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Status of the Cod Stock in NAFO Division 3M

by

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Since 1978 the nominal catch has declined progressively and has consistently been lower than the TAC. Recent TAC's and nominal catches are as follows:

	1974	1975	1976	1977	1978	1979	1980	1981
TAC ($\times 10^{-3}$ t)	40	40	40	25	40	40	13	8.5
Catch ($\times 10^{-3}$ t)	25	22	22	27	33	30	10	14 ^a

^aProvisional.

Few additional data were available for catch rate analysis. Catch rates had shown a definite decline from 1974-80 (Gavaris 1981). Comparison of Norwegian longline catch rates for tonnage class 4 vessels in 1979 and 1980 indicate a decline, possibly by as much as half (Table 1). No information was available for 1981 and 1982.

Age and length sampling data consisted of one age length key taken from Faroes longline catches in the second quarter of 1981 (343 otoliths) and three length frequencies, Faroes longlines in April and May and Canadian otter trawl in June (881, 1007, and 200 measurements respectively). These data were used to derive an estimate of the age frequency for each gear (Fig. 1). The majority of the catch is comprised of the 1977 year-class although the 1973 year-class is still evident. Average weight at age shows a general increase from 1978-81, possibly due to lower abundance (Table 2).

The research vessel GADUS ATLANTICA conducted a random stratified survey in early 1982. In comparison to surveys from 1978-81, the estimate of population numbers is at its lowest level, about half of the 1981 value (Table 3). Strata 515-519 were not included in the analysis either because cod were not present or the stratum was not covered in every year. These estimates were computed using a logarithmic transformation. The age structure was obtained by applying an age length key to the stratified estimate of length frequency. Total mortality rates computed from the survey results are high when compared to an assumed natural mortality rate of 0.2 and $F_{0.1} = 0.13$ (Gavaris 1981). The length and age frequencies from the survey indicate that the 1981 and 1980 year-classes comprise about 40% of the population numbers (Fig. 2).

These results indicate that, while there may be good recruitment, the population abundance has decreased under current levels of exploitation. The abundance estimates indicate that there are few fish remaining from the weaker year-classes.

REFERENCES

Gavaris, S. 1981. Assessment of the cod stock in Div. 3M. NAFO SCR Doc. 81/II/12, Ser. No. N276.

Table 1. Commercial catch rates for Norwegian long lines, tonnage class 4, for cod in NAFO Division 3M.

Month	1979	1980	Ratio
January	0.34	0.22	0.65
February	0.20	0.16	0.80
March	0.32	0.16	0.50

Table 2. Average weight at age for the commercial catch of cod in NAFO Division 3M.

Age	1978	1979	1980	1981
4	0.60	1.07	1.14	1.24
5	1.10	1.48	1.75	1.79
6	1.58	2.45	2.47	2.63
7	2.65	4.35	3.17	3.13
8	3.56	5.34	4.42	4.72

Table 3. Abundance estimates including lower and upper 95% confidence bounds and total mortality rates for cod in Division 3M from research surveys conducted by the GADUS ATLANTICA.

AGE	1978	1979	1980	1981	1982
1	0	0	0	6395	319252
2	56140	2120779	269216	0	907328
3	2818383	483880	5056108	1020818	10711
4	9210366	2544950	630202	3055463	846947
5	27069773	2466428	753530	192365	498310
6	7194880	3040668	707184	416131	16375
7	282210	777767	1038871	205535	76269
8	107074	49106	47846	408451	69771
9	38322	24739	6569	20080	111425
10	91466	9000	1533	4557	5528
11	42033	13756	0	1126	2709
12	10468	4756	3021	0	0
13	18688	23505	1547	2265	0
14	21698	13097	0	0	0
15	3977	4245	3057	0	0
16	0	28150	0	0	2709
17	0	4756	0	0	0
18	0	4372	0	0	0
19	3191	4756	0	0	0
20	0	0	0	0	0
Total	46968672	11618709	8518684	5333186	2867334
Lower	39662256	8725750	6715023	3969169	2305277
Upper	55599904	15406039	10765148	7101588	3536950
Z ₄₋₁₀	1.93	1.25	0.94	1.71	

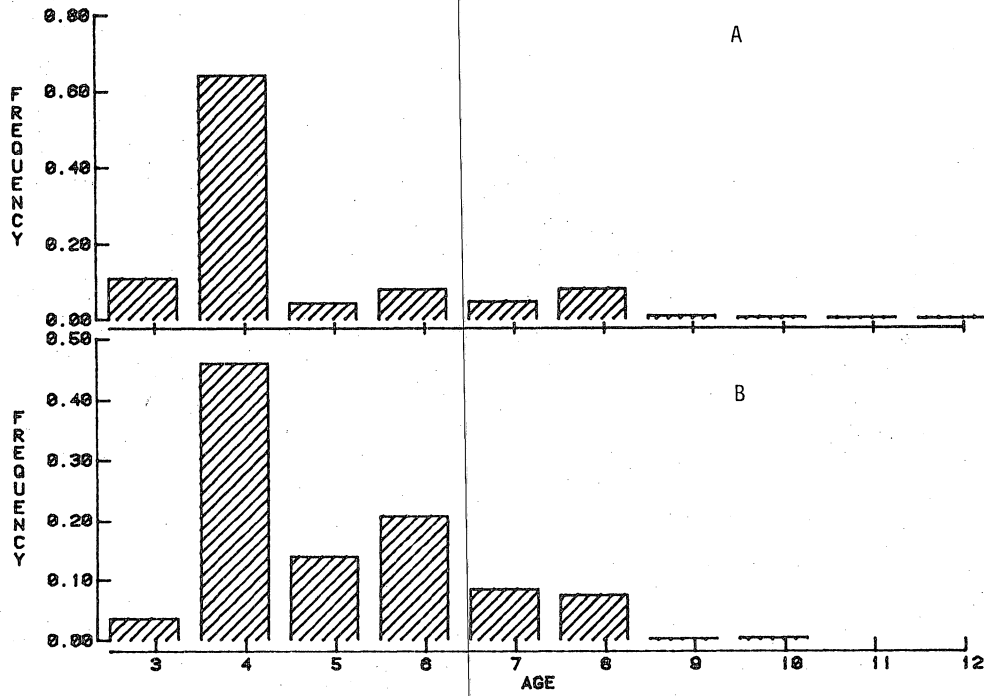


Fig. 1. Age frequency of commercial catch by a) longlines and b) otter trawls for the cod stock in NAFO Division 3M.

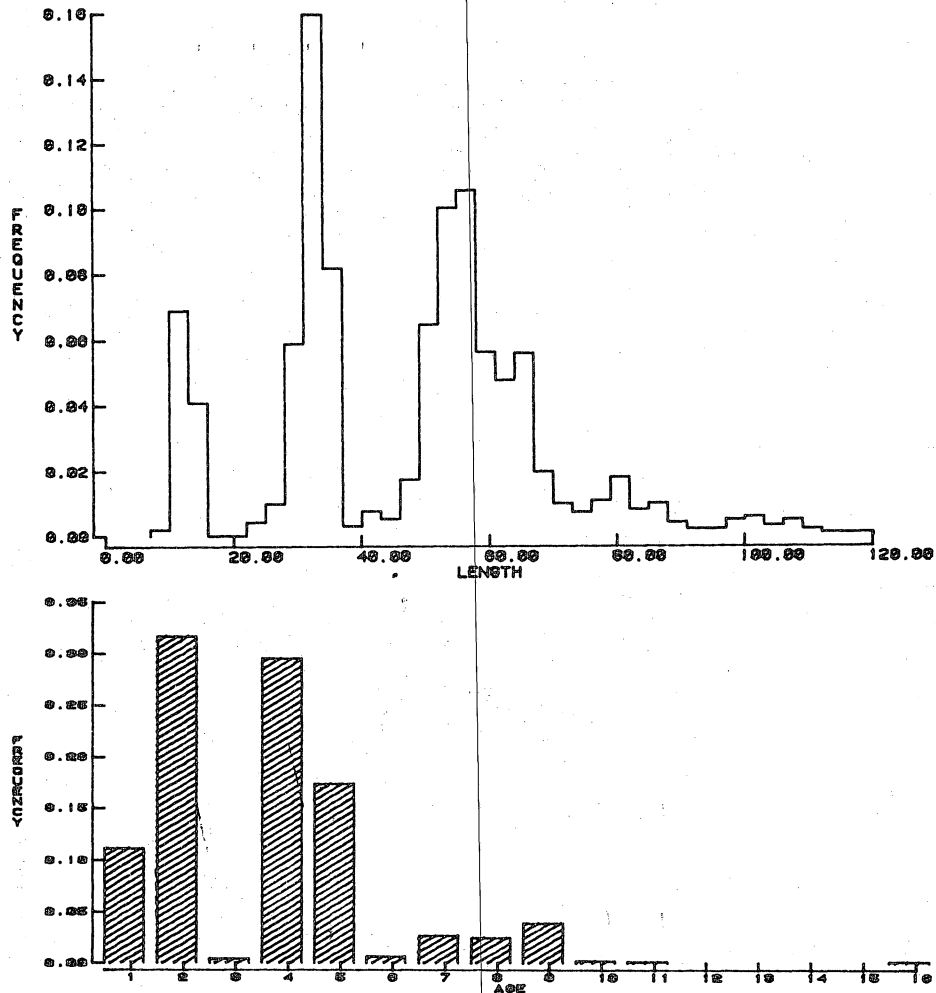


Fig. 2. Cod length and age frequencies from the research vessel cruise in Division 3M conducted by the GADUS ATLANTICA in 1982.

