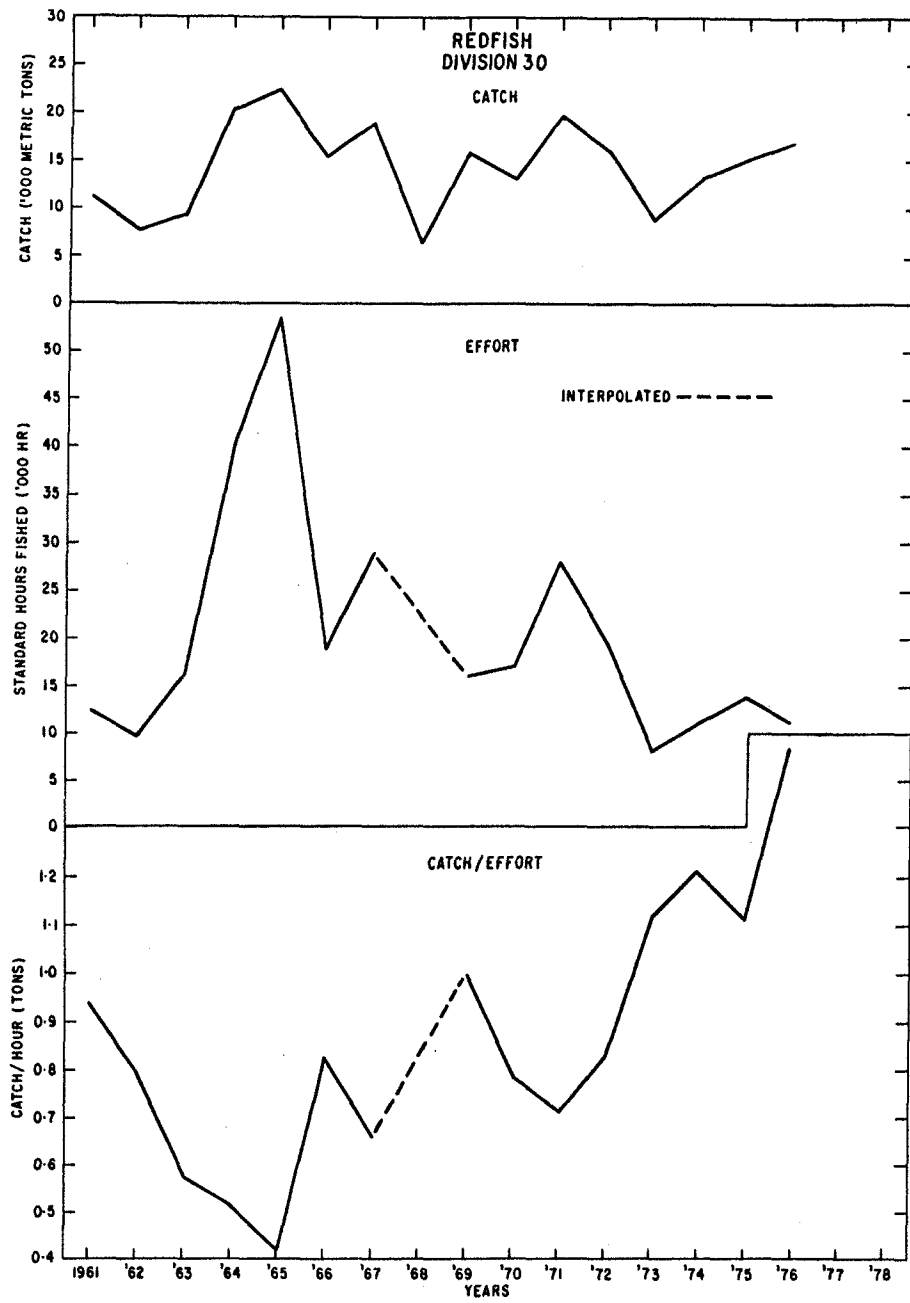


Fig. 1 Trends in nominal redfish catch, effort and catch per unit effort in standardized trawler units following the method of Parsons and Parsons 1975 with 1972-1976 added for Div. 30.

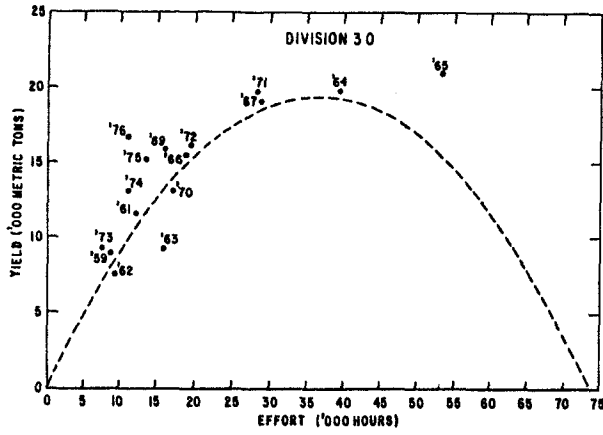


Fig. 2. Yield curves for redfish Div. 30 derived from catch per unit effort for standard hours fished from Parsons and Parsons 1976 extended to include 1972-1975.

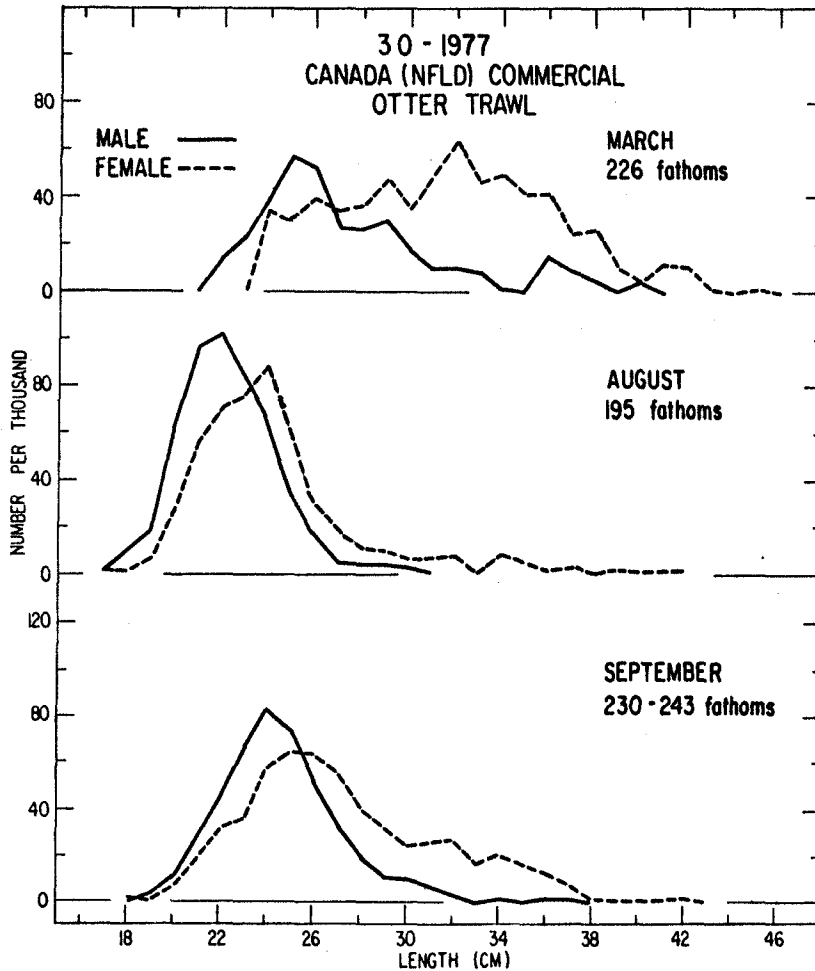


Fig. 3. Canada (NFLD) 1977 bottom trawl commercial length frequency for Division 30 redfish.

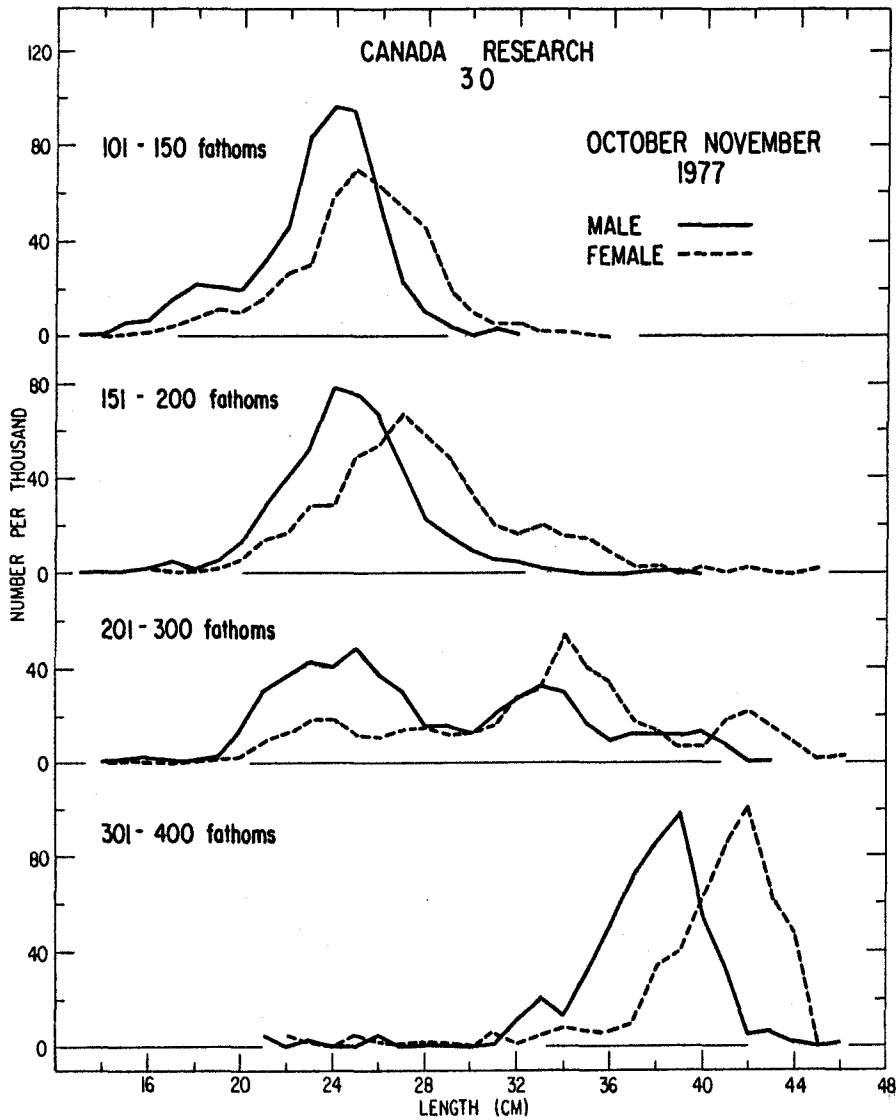


Fig. 4. Canada (Nfld) 1977 bottom trawl research length frequency for Division 30 redfish.