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Subareas 1 (and East Greenland), 2, and 3

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Subarea 1 (and East Greenland)

A. Status of the Fisheries

1. General trends

The nominal catches and catches per day fished by vessels of the Federal Republic of Germany in 1978 are given in Table 1 and a further species breakdown of "OTHER FINFISH" in Table 2.

According to these preliminary catch statistics the total nominal catch in Subarea 1 decreased only by about 9,000 tons (19%) as compared to 1977, although the catch of redfish, which amounted to 61% of the total nominal catch in 1977, dropped by 22,200 tons (75%) and the by-catch of cod (a directed cod fishery was not permitted) by 1,553 tons (60%) in 1978. Substantial increases in catches, however, namely of roundnose grenadier and Greenland halibut partly compensated for these losses.

Fishing activity was almost entirely restricted to the first six months of 1978. Only 5% of the total nominal catch was taken in Division 1C, whereas 24, 44 and 27% were caught in Division 1D, E and F respectively.

Off East Greenland fishing activity increased. The number of days fished more than doubled against 1977 and the total nominal catch increased by 12,900 tons (37%). The trend of increased exploitation of species other than cod and redfish was the same as in Subarea 1

2. Forecast for 1979

The predominant proportion of the 1973 year-class of cod is expected to decline and the commercial catches will be increasingly dependent on the newly recruiting year-class classes of 1974 and 1975.

B. Special Research Studies

1. Environmental studies

Oceanographic observations were obtained on fishing stations and on the ICNAF standard section across Fyllas Bank by R/V *Anton Dohrn* in early December 1978. Results are presented in Res. Doc. 79/VI/80.

2. Biological Studies

Biological sampling of commercial catches and landings especially of cod was carried out during

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the first quarter of 1978. In early December 1978 a groundfish survey mainly directed on cod was conducted by R/V *Anton Dohrn* in Divisions 1C-F.

Since 1976 the relatively good year-class 1973 continued to predominate both in commercial (75% on average) and research catches (69% on average). Only 4% of the commercial catches consisted of older and mature cod. The incoming year-classes 1974 and 1975 have already made up 21% in commercial catches. The proportion of younger cod of year-classes 1974-77 was still more pronounced in research catches.

Age compositions of Subarea 1 cod of commercial and research catches in 1978 are given in Table 3.

The continuing exploitation of the 1973 year-class before reaching maturity in 1979 gives reason for serious concern regarding its effective contribution to the very depressed spawning stock. Correspondingly this applies to the even younger but probably less strong year-classes of 1974 and 1975 which already begin to occur in considerable amounts in commercial catches.

A preliminary assessment of the redfish stock in Subarea 1 based on biological data and catch and effort statistics is presented in Res. Doc. 79/VI/69.

### Subareas 2 and 3

#### A. Status of the Fisheries

##### 1. General trends

The nominal catches and catches per day fished by vessels of the Federal Republic of Germany in 1978 are given in Table 4 and a further species breakdown of "OTHER FINFISH" in Table 5.

Off northern and central Labrador (Division 2G and H) fishing activity took place mainly in November and December 1978 comprising 91% of the total nominal catch from these areas. Although there was an increase of the total catch by 1,260 tons (26%) against 1977, the catch of cod increased only slightly by 6% to 2,532 tons in 1978. The catch rates in 1978 were somewhat lower than in the previous year when fishing took place mainly during the first quarter. They may therefore indicate differences in seasonal availability but not necessarily a reduction in stock abundance. The success of the fishery in this area continues to remain strongly dependent on weather and ice condition. Therefore, only 70% of the cod quota allocated to the Federal Republic of Germany could be obtained.

Catches of Roundnose grenadier in Subareas 2+3 by vessels of the Federal Republic of Germany amounted to 963 ton and were mainly taken in Division 2GH (97%).

In the management area comprising Divisions 2J+3KL 98.5% of the cod quota of 3,120 tons allocated to the Federal Republic of Germany was already taken during the main fishing season in January and February and the remaining amount in December 1978. There was no significant change in catch rates as compared to 1977. Cod amounted to 64%, redfish to only 2% and Greenland halibut to 8% of the total nominal catch.

In Division 3M 82% of the cod quota of 500 tons allocated to the Federal Republic of Germany was taken, mainly in August and September 1978. According to the preliminary catch statistics cod amounted to 26% and redfish to 19% of the total nominal catch by vessels of the Federal Republic of Germany in Div. 3M. The reported catch of 504 tons of Greenland halibut (32%) might, however, subject to revision.

##### 2. Forecast for 1979

In view of the unchanged TAC for cod in Division 2GH, catches are expected to at least remain at about the same level or may even increase if ice conditions would be less severe.

In view of the increasing stock size of cod in Division 2J+3KL fishing conditions are expected to remain stable or may even improve.

#### B. Special Research Studies

##### 1. Environmental Studies

Due to bad weather conditions the groundfish survey program of R/V *Anton Dohrn* in late November 1978 had to be restricted to the southern part of Division 2J. Oceanographic observations could therefore only be obtained on fishing stations in the named area.

## 2. Biological Studies

Biological sampling of commercial catches of cod in Divisions 2H, 2J and 3K was carried out during the first quarter of 1978. The time-series of late autumn stratified random groundfish surveys was continued in Division 2J by R/V *Anton Dohrn* in late November 1978, but due to extremely bad weather conditions combined with air temperatures around  $-16^{\circ}\text{C}$  the survey activity had to be restricted to the southern part of Division 2J.

Cod age compositions of commercial catches in Division 2H, 2J and 3K as well as of research catches in 2J in 1978 are given in Table 6.

Except for the beginning recruitment of the 1974 year-class to the commercial fishery there was no significant change in the age composition in Subarea 2 and Division 3K. Although the 1973 year-class is clearly predominating followed by the 1972 year-class, older cod are still fairly well represented. Furthermore a remarkable increase in mean lengths of cod could be observed. The youngest cod obtained in research vessel catches belonged to the 1976 year-class.

### Subareas 4 and 5, Statistical Area 6

#### A. Status of the Fisheries

##### 1. General trends

Table 7 shows the nominal catch (in tons) of Federal Republic of Germany freezer trawlers in Subarea 4, where fishery took place only in 1978. Compared to the 1977 figures catches of all different species declined considerably especially squid (*Illex*) (1977: 7932 t, 1978: 503 t) All other catches are considered to be incidental and are of no importance.

No fishing activity took place in Subarea 5 and 6.

##### 2. Forecast for 1979

In 1979, due to the status of the stocks, no directed fishery in Subarea 4, 5 and 6 will take place besides some minor catches of squid (*Illex*) according to the EEC quota.

#### B. Special Research Studies

##### 1. Environmental Studies

In 1978 R/V *Anton Dohrn* conducted three surveys covering parts of Subarea 4, 5 and 6.

- a) From February 13 to April 9 a Young Herring Survey was carried out mainly in Div. 4X, 5Ze, 5Zw, 5Y, and 6A. The main results are published by Dornheim, H., G. T. Waring, and M. P. Sissenwine in ICNAF Res. Doc. 79/VI/40.
- b) From September 9 to October 24 another cruise with special emphasis on spawning Atlantic herring was made covering generally the same area as mentioned above. Results are compiled by Dornheim, H. and T. Azarovitz in ICNAF Res. Doc. 79/VI/83.
- c) From October 26 to November 17 a larval Atlantic herring survey was conducted in the Georges Bank/Nantucket Shoals area (Subarea 5 and 6) using a 61-cm Bongo sampler, a neuston net and a Multiple Opening and Closing Net and Environmental Sampling System (MOCNESS). Herring larvae, some hundred per haul, were collected east of Cape Cod.

During all cruises hydrographic data were obtained by help of Nansenbottles, XBT's, and the Multisonde. They are partly published in the above mentioned papers, partly analyzed along with data from other sources.

##### 2. Biological Studies

A total of 1,662 Atlantic sea herring was aged in 1978. Results (Table 8) show that in Div. 4X the 1976 year-class was by far predominating. In spring, the 1976 and 1975 year-classes prevailed in Div. 5Z, whilst in October the 1975, 1974, and 1973 year-classes. Almost the same situation was observed in October in Div. 5Y. Still 10% of our catches was made by the former strong 1970 year-class. In Div. 6A samples show the predominance of the 1975 year-class; some importance had the 1974 and 1973 year-classes.

Stages of maturity (Table 9) show the prevalence of stages 1 and 2 in Div. 4X. Samples from

October in Div. 5Z and 5Y show that some spawning has taken place in these areas in 1978. In Div. 6A both juvenile (stage 2) and spawned (stage 8) herring was observed.

Furthermore, length frequencies were determined at all fishing stations from mackerel, cod, haddock, pollock, and silver hake. In addition, from cod and haddock samples otoliths were extracted for further age determination studies.

3. Gear and Selectivity Studies

No activities reported for 1978 in the area.

Table 1. Nominal catches (tons) in Subarea 1 by Division and month and from East Greenland (total) in 1978.

Div./Month	Days fished	COD		REDFISH		OTHER FINFISH		TOTAL FINFISH	
		Nominal catch	Catch per day						
1C									
Jan	-	-	-	11	11.0	33	33.0	44	44.0
Feb	13	26	2.0	148	11.4	262	20.2	436	33.5
Mar	36	21	0.6	217	6.0	709	19.7	947	26.3
May	11	4	0.4	5	0.5	444	40.4	453	41.2
Total	61	51	0.8	381	6.2	1,448	23.7	1,880	30.8
1D									
Jan	43	23	0.5	377	8.8	487	11.3	887	20.6
Feb	73	30	0.4	298	4.1	1,729	23.7	2,057	28.2
Mar	90	61	0.7	200	2.2	1,861	20.7	2,122	23.6
Apr	58	83	1.4	154	2.7	2,670	46.0	2,907	50.1
May	49	22	0.4	37	0.8	1,457	29.7	1,516	30.9
Dec	2	-	-	-	-	53	26.5	53	26.5
Total	315	219	0.7	1,066	3.4	8,257	26.2	9,542	30.3
1E									
Jan	85	70	0.8	985	11.6	1,007	11.8	2,062	24.3
Feb	104	78	0.8	1,129	10.9	2,018	19.4	3,225	31.0
Mar	70	64	0.9	199	2.8	1,917	27.4	2,180	31.1
Apr	112	123	1.1	297	2.7	4,131	36.9	4,551	40.6
May	133	94	0.7	87	0.7	4,311	32.4	4,492	33.8
Jun	24	12	0.5	2	0.1	945	39.4	959	40.0
Dec	2	-	-	-	-	24	12.0	24	12.0
Total	530	441	0.8	2,699	5.1	14,353	27.1	17,493	33.0
1F									
Jan	218	214	1.0	2,520	11.6	3,152	14.5	5,886	27.0
Feb	46	45	1.0	324	7.0	469	10.2	838	18.2
Mar	12	10	0.8	79	6.6	263	21.9	352	29.3
Apr	38	47	1.2	147	3.9	1,210	31.8	1,404	36.9
May	12	-	-	115	9.6	65	5.4	180	15.0
June	53	26	0.5	37	0.7	1,859	35.1	1,922	36.3
Total	379	342	0.9	3,222	8.5	7,018	18.5	10,582	27.9
Subarea 1 Total	1,285	1,053	0.8	7,368	5.7	31,076	24.2	39,497	30.7
East Greenland Total	2,562	3,938	1.5	19,026	7.4	11,807	4.6	34,771	13.6

\* Species breakdown shown in Table 2.

Table 2. Nominal catches (tons) of "Other finfish" (Table 1) by species in SA 1 by Division and Month and from East Greenland (Total) in 1978.

Div/Month	102 HAD	106 POK	112 PLA	118 GHL	120 HAL	140 BHW	144 USK	152 LIN	- BLI	168 RNG	188 CAT	312 ARG	469 SHX	479 SKA	499 FIN	Total
1C Jan	-	-	11	-	7	-	-	-	-	-	3	-	-	-	12	33
Feb	-	-	73	-	12	-	-	-	-	-	62	-	-	-	115	262
Mar	-	-	76	170	13	-	-	-	-	194	77	-	2	-	177	709
May	-	-	7	166	1	8	-	-	-	38	27	-	-	-	197	444
Total	-	-	167	336	33	8	-	-	-	232	169	-	2	-	501	1448
1D Jan	-	-	217	6	15	-	-	-	-	-	128	-	0	-	121	487
Feb	-	-	819	186	27	-	-	-	-	41	236	-	7	-	413	1729
Mar	-	-	614	54	15	-	-	-	-	237	321	-	2	-	618	1861
Apr	-	-	281	603	53	-	-	-	-	886	180	18	4	-	645	2670
May	-	-	153	268	7	-	-	-	-	515	230	5	2	-	277	1457
Dec	-	-	-	46	0	-	-	-	-	-	-	-	-	-	7	53
Total	-	-	2084	1163	117	-	-	-	-	1679	1095	23	15	-	2081	8257
1E Jan	1	-	230	12	60	-	-	-	-	-	239	-	1	-	464	1007
Feb	-	0	815	162	28	-	-	-	-	54	236	-	2	-	721	2018
Mar	-	-	475	193	41	-	-	-	-	228	159	6	1	-	814	1917
Apr	1	-	413	669	94	-	-	-	-	1083	314	18	9	-	1530	4131
May	-	-	57	976	30	306	-	-	-	1369	608	48	3	-	914	4311
Jun	-	-	43	212	2	1	-	-	-	232	170	-	0	-	285	945
Dec	-	-	-	20	-	-	-	-	-	1	-	-	-	-	3	24
Total	2	0	2033	2244	255	307	-	-	-	2967	1726	72	16	-	4731	15353
1F Jan	-	-	648	459	41	-	-	-	-	139	532	-	2	-	1331	3152
Feb	-	-	151	50	2	-	-	-	-	33	30	-	0	-	203	469
Mar	-	-	27	43	13	-	-	-	-	59	23	3	0	-	95	263
Apr	-	-	38	124	13	-	-	-	-	577	71	2	2	-	383	1210
May	-	-	16	5	-	-	-	-	-	16	16	-	-	-	12	65
Jun	-	-	92	532	3	36	-	-	-	108	384	-	-	-	704	1859
Total	-	-	972	1213	72	36	-	-	-	932	1056	5	4	-	2728	7018
SA 1 Total	2	0	5256	4956	477	351	-	-	-	5810	4046	100	37	-	10041	31076
E. Greenland Total	23	12	784	2156	264	897	45	15	931	2073	1002	206	14	9	3376	11807

  

HAD	Haddock	BLI	Blue ling
POK	Pollock, Saithe	RNG	Roundnose grenadier
PLA	American plaice	CAT	Catfishes, Wolffishes
GHL	Greenland halibut	ARG	Argentine
HAL	Atlantic halibut	SHX	Large sharks (NS)
BHW	Blue whiting	SKA	Skates (NS)
USK	Cusk ( <i>Brosme brosme</i> )	FIN	Finfishes (NS)
LIN	Ling		

Table 3. Cod age compositions (%.) and mean lengths (cm) in Subarea 1, 1978.

1978 Quarter	Sampling type	Div.	Year-classes													Mean Length (cm)
			77	76	75	74	73	72	71	70	69	68	67	66 & older		
I	Comm. catches	1C	-	-	14	120	833	27	6	-	-	-	-	-	61.2	
	Comm. catches	1D	-	-	5	134	776	46	27	5	4	-	1	2	62.4	
	Comm. landings	1F	-	-	6	352	630	8	4	+	+	-	-	-	54.4	
IV	Research catches	1C	-	1	28	63	808	64	20	7	2	6	1	-	65.4	
	Research catches	1D	8	33	102	97	683	50	15	3	2	3	2	2	60.5	
	Research catches	1E	134	287	75	46	412	34	9	-	2	-	-	-	47.3	
	Research catches	1F	2	2	12	103	854	26	1	-	-	-	-	-	60.0	

Table 4. Nominal catches (tons) in SA 2 and SA 3 by Division and Month in 1978.

Div./Month	Days fished	COD		REDFISH		GREENLAND HALIBUT		OTHER FINFISH		TOTAL FINFISH		
		Nominal catch	Catch per day	Nominal catch	Catch per day	Nominal catch	Catch per day	Nominal catch	Catch per day	Nominal catch	Catch per day	
2G	Oct	53	-	-	-	51	1.0	819	15.5	870	16.4	
	Nov	31	-	-	12	0.4	424	13.7	116	3.7	552	17.8
	Total	84	-	-	12	0.1	475	5.7	935	11.1	1,422	16.9
2H	Feb	5	173	34.6	1	0.2	1	0.2	164	32.8	399	79.8
	Sep	2	-	-	-	-	36	18.0	3	1.5	39	19.5
	Oct	3	-	-	-	-	18	6.0	12	4.0	30	10.0
	Nov	53	779	14.7	5	0.1	61	1.2	42	0.8	887	16.7
	Dec	82	1,580	19.3	47	0.6	22	0.3	412	5.0	2,061	25.1
	Total	145	2,532	17.5	53	0.4	138	1.0	633	4.4	3,356	23.1
2GH Total	229	2,532	11.1	65	0.3	613	2.7	1,568	6.8	4,778	20.9	
2J	Jan	91	1,641	18.0	32	0.4	16	0.2	575	6.3	2,264	24.9
	Feb	103	1,387	13.5	56	0.5	232	2.3	616	6.0	2,291	22.2
	Sep	2	-	-	-	-	30	15.0	3	1.5	33	16.5
	Oct	4	-	-	-	-	-	-	5	1.3	5	1.3
	Dec	2	3	1.5	1	0.5	-	-	19	9.5	23	11.5
	Total	202	3,031	15.0	89	0.4	278	1.4	1,218	6.0	4,616	22.9
3K	Feb	2	27	13.5	3	1.5	-	-	17	8.5	47	23.5
	Sep	9	-	-	-	-	93	10.3	6	0.7	99	11.0
	Oct	3	-	-	-	-	36	12.0	2	0.7	38	12.7
	Total	14	27	1.9	3	0.2	129	9.2	25	1.8	184	13.1
3L	Dec	2	43	21.5	-	-	-	-	19	9.5	62	31.0
2J+3KL Total	218	3,101	14.2	92	0.4	407	1.9	1,262	5.8	4,862	22.3	
3M	Aug	17	104	6.1	69	4.1	111	6.5	54	3.2	338	19.9
	Sep	47	235	5.0	183	3.9	393	8.4	276	5.9	1,087	23.1
	Oct	2	1	0.5	38	19.0	-	-	4	2.0	43	21.5
	Dec	2	70	35.0	10	5.0	-	-	20	10.0	100	50.0
	Total	68	410	6.0	300	4.4	504	7.4	354	5.2	1,568	23.1
3N	Oct	1	-	-	12	12.0	-	-	1	1.0	13	13.0
Subarea 2 Total	431	5,563	12.9	154	0.4	891	2.1	2,786	6.5	9,394	21.8	
Subarea 3 Total	85	480	5.6	315	3.7	633	7.4	399	4.7	1,827	21.5	

\* Species breakdown in Table 5.

Table 5. Nominal catches (tons) of "Other finfish" (Table 4) by species in SA 2 and SA 3 by Division and Month in 1978.

Div./Month	112 PLA	114 WIT	120 HAL	168 RNG	188 CAT	469 SHX	479 SKA	499 FIN	TOTAL
2G Oct	-	-	-	793	-	-	-	26	819
2G Nov	-	-	-	111	-	-	-	5	116
2G Total	-	-	-	904	-	-	-	31	935
2H Feb	1	-	-	-	-	-	-	163	164
2H Sep	-	-	-	3	-	-	-	-	3
2H Oct	-	-	-	2	-	-	-	10	12
2H Nov	2	-	2	7	4	-	-	27	42
2H Dec	24	-	6	20	46	-	0	316	412
2H Total	27	-	8	32	50	-	0	516	633
2G+H Total	27	-	8	936	50	-	0	547	1568
2J Jan	16	3	2	-	3	1	-	550	575
2J Feb	12	20	2	-	15	1	-	566	616
2J Sep	-	-	-	3	-	-	-	-	3
2J Oct	-	-	-	5	-	-	-	0	5
2J Dec	-	-	0	17	1	-	-	1	19
2J Total	28	23	4	25	19	2	-	1117	1218
3K Feb	-	-	-	-	-	-	-	17	17
3K Sep	-	-	-	2	-	-	-	4	6
3K Oct	-	-	-	-	-	-	-	2	2
3K Total	-	-	-	2	-	-	-	23	25
3L Dec	7	-	0	-	6	-	-	6	19
2J+3KL Total	35	23	4	27	25	2	-	1146	1262
3M Aug	11	-	-	-	30	-	-	13	54
3M Sep	85	-	-	-	159	-	-	32	276
3M Oct	-	-	-	-	-	-	4	-	4
3M Dec	4	-	0	-	6	-	-	10	20
3M Total	100	-	0	-	195	-	4	55	354
3N Oct	-	-	-	-	-	-	1	-	1
SA 2 Total	55	23	12	961	69	2	0	1664	2786
SA 3 Total	107	-	0	2	201	-	5	84	399
	PLA	American plaice			CAT	Catfishes, Wolffishes			
	WIT	Witch flounder			SHX	Large sharks (NS)			
	HAL	Atlantic halibut			SKA	Skates (NS)			
	RNG	Roundnose grenadier			FIN	Finfishes (NS)			

Table 6. Cod age compositions ( $^{\circ}/_{\infty}$ ) and mean lengths (cm) in Subarea 2 and Division 3K in 1978.

1978 Quarter	Sampling type	Div.	Year-classes											Mean length (cm)	
			76	75	74	73	72	71	70	69	68	67	66		65 & older
I	Comm. catches	2H	-	-	3	496	211	64	63	57	63	34	8	1	57.6
	Comm. catches	2J	-	3	47	487	247	70	50	39	34	16	7	+	55.8
	Comm. catches	3K	-	-	26	456	298	74	48	40	31	17	8	2	57.3
IV	Research catches	2J	14	42	252	200	187	179	69	23	11	11	7	5	48.1

Table 7. : Nominal catch (tons) effort (days fished), and discards (tons) of FRG freezer trawlers in Subarea 4, 1978

Div.	Month	Cod	Haddock	Pol.	Argent.	Grenadier	Squid (Illex)	other finfish	DF	Discards	
V <sub>s</sub>	Sep	-	-	-	-	-	309	99	408	11	-
	Oct	-	-	-	-	-	0	1	-	1	-
W	Sep	-	-	-	-	-	271	87	358	7	-
	Oct	1	2	-	-	-	67	2	72	9	-
X	Oct	2	5	1	1	0	503	13	525	22	51

Table 8.

Age composition (‰) in 1978 \*

Area	Month	4X		5Z		5Y		6A	
		Oct	Mar	Oct	Oct	Oct	Mar		
Yearcl. Age									
1977	1	-	-	-	-	-	-	-	-
76	2	908	306	56	24	-	-	-	-
75	3	54	570	256	401	475	-	-	-
74	4	11	75	233	204	303	-	-	-
73	5	11	43	304	227	172	-	-	-
72	6	-	5	13	6	20	-	-	-
71	7	-	-	27	36	20	-	-	-
70	8	16	1	103	102	10	-	-	-
69	9	-	-	3	-	-	-	-	-
< 69 > 9		-	-	5	-	-	-	-	-
Total		1000	1000	1000	1000	1000			
n		186	831	379	167	99			
$\bar{x}$ mm		196	220	291	299	263			
s <sup>2</sup>		7.771	12.833	14.960	8.972	6.854			
n		418	2763	870	598	1021			

Table 9.

Stages of maturity (‰) in 1978 \*

Area	Month	4X		5Z		5Y		6A	
		Oct	Mar	Oct	Oct	Oct	Mar		
Stages	1	538	347	-	-	-	-	-	-
	2	425	569	185	305	590	-	-	-
	3	-	4	5	12	-	-	-	-
	4	-	-	34	24	-	-	-	-
	5	5	-	362	126	-	-	-	-
	6	5	-	40	66	-	-	-	-
	7	5	-	374	449	-	-	-	-
	8	22	80	-	18	410	-	-	-
Total		1000	1000	1000	1000	1000			
n		186	836	379	167	100			

\*) Only research vessel samples available