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Recent information of landings, age-compositions and future recruitment of Subarea 1 cod

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Nominal catch 1970.

According to Stat.Bulletin Vol.20 the 1970 nominal catch of Subarea 1 cod adds up to 115,997 metric tons.

All catches except those by Denmark (F), Norway, Non-members and a small part of catches by Denmark (G) are broken down by division and month. Catches not broken down add up to 23,024 tons. In the present paper these catches have been allocated according to the following:

The 7733 tons estimated for Denmark (F) have been allocated to Div. 1B by 2200 tons, 1C 1600 tons, 1D 3200 tons and 1E 733 tons. This is rather arbitrarily done taking into consideration that areas off Holsteinsborg (1B) and off Godthåb-Fiskemøstet (1D) are those traditionally preferred by Faroese vessels.

6293 tons fished by Norway are supposed to be taken in Divs. 1B-1E in a rather even distribution, here set to: Divs. 1B, 1C and 1E 1550 tons each, the remainder (1643 tons) in Div. 1D.

4554 tons taken by Non-members are known (from Stat.Bull.) to have been taken by 4487 tons in May, 67 in June. For each of these months the catch is allocated on divisions in the same proportion as the catches reported by Germany. The resultant figures are: Div. 1C 738 tons, 1D 401 tons, 1E 1464 tons and 1F 1951 tons.

Of the catch (20,007 tons) taken by Denmark (G) 4444 tons are broken down by month only. According to vessel size category the 4444 tons are taken by the new Greenland trawlers. In 1970 they operated in Div. 1D mainly but also in Div. 1C (Banana Bank) and in Div. 1E. The estimated break-down here used is: Div. 1C 1000 tons, 1E 500 tons, the remainder 2944 tons in Div. 1D. Monthly catches are allocated on divisions in the same proportion.

The allocations stated above are included in Table 1, which gives total nominal cod catch for Subarea 1, 1970 per division and month.

A break-down of the total catch on gears shows the following result:

Trawl (including Spanish pair-trawling)	81,179 tons
Portuguese dory vessels	5,229 "
Greenland miscellaneous gears (pound nets, but not trawl)	15,563 "
Gill nets (Norway)	5,793 "
Long lines (Norway)	500 "
Gear EK (Denmark (F)) estimated	7,733 "
	<u>115,997 tons</u>

The catch by Denmark (F) will have been taken partly by trawl so that total trawl catch may be approximately 85,000 tons or 73% of total nominal catch.

Predictions for recruitment 1971-74.

In Subarea 1 recruitment of cod to the fisheries will start at an age of (3-4 years. The year-classes in question for recruitment in the period 1971-74 are thus year-classes 1967-71.

Predictions for the strength of the 1971 year-class can at present be made only on hydrographic and plankton observations in 1971. Although the material is not yet worked up completely it is the general impression, especially from hydrographic observations, that there are no reasons to expect that this year-class will be more than a poor one. The same applies to the 1970 year-class (Smidt, 1971).

Also the 1969 year-class has on the basis of larval surveys been predicted a rather poor one (Horsted, 1970) and pre-recruit surveys in 1970 revealed no reasons to modify this prediction (Smidt, 1971).

Based on larval surveys in 1968 the 1968 year-class was not estimated a rich one, but perhaps one of mean strength (Smidt, 1969), but it was not observed in any noteworthy amounts as age-group I in 1969 (Horsted, 1970). In 1970, when this year-class formed age-group II, it was, however, noted in beach seine research catches in Div. 1F and in offshore research catches (otter trawl with small-meshed cod end) on a standard station in Div. 1D, see Table 3. Age-group II does, however, not seem to be fully represented in the catches on the standard station. This may be due to mesh selection as well as to merely absence of the youngest individuals from this fishing ground. In the hauls made on the standard station in 1971 the 1968 year-class (age-group III) is by far the predominating one accounting for 58% and 63% respectively in the two samples of cod in the research catches (Table 3). The series of hauls made on the standard station is not yet long enough to enable us to judge the liability in year-class predictions, but present judgment would make the 1968 comparable to the 1966 year-class or even somewhat better. So far as contribution to future fisheries is concerned it should be noted, however, that while the 1968 year-class was very sparsely exploited in its first year of recruitment (in 1970, when effort was very low) the exploitation of the 1968 year-class in its first year of recruitment is left to the 1972 fishery, which may well be more intensive than the 1970 fishery. The 1968 year-class has also been observed in the only research otter trawl haul in Div. 1E offshore, but this material is very limited (129 cod caught, 11 of these belonging to the 1968 year-class).

The 1967 year-class was not surveyed as larvae, and it was not reported as one year olds in 1968. In 1969 it occurred as small cod (age-group II) in Divs. 1B and 1C (Horsted, 1970), but not in any significant numbers south of that. In 1970, again, it is reported in the northern part of Subarea 1, but not in great numbers. In 1971 this northern distribution has been confirmed, the year-class nearly being absent in offshore otter trawl samples from Divs. 1E and 1F (Table 2). Also, in 1971, it did not seem an important year-class in the research catches on the standard station in Div. 1D (Table 3).

In general the Subarea 1 cod fisheries in the years up to and including 1974 will, therefore, be based on a poor to moderate stock. The year-classes 1966 and 1968 will constitute the greatest part of the catches, being most abundant in Divisions 1B-1D. Fisheries in Divisions 1E-1F are likely to be based on a less abundant stock, but spawning concentrations of cod of year-classes 1965 (especially), 1964, 1963 and gradually also year-classes 1966, the latter probably dominating in 1973-74, may support a seasonal fishery here, characterized by a comparatively high mean weight of fish in catches

Numbers landed 1970 per age-group.

The amount of sampling in 1970 has generally been very poor. At present only 9 samples from landings representing 505 tons of the total catch (115,997 tons), i.e. less than 0.4% of total landings, are available. The age-frequencies of these samples are given in Table 4. These frequencies have been used to estimate numbers landed per age-group as shown in Table 4. Mean weight of fish is based upon measured mean weight of gutted, iced fish in the samples. This weight is raised by 5% to allow for weight reduction during storage of ice and then multiplied by the normal conversion factor of 1.22 to give round, fresh weight.

It will be seen that age-group VII, year-class 1963 was the most important (35% of total numbers) followed by age-group V, year-class 1965 (23%).

References:

- Horsted, Sv.Aa., 1970: Danish Research Report, 1969. ICNAF Redbook 1970/II: 30-40.
 Smidt, E., 1969: Danish Research Report, 1968. ICNAF Redbook/II:25-30.
 " 1971: " " " , 1970. " " /II:27-33.

Table 1. Subarea 1 cod. Nominal catch 1970 in tons per division and month after allocation of catches taken by Norway, Denmark (D) and partly Denmark (G).

Month	Division						Total
	1A	1B	1C	1D	1E	1F	
1	-	-	101	191	97	246	635
2	-	-	331	726	299	322	1678
3	-	-	47	433	489	1131	2100
4	169	-	489	719	341	379	2097
5	1	14	7104	5180	6976	6652	25927
6	-	94	2793	1737	3174	3671	11669
7	110	753	989	4276	6530	2219	14877
8	54	1824	1627	4693	6326	2080	16604
9	74	1088	1401	3109	1252	1534	8458
10	6	645	441	3316	298	959	5665
11	-	770	1659	2610	321	1888	7248
12	-	-	120	745	104	1779	2748
NK	-	3750	3201	7057	2285	-	16291
Total	414	8938	20303	34792	28490	23060	115997

Table 2. Age-group frequencies in samples from Greenland commercial otter-trawlers' landings, Subarea 1, 1971. Mesh size 11.22, presumably 130-140 mm. Round, fresh weights obtained from gutted weight x 1.22.

Ref.No.	Div.	Month	Sample representing tons trawled (round, fresh)	Mean weight of fish in sample, kg (round, fresh)	Discarded before sampling	Number sampled	Frequencies (per mille)							
							age-group year-class		1966		1967		1965	
							III	IV	V	VI	VII	VIII	IX	X
2296	C	2	165	2.32	"nearly none"	967	0	25	587	337	14	7	74	
2297	C	4	123	2.05	"some"	955	0	140	554	234	25	1	26	
2301	C	5	78	2.93	"few"	829		26	400	397	44		34	
4557	J	6	88	2.68	"none"	718	1	41	323	218	136	15	42	
2336	D	10	56	4.15	"few"	635	38	92	209	157	114	60	77	
2295	E	1	143	3.28	"none"	896	0	0	112	290	132	27	19	
4533	F	6	151	2.60	"none"	663	0	0	16	43	226	586	127	
2311	P	6	160	2.23	"nearly none"	856	0	1	13	22	453	408	104	
2319	P	7	163	2.05	"very few"	874	0	7	53	14	393	69	51	

Table 3. Number of cod per hour's trawled on standard station GODTHÅB DYRST, 63°56'N, 20°21'W, depth app. 300 m. Otter trawl, 36 mm cod end mesh-size.

Year	Date	Ref. No.	No. of hauls	Total time trawled (minutes)	No. of cod per hour and age-group								
					II	III	IV	V	VI	VII	VIII	IX	
1968	1 APR	3941	2	105	2	96	214	395	78	22	3		
"	1-2 MAY	3964/-5	2	95	0	31	33	57	11	1	5		
1969	8-9 JAN	4142	3	183	0	70	208	68	27	8	13		
"	21 FEB	4164	1	45	0	103	261	109	41	8	4		
"	4 MAR	4168	2	120	0	65	157	89	47	9	6		
"	7-8 MAY	4213	3	180	2	273	130	12	8	0	1		
1970	4-5 JUN	4376	3	171	6	6	35	7	1	1	1		
1971	17-21 JAN	4512	3	146	2	240	60	95	9	2	3		
"	13-14 MAY	4530	4	217	0	229	29	16	2	0	1		

Table 4. Material for estimation of numbers of cod landed per age-group, Subarea 1, 1970. All samples are from Danish otter trawl landings. o/oo-figures are age-frequencies found in samples. No $\times 10^{-3}$ -figures are estimated numbers (in thousands) landed from division and quarter given in last line of the table.

Division	C+D		D	D	D	D+E	E	E	E	Total
Quarter	1	2	3	4	1	2	3	4	5	9 samples
Age-group	No $\times 10^{-3}$									
IV	o/oo		8	67	274	1	9	8	49	2378
	No $\times 10^{-3}$		38	306	664	1	77	62	77	
V	o/oo		36	183	225	271	104	126	122	10006
	No $\times 10^{-3}$		171	836	545	216	895	969	191	
VI	o/oo		253	117	107	221	162	177	170	8488
	No $\times 10^{-3}$		1246	533	259	176	1393	1361	266	
VII	o/oo		212	534	344	219	251	437	440	15698
	No $\times 10^{-3}$		2946	2530	1570	530	200	3760	3384	
VIII	o/oo		22	116	112	82	98	157	143	4247
	No $\times 10^{-3}$		4	305	549	512	198	78	1351	
IX+	o/oo		7	19	44	177	92	158	131	3461
	No $\times 10^{-3}$		2	27	209	807	223	126	1127	
Mean weight per fish (kg, round, fresh)	2.08	2.10	2.02	3.32	3.46	3.33	2.79	2.75	3.45	44278 thousand total
Landing sampled	56	87	24	25	39	60	54	109	51	505 tons (=0.4% of landings)
Raised to (tons)	479	29176	9579	15152	8368	2655	24006	21170	5412	115,997 tons
representing (Div., quarter)	A-C	A-C	D	D	D	D+E	E	F	E-F	Subarea 1
	1	2-4	2	3	4	1	2	1-2	3	4