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ANNUAL MEETING - JUNE 1969

Report of Mid-Term Meeting of Assessments Subcommittee

London, 22-25 January 1969

1. The Assessments Subcommittee met under the Chairmanship of Mr B.B.Parrish in London by courtesy of the Ministry of Agriculture, Fisheries and Food from 22 to 25 January 1969. Other participants were Dr F. Chrzan, Mr Z. Pietniewicz (Poland), Mr J. Gulland (FAO), Dr A.S.Bogdanov, Mr L. Zheltov (USSR), Dr A. Meyer, Dr A. Schumacher (Germany), Mr Sv. Aa. Horsted (Denmark), Mr D.J.Garrod (UK), Dr A.W.May, Dr G.F.M.Smith, Dr F.D.McCracken (Canada), Mr R. Hennemuth (USA) and Mr L.R.Day (ICNAF). Dr D. Cushing (UK) attended for a half-day discussion. The agenda is attached as Appendix I.

2. Provisional Estimates of Catch Quotas for Subarea 1 Cod and Subarea 5 Haddock

At the Commission meeting in 1968, R&S reported results of recent assessments of the state of the exploited stocks in the ICNAF Area. They indicated that for the main cod and haddock stocks any increase in fishing beyond the present level would certainly not result in any long-term increase in average annual yield. They also showed that for some of these stocks a reduction in fishing mortality rate from the present level, through regulation, would not result in any appreciable decrease in long-term, average, annual yield, and would probably increase it. At the same time it would result in an increase of the average catch-per-unit effort and a reduction in the total fishing costs. The assessments showed that this applies especially to the cod stock in Subarea 1 and the haddock stock in Subarea 5, both of which have been over-exploited in recent years. It was reported further that, for both of them, the scientific data needed to set up and operate a catch quota regulation are currently available.

Further analyses, carried out since the 1968 Annual Meeting, do not change these conclusions and point to the desirability of introducing regulations controlling fishing mortality rate (e.g. catch quotas) on these stocks, additional to the mesh size regulations currently in force. Therefore, as a guide to the Committee on Regulatory Measures, provisional estimates have been made of the total catch quotas which would have to be set at the present time for the Subarea 1 cod and Subarea 5 haddock fisheries respectively to achieve specified reductions in fishing mortality. These are set out briefly below:

(a) Subarea 1 Cod

From information on the numbers of cod caught in a given year, the fishing mortality rates for the fully recruited age-groups, the mean weight of fish at each age in the exploited stock and the number of new recruits entering it, it is possible to estimate from the available information for one year, the total catch which can be taken, for a given fishing mortality rate, in the next year. As an example, estimates of these catches have been made for the cod fishery in Subarea 1 for 1968 and 1969, based on observed catch data for 1967, and fishing effort data for 1965. Since 1965, fishing mortality has increased at least up to 1967, and if this trend has been continued into 1968 would give a fishing mortality of around 0.80. Values of fishing mortality 10-25% less than this (i.e. 0.72-0.60) will give yields per recruit not substantially less, and possibly higher.

The year-classes now recruiting to the Greenland cod fishery are weak, so that the catch is likely to decrease in the immediate future, whatever course of action is adopted. Quotas for 1968 to give specified fishing mortalities are:

To achieve	F	=	0.80	349,000 tons
" "	F	=	0.72	314,000 tons
" "	F	=	0.60	285,000 tons

The quota for 1969 will depend on the removals in 1968, which are unknown. Because of the weak year-classes, fishing mortality may not have been as high as 0.80 even in the absence of regulation due to temporary diversion to other areas. Possible quotas are:

If 1968 fishing mortality had been 0.80

To achieve 1969 F = 0.80 281,000 tons
 To achieve 1969 F = 0.60 228,000 tons

If 1968 fishing mortality had been 0.60

To achieve 1969 F = 0.60 276,000 tons

These figures show that, with the reduction in fishing mortality rate, the estimated catches, i.e. (the catch quotas) in both 1968 and 1969 are, of course, less than at the higher unchanged rate, but the estimate for 1969, with the 25% reduction is only slightly less, indicating that most of the initial loss in catch due to the cutback in fishing effort has been made up by the end of the second year.

It is emphasized that the above estimates are only examples of the catch quotas to achieve a cutback in fishing mortality rate of 10% at 25% in 1968 or 1969. They do not apply to the quotas if regulations are first introduced in 1970 or subsequently. These will depend on the values of the population parameters (e.g. mortality rates, growth and especially, recruitment) applying at that time. As mentioned above, the year-classes, recruiting in 1968 and 1969 are known from pre-recruit surveys to be weak ones and the available data point to the one recruiting in 1970 also being weak. With continued high fishing this will result in a further decrease in catch in the unregulated fishery in 1970 to a lower level than in 1969, which would therefore, necessitate, setting lower quotas than those indicated above.

(b) Subarea 5 Haddock

During the period 1935-1963 the Georges Bank haddock fishery was a reasonably stabilized one with an average annual yield of about 50,000 m. tons. With the recruitment of the strong 1962-1963 year-classes, in the years 1964-1966 there was a rapid increase in fishing intensity, and hence in fishing mortality rate, giving annual yields of over 100,000 tons, but, with the rapid decrease in abundance of these strong year-classes and the subsequent recruitment of the weak 1964 and 1965 year-classes this was followed in 1967 and 1968 by a sharp reduction in stock abundance and catch, which resulted in a reduction in fishing intensity to approximately the original level. The stock abundance in 1968 was, in fact, at the lowest observed level on record, approximately one-third of that during the 1935-1963 period of stabilized fishing. This is shown by the data in the first two columns in the table below.

Landings, Fishing Effort and Stock Abundance data for Georges Bank Haddock for the period 1935-1963 and for 1968 and the estimated catch in 1969 to maximize catch-per-recruit

	1935-1963 Annual (Average)	1968 (estimates from Provisional data)	1969 (Estimated)
LANDINGS (By wt)	48,000 tons	25-31,000 tons	16,000 tons
(By no)	3.8×10^7	$1.6-2.0 \times 10^7$	1.1×10^7
Number of 2 yr old and older haddock in exploited stock	13.0×10^7	4.3×10^7	3.7×10^7
Numbers landed per day fished (US otter trawlers)	(All age groups) 5,572 (2 yr olds) 1,356	1,863 200	1,600 <100
TOTAL FISHING EFFORT			
Number of days fished in US trawler units)	7,000	8-10,000	7,000

Using the data for 1968 in the second column of the above table and data on the strengths of the 1966 and 1967 year-classes which will recruit to the stock, the estimate is given in the third column of the catch quota which could be set for 1969 to maximize the catch-per-recruit at an annual fishing mortality rate of 65% corresponding with the intensity of fishing during the earlier period of stabilized fishing. It shows that to achieve this the catch in 1969 should not exceed 16,000 tons, compared with the estimated catch of 25-31,000 tons in 1968. A much greater reduction in catch than this would be necessary if any recovery of the stock would be achieved by 1970.

Data from pre-recruit fishing surveys show that the 1968 year-class, which will first recruit to the 4 1/2 inch mesh fishery in 1970, is also very weak. Despite uncertainties about the relationship between stock and recruitment the Subcommittee considers that, in order to permit the most rapid rebuilding of the adult stock, and so give an improved chance of better recruitment, it is desirable to restrict the catch to the lowest practicable level for the next few years (i.e. at least up to 1972). Complete closure of the haddock fishery would be the ideal from the point of view of the most rapid recovery of the stock.

The present serious state of the Georges Bank haddock stock and the need for severe regulating measures is largely due to (a) an explosive increase in fishing on strong year-classes immediately after their recruitment to the exploited stock; (b) an unprecedented sequence of poor year-classes. With the presence of highly mobile fleets fishing in the ICNAF Area, it is clear that fishing can be diverted quickly from one resource to another so that, without regulation strong year-classes can become rapidly depleted resulting, at best, in very large, short-term fluctuations in catch and lower long-term average yields but perhaps also in decrease in average recruitment.

The results of the assessments presented to the Commission in 1968 showed that the haddock stocks in Subarea 4 are also fully exploited. Poor recruitment and increased fishing intensity has led to a decrease in haddock stock density in this subarea also, and since this will affect the stock through several years the diversion of fishing from the Georges Bank haddock to these stocks cannot, therefore, be expected to result in increased sustained yields.

3. Mesh Size Regulation

The Subcommittee wishes to emphasize that regulations controlling fishing mortality rate are not alternatives to mesh regulation, and to reiterate the earlier statements by R&S that there will still be a gain in the long term yield per recruit of cod at W. Greenland, and in some other areas, by a further increase in mesh size above that in force at the present time.

Mid-Term Meeting of Assessments Subcommittee

London, 22-25 January 1969

Agenda and Timetable

22nd and a.m. 23rd January

1. Catch quotas for Subarea 5 haddock and Subarea 1 cod
2. Consideration of other regulatory measures for these and other stocks
 - a) further increases in mesh size
 - b) closed areas and/or seasons
 - c) direct control of fishing effort

p.m. 23rd and 24th January

3. Consideration of assessment models
 - a) the validity of the constant parameter model, with special reference to the recruitment and growth parameters
 - b) the application of other models

a.m. 25th January

4. Assessments of other cod and haddock stocks in the ICNAF Area, with special reference to Subareas 3 and 4