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by

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INTRODUCTION

G.D.R. overall nominal catch in the NAFO-area amounted to 8392.2 tons in 1983, therefore the total yield taken by G.D.R. fleet amounted to about 3300 tons more than in 1982 (Table 1). The basis of this increase are the better fishing results of roundnose grenadier and redfish in the subareas 2+3, and the new-beginning of mackerel-fishery in the statistical subarea 6.

Fisheries were carried out in NAFO-subareas 2, 3 and 6 only.

The main species of the catches were Greenland halibut, roundnose grenadier, mackerel, and redfish.

Subareas 2 and 3

A Status of the Fisheries

Mainly the fishery was carried out by sterntrawlers of the type "Zubringer-trawler" (FAO-code 900-999,9 BRT) its portion is 99.4 % of nominal cat ch. A factory ship (FAO-code 2000-2999.9) worked in NAFO-Division 3 M during the fishery of redfish in January. The bottom trawl-fishery was carried out only in whole area in 1983.

The timetable of fishery of the G.D.R.fleet was the following:

- directed Greenland halibut fishery in Divisions 2 J, 3 K, 3 L (August)
- directed redfish fishery in Divisions 3 L, 3 N (August)
- directed RN-grenadier-fishery in Subareas 2 and 3 (Sept-December)
- directed cod-fishery in Division 2 H (end of November).

Also in 1983 the fishery activities were strongly connected with the quota regulations in previous years, therefore the catches

don't reflect the situations and variations of stocks but nevertheless the seasonal characteristics of fishery and the influence of hydrological parameters at the yield.

### 1. Cod

A specialized cod fishery was carried out in Division NAFO 2 H by the fleet of "Zubringer Trawler" at the end of November only. Based upon the limitation of effort the activities of fishery were limited, because the catcher-boats of the fleet could only work for 4 to 6 days. Therefore weather conditions, search activities, change of fishing grounds and disadvantageous biological conditions affected the effort and therefore the results. Only 18.9 per cent of cod-quota was reached.

The fishery was carried out in 200-450 m. At about 350 m the cod-catch was the relative and absolute best one. In average the catch per hour of all trawl-stations amounted to 0.5 tons of cod. The nominal catch was decisively determined of the high level of by-catch of Northern wolffish. The by-catch of Northern wolffish in nominal catch amounted to an average of 42 per cent and therefore was on an unusually high level. May be this high level of by-catch of Northern wolffish is the effect of cooling of North-west Atlantic during the last years (see below).

### 2. Redfish

The nominal catch of redfish amounted to 1252.1 tons in 1983, which increased in comparison with 1982 (see table 1). Mainly redfish were caught by sterntrawlers of the type "Zubringer-Trawler" in the Divisions 3 K (August-October), and 2 L (August). This redfish-fishery was a specialized fishery partly (August NAFO 3 L). The fishery in Division 3 L (48°N, 48°W) was carried out in a fishing-depth between 290-370 m (mainly 300-330 m) by bottom-trawl generally. In the specialized redfish-fishery the c.p.u.e. in catch per day amounted to in average 8.6 tons.

In Division 3 K during the period of September/October and in Division 3 H during the period October/December redfish was by-catch of the grenadier/halibut and cod-fishery only. The by-catch of redfish amounted to up to 50 per cent depending on fishery-depth, but in average about 2 to 5 per cent only.

During a short period one factory-trawler carried out a fishery by bathy-pelagic trawling in Division 3 M in January. The c.p.u.e. in catch per day amounted to about 8.0 tons.

### 3. Roundnose Grenadier/Greenland halibut

As in 1982 (reported in G.D.R. Research Report in 1982) the main feature of the season 1983 was the spatial separation of fishing

grounds and fishing depths for the two main fish species RN-grenadier and Greenland halibut.

Corresponding to the experience of the last years a further separation of the main fish species was observed.

(On these problems and the Greenland halibut by-catch in the directed fishery for rn-grenadier we'll report in a NAFO SCR-Document in 1984).

The development of c.p.u.e. is given in table 3. The fishery was carried out by sterntrawlers type "Zubringer-Trawler" only.

A directed fishery of Greenland halibut was carried out at the general position  $50^{\circ}\text{N}$ ,  $52^{\circ}50'\text{W}$  (Division 3 K) during the period from August 4.-20. Fishing-depths were 450-500 m. The fishing rate was stable (average 5.8 tons catch per day on ground) but nevertheless not satisfactory. The portion of halibut amounted to an average of 65 per cent. Species of by-catch were witch, catfish, skates, and rn-grenadier.

The directed fishery of rn-grenadier was started at the general position about  $51^{\circ}\text{N}$  and at 400-1200 m (mainly 700-1000 m) depth of fishery. The c.p.u.e. in average amounted to 8 to 10 tons per day on ground. The expectations of fishery were not realized. This area didn't show clearly a separation of species corresponding to horizons of depth in opposite to the northern areas. There it was not possible to prevent a high level of by-catch of redfish. The fishing grounds were left because the quota of redfish was too small for that fishery. Therefore the fleet changed to the northern area (Division 2 H) at the beginning of October.

Again, like in 1980, 1981, and 1982 the relations of the proportions of rn-grenadier and Greenland halibut in the catches were different from time to time depending on the area and depth in which the fishery was conducted, but especially depending on the level of immigration of Greenland halibut in the northern part (NAFO 2 H, J) of the fishery-area from October till December with the reservation of the development of hydrological conditions. From these facts firstly result fluctuations of c.p.u.e. values of rn-grenadier and Greenland halibut with the corresponding of the last years (see table 3), and secondly in the northern fishing area (NAFO 2 H) the proportion Greenland halibut was higher compared to the southern fishing area generally (see table 4).

In opposition to 1982 (end of September) the directed fishery of rn-Grenadier was started one month earlier (beginning of September) than in 1983. Therefore in 1983 about 945 tons of rn-Grenadier more than in 1982 were caught (see table 3).

## B Special Research Studies

### 1. Environmental Studies

No data

### 2. Biological Studies

Cod:

During directed cod fishery (26.-30.11.) length and weight data were collected on board a commercial vessel in Division 2 H. At the spectrum of length from 43 to 90 cm the mainlength (proportion of 80 per cent) amounted to 62 to 78 cm. The average weight per fish amounted to 3900 g. The cod was at the end of food-migration (filling of stomach was three-fourths up to full) and at the beginning of maturity.

Redfish:

Data of redfish-samples we investigate present. The samples were collected and frozen on board of commercial vessels in Sub-areas 2 and 3.

Rn-grenadier:

In Division 2 H length (analfin length and total length)-, age-, and weight data were collected on board of commercial vessels in November and December.

At present the age-samplings (otoliths in part scales too) were investigated and determined. Two samples (150 examples per sampling) were prepared for international exchange of age-determination-material. It is already transmitted to the scientist of F.R.G.

Greenland halibut:

Length-, age-, and weight data were collected on board commercial vessels in Subarea 2 (Tables 7, 8). The main data on length-age composition of the Greenland halibut in the northern part of their area were collected in November/December 1983. Some data of biological problems are not published in the present paper, but in Research Document of Annual Meeting of 1984 on problem of Greenland halibut by-catch in the directed fishery for rn-grenadier.

## Subarea 6

### A Status of the Fisheries

In Subarea 6 A directed Mackerel-fishery (pelagic trawl) was carried out in 1983 only. Since 1977 the G.D.R. fleet was worked again in divisions 6 A, B, and C in 1983.

**Mackerel:**

In comparison with the experience of the period 1970-1977 the development trend, and condition of fishery changed completely in 1983. In opposition to the fishery in deeper water in earlier years the fishery was carried out in 1983 in shallower waters (maximum 135 m, minimum 20 m), and at positions which were more southerly (southern 35°N) than in the seventieth.

The fishery was carried out by factory trawlers (FAO-code 2000-2999.9BRT) only during the period from the end of February up to the end of April.

The c.p.u.e. in total catch per day amounted to 14.0 tons in February, 26.5 tons in March, 29.1 tons in April. The proportion of mackerel in the total catch amounted to about 99 per cent. By-catch species were alewives, spiny dogfishes and squids.

**B Special Research Studies**

**1. Environmental Studies**

No data

**2. Biological Studies**

**Mackerel:**

During catch period length-, weight data and age reading material (otoliths) were collected on board commercial vessels.

At a range of total forklengths from 21 to 45 cm dominated a range of main lengths (total fork-length of 5 per cent limit) from 26 to 29 cm and from 36 to 41 cm. These two dominating

length-groups are present in the age-length key. The year-classes 3, 4, and 8, 9, 10 are dominating (see table 9).

In the samples the mean-length and mean-weight per age groups are represented (see Table 10).

Table 1: G.D.R. nominal catches (tons) of species in the NAFO-area for 1982 and 1983

Species	1982	1983
Cod	341	127.8
Redfish	437	1252.1
Roundnose grenadier	1640	2585.5
Greenland halibut	2487	2590.2
American plaice	-	33.8
Northwest-atlantic eelpouts	-	15.2
Northern wolffish	16	7.9
Skates	104	261.1
Greenland shark	6	16.0
Red and white hakes	3	18.3
Catfish	9	13.2
Baird's smoothead	46	92.4
Mackerel	-	1314.5
Alewife	-	5.8
Spiny dogfishes	-	7.8
Witch	4	50.4
squid	-	0.2
Total	5093	8392.2

Table 2: G.D.R. nominal catches (tons of species by divisions of Subareas 2, 3 and 6 for 1983

Species	2 G	2H	2J	3K	3L	3M	6A	6B	6C	Total
Cod	-	96.4	-	14.6	13.8	3.0	-	-	-	127.8
Redfish	-	99.2	-	526.6	586.4	39.9	-	-	-	1252.1
Roundnose grenadier	-	1279.8	-	1243.2	60.8	1.7	-	-	-	2585.5
Greenland halibut	-	1623.1	-	932.2	32.1	2.8	-	-	-	2590.2
American plaice	-	19.6	-	13.7	0.1	0.4	-	-	-	33.8
NW-atlantic eelpouts	-	1.3	-	13.5	0.4	-	-	-	-	15.2
Northern wolffish	-	2.0	-	2.3	3.6	-	-	-	-	7.9
Skates	-	124.6	-	86.1	50.4	-	-	-	-	261.1
Greenland shark	-	12.8	-	2.7	-	0.5	-	-	-	16.0
Red and white hakes	-	9.1	-	9.2	-	-	-	-	-	18.3
Catfish	-	13.2	-	-	-	-	-	-	-	13.2
Baird's smoothead	-	92.4	-	-	-	-	-	-	-	92.4
Mackerel	-	-	-	-	-	-	461.0	169.0	684.5	1314.5
Alewife	-	-	-	-	-	-	-	3.6	2.2	5.8
Spiny dogfish	-	-	-	-	-	-	0.2	4.9	2.7	7.8
Squid	-	-	-	-	-	-	-	0.2	-	0.2
Witch	-	-	-	49.2	1.1	0.1	-	-	-	50.4
Total	-	3373.5	-	2893.3	748.7	48.4	461.2	177.7	689.4	8392.2

**Table 3:** Development of c.p.u.e. (catches per hour in tons) of roundnose grenadier (RNG) and Greenland halibut (GHL) 1981, 1982 and 1983 for "Zubringer-Trawler" (900-999.9 BRT)  
(<sup>x</sup> provisional)

	September		October		November		December	
	RNG	GHL	RNG	GHL	RNG	GHL	RNG	GHL
<u>Div. 2 G</u>								
1981	-	-	0.31	0.35	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983 <sup>x</sup> )	-	-	-	-	-	-	-	-
<u>Div. 2 H</u>								
1981	0,35	0.18	0.11	0.23	0.38	0.56	0.16	0.91
1982	-	-	0.29	0.32	0.12	0.51	0.10	0.69
1983 <sup>x</sup> )	-	-	0.43	0.15	0.21	0.22	0.11	0.61
<u>Div. 2 J</u>								
1981	-	0.08	0.17	0.19	0.61	0.14	0.33	0.21
1982	-	-	0.09	0.16	0.21	0.09	-	-
1983	-	-	-	-	-	-	-	-
<u>Div. 3 K.</u>								
1981	-	-	0.24	0.25	0.49	0.12	-	-
1982	0.39	0.09	-	-	-	-	0.10	0.09
1983 <sup>x</sup> )	0.45	0.18	0.29	0.25	-	-	-	-

**Table 4:** Development of proportion (%) of Greenland halibut (GHL) and rn-Grenadier (RNG) in the directed fishery for rn-Grenadier according to Divisions, months and years

	September		October		November		December	
	RNG	GHL	RNG	GHL	RNG	GHL	RNG	GHL
<u>Div. 2 G</u>								
1981	-	-	48	49	-	-	-	-
1982	-	-	-	-	-	-	-	-
1983	-	-	-	-	-	-	-	-
<u>Div. 2 H</u>								
1981	57	27	25	55	33	46	7	43
1982	-	-	48	51	15	68	10	68
1983	-	-	65	23	38	40	14	79
<u>Div. 2 J</u>								
1981	19	25	39	41	62	12	28	15
1982	-	-	24	21	42	12	-	-
1983	-	-	-	-	-	-	-	-
<u>Div. 3 K</u>								
1981	-	-	45	36	62	15	5	4
1982	53	12	-	-	79	14	65	9
1983	54	22	43	38	-	-	-	-

**Table 5:** Size composition of rn-grenadier (o/oo) in catches taken by commercial bottom trawl (mesh-size > 130 mm) in Division 2 H, November and December 1983

Analfin-length (cm)	November			December		
	males	females	total	males	females	total
4,5						
5,0	1	+	1			
5,5	3	1	4			
6,0	2	1	3			
6,5	2	3	5			
7,0	7	4	10		3	3
7,5	5	6	11		-	-
8,0	16	7	23		-	-
8,5	9	7	16		-	-
9,0	12	7	20	3	3	7
9,5	20	11	31	10	17	27
10,0	28	10	38	17	10	27
10,5	22	20	42	17	23	40
11,0	26	24	50	27	20	47
11,5	37	27	64	40	20	60
12,0	38	23	62	80	40	120
12,5	58	29	86	23	43	67
13,0	45	30	77	63	57	120
13,5	46	36	82	33	53	87
14,0	44	32	76	70	40	110
14,5	46	44	90	53	57	110
15,0	28	27	55	37	40	77
15,5	17	24	40	13	43	56
16,0	15	15	30	7	10	17
16,5	11	16	27	10	3	13
17,0	7	9	16	-	7	7
17,5	2	13	15	-	3	3
18,0	2	7	9	-	-	-
18,5	1	4	5	3	-	3
19,0	-	3	3			
19,5	1	3	4			
20,0	-	3	3			
20,5	-	1	1			
21,0	-	-	-			
21,5	-	-	-			
22,0	-	1	1			
Ø-L <sub>A</sub> (cm)	12,69	13,52	13,17	13,25	13,48	13,36

**Table 6:** Mean length (total- and analfinlength) and mean weight depending on depth of catch, Division 2 H in November and December 1983

depth (m)	Main length (cm L <sub>t</sub> )	Mean analfin- length (cm)	Mean weight (kg)
520	30-50	10.44	0.26
500/ 550	35-50	11.29	0.27
950/1000	45-80	13.48	0.53
1150/1200	50-75	14.31	0.56
1250	60-80	14.53	0.59
1300	65-80	15.09	0.83



Table 7: Age composition (o/oo) and average length per age (cm) of Greenland halibut in catches taken by commercial bottom trawl (mesh-size > 130 mm) NAFO 2 H, Nov. 1983

Year class	Age years	Number of spec.(o/oo)	Mean length (cm)	Number of spec.(o/oo)	Mean length (cm)
		♂♂	♂♂	♀♀	♀♀
1980	3	1	29.0	-	-
1979	4	-	-	18	41.0
1978	5	12	39.0	16	45.2
1977	6	54	44.8	17	47.9
1976	7	88	48.6	38	52.7
1975	8	32	53.2	40	56.2
1974	9	102	56.0	9	59.2
1973	10	79	59.0	23	62.5
1972	11	51	62.2	37	64.9
1971	12	33	65.0	25	70.4
1970	13	21	66.8	36	73.4
1969	14	9	74.3	33	78.3
1968	15	5	78.6	24	79.8
1967	16	8	82.0	13	82.1
1966	17	-	-	38	85.8
1965	18	-	-	25	88.4
1964	19	2	97.0	47	92.2
1963	20			6	100.3
1962	21			4	101.0
1961	22			4	105.5
Relative Number (o/oo)		547		453	
No.of spec. analysed		157		129	
Mean length (cm)		55,9		70,0	

Table 8: Size composition of Greenland halibut (o/oo) in catches taken by commercial bottom trawl (mesh-size > 130 mm), NAFO 2 H, November/December 1983

Length-group	2 H(Nov.)		2 H(Dec.)	
	oo	oo ++	oo	oo ++
28	1	-	-	-
30	-	-	-	-
32	-	-	-	-
34	2	2	-	-
36	1	2	2	-
38	4	4	2	-
40	5	6	-	2
42	28	6	8	-
44	25	7	15	4
46	31	9	44	19
48	41	15	76	15
50	48	11	70	34
52	49	24	68	25
54	60	21	63	25
56	50	21	61	32
58	48	5	38	11
60	34	17	15	19
62	36	21	19	15
64	29	15	8	17
66	11	15	8	15
68	13	12	11	25
70	5	13	2	23
72	7	17	-	21
74	6	18	-	17
76	2	20	-	19
78	2	15	-	8
80	1	21	-	27
82	2	18	-	30
84	2	15	-	30
86	2	28	2	23
88	-	22	-	2
90	-	11	-	19
92	-	13	-	6
94	-	7	-	2
96	2	8	-	-
98	-	4	-	-
100	-	4	-	-
102	-	2	-	2
104	-	3	-	-
106	-	1	-	-
Relative number(o/oo)	547	453	512	487
Mean length(cm)	55,9	70,0	53,8	68,5
No. of spec. measured	716	592	243	231

**Table 9:** Age-length key of all samples collected on board commercial ships in March/April 1983

Fork-length (cm)	Number sampled by year-classes and age														No aged
	2	3	4	5	6	7	8	9	10	11	12	13	14		
23	1													1	
24															
25		5												5	
26		8												8	
27		30												30	
28		25												25	
29		10												10	
30		10												10	
31		6	1											7	
32		1	2											3	
33		3	8											11	
34			12	1										13	
35		3	17	2										22	
36			9	4	1									14	
37		1	3	11	7				1					23	
38			1	8	13	10	4	4	1					41	
39				6	12	10	18	12	18	5				81	
40					8	6	19	33	20	9	1			96	
41						3	9	15	12	6	3		3	51	
42								7	6	2	2	1	1	20	
43									1			1		2	
o/oo		216	112	68	89	61	106	152	123	47	15	2	8	1001	
Totals	1	102	53	32	42	29	50	72	58	22	7	1	4	473	

**Table 10:** Mean length and mean weight per age group, Mackerel; NAFO 6 A, B, C; March/April 1983

Age group	Mean length (cm $L_f$ )	Mean weight (g)
2	23.5	120
3	28.5	232
4	35.1	439
5	37.8	591
6	39.1	642
7	39.6	683
8	40.2	710
9	40.7	750
10	40.5	735
11	40.7	768
12	41.5	865
13	42.5	915
14	41.3	849
Average	37.01	576

