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German Research Report for 1991

by

H.-P. Cornus¹, P. Ernst², H.-J. Rätz¹ and M. Stein¹

Introduction

The total German catch within the NAFO convention area amounted to 13,341t in 1991 (Table 1). This statistic refers to the catches of the reunified Germany. Therefore, no comparison in relation to 1990 has been made. The main fisheries were on cod in Division 3L and redfish in Divisions 3M and 3LN, which amounted to 48,5% and 44,4% of the total German catch in the NAFO area, respectively.

Subareas 0 and 2

A. Status of the Fisheries

In Subareas 0 and 2 there were no fisheries of German fleets.

B. Special Studies

1. Environment

As in the years before, German specialists took part in the research trip of the FRV "Kapitan Shaytanov" of the PINRO, Murmansk/Russian Federation to the Northwest Atlantic during the 4th quarter of 1991 (groundfish survey) in the Subareas 0 and 2 with the emphasis on Greenland halibut. Therefore, all environmental data are published in the papers of Russian Federation.

2. Biological Studies

Redfish (*Sebastes mentella* TRAV.), Div. OB, 2G see results of the groundfish survey and Tables 3 and 4.

Roundnose grenadier (*Coryphaenoides rupestris* GUNN.), Div. OB see results of groundfish survey and Table 5.

Greenland halibut (*Reinhardtius hippoglossoides* WALB.), Div. OB see results of the groundfish survey and Table 6.

Groundfish Survey

The joint groundfish survey of Germany and the Russian Federation was carried out in the NAFO Subareas 0 and 2 from 7 October until 24 November 1992. The object of this stratified random survey was the Greenland halibut (*Reinhardtius hippoglossoides* WALB.) as commercial important species. Biological samples were collected from Greenland halibut and other species, too and are given in Tables 3-6. The material and methods of the survey were described in the NAFO SCR Doc. 91/21 (Ernst et al., 1991). For Greenland halibut, the results of the "Mean Trawlable Biomass" (MTB) in 1989-91 are given in Table 2. The calculation was based on a variable towing speed of each haul taking the launching and retrieval positions into account.

The results indicate a dramatic decrease of the MTB in the Division OB from 79,000 t in 1989 to 45,600 t in 1991. The same tendency is observed for the development of the MTB in the Divisions 2G, H (38,700 t in 1989, 12,300 tons in 1991), although the investigated area increased from 7,900 nm² in 1989 to 16,800 nm² in 1991.

¹) Bundesforschungsanstalt für Fischerei, Institut für Seefischerei, Palmallee 9, FRG-2000 Hamburg 50

²) Bundesforschungsanstalt für Fischerei, Institut für Ostseefischerei Rostock, An der Jägerbäk 2, FRG-O-2510 Rostock-Marienehe

Subarea 1

A. Status of the Fishery

Directed Cod Fishery

In comparison to 1990 when more than 6,000 t could be taken, the fishery stopped practically in 1991. About only 80 t could be fished in the first quarter, then this fishery was considered as unprofitable and shifted to East Greenland.

B. Special Studies

1. Environment

Analysis was made of historical temperature and salinity data from East and West Greenland (Divs. 1F-1B; Stein, 1992 a). During the annual groundfish survey to the West Greenland area, standard fishery oceanography sampling (CTD/Rosette) was achieved in Divs. 1F-1E. At standard oceanographic stations along the NAFO Standard Sections Cape Farewell, Cape Desolation, Fyllas Bank, Sukkertoppen and Holsteinsborg the vertical distribution of temperature and salinity was mapped between October 24, 1991 and November 21, 1991. A total of 134 CTD/Rosette stations were completed off West Greenland.

As in previous years, a transatlantic section was performed from Cape Farewell to the Pentlands/Scotland by means of XBT drops (Deep Blue). The data were on-line transmitted via satellite to the IGOSS system.

Preliminary analysis of the West Greenland data indicates anomalous warm conditions in the water column (Stein, 1992 b). The Irminger component of the West Greenland Current with temperatures $>6^{\circ}\text{C}$ in the surface layer (0-200m) was up 1.2°K above normal. Also in the middle and in the north of the survey area anomalous warm conditions were found. The differences to the year 1990 amounted to 1°K . Observations at station 4 of the Fyllas Bank indicated the warming trend as prognosted. Temperature of the 0-200m layer is 0.2°K above the 29 years mean

2. Biological Studies

Groundfish Survey

Abundance and biomass indices were derived from the annual groundfish survey established in 1982. The stratified random surveys covered the shelf area and continental slope off West Greenland (Subdivisions 1B-1F) outside the 3-mile limit to the 600 m isobath. During October and November 1991, 97 valid hauls were carried. The total catch in number amounted to 41,586 specimens classified to 40 taxonomic units. The numbers of length measurements spitted by species and division are listed in Table 7. Information about length, weight, sex, maturity and age is available for all cod on an individual basis. An assessment based on survey data for redfishes (*Sebastes marinus* and *S. mentella*) is documented (Cornus, 1992). Within the framework of ecological studies a stomach sampling was carried out. In total 262, 300, 6, 26, 200, and 60 stomachs were collected of the species *Gadus morhua*, *Reinhardtius hippoglossoides*, *Hippoglossus hippoglossus*, *Raja radiata*, *Sebastes* species and *Lycodes* species, respectively. Additionally, the distribution of 0-group redfish (*Sebastes* species) was investigated by pelagic trawling along the NAFO standard sections concurrently to the recording of the hydrographic data (Wieland, 1992).

The results of the groundfish survey revealed a continuation in the drastic decline of total fish biomass (Rätz, 1992). Compared to the last year's estimate (1990), the overall decrease amounted to -66% in 1991. The ecologically important fish species, *Gadus morhua* (-85%), *Hippoglossoides platessoides* (-27%), *Sebastes marinus* (-28%), *S. mentella* (-59%), *Anarhichas lupus* (-29%), *A. minor* (-46%) and the elasmobranch *Raja radiata* (-60%), contributed significantly to this negative trend. Contrarily, only a few species, *G. morhua* (-86%), *S. mentella* (-74%) and *R. radiata* (-65%), showed a pronounced decrease in abundance. The total fish abundance remained at a low level and increased slightly by 13%. These major events in the ichthyofauna were possibly caused by the increased fishing effort directed to cod.

Subarea 3

A. Status of the Fisheries

Directed Cod Fishery

Factory trawlers based at Cuxhaven fished on cod in 3L from January to July. The highest catches were taken in January whereas catches in February and March were about half of those in January. From April on the fishery ceased nearly, and the fleet moved to Greenland. The quota was

fished out at 93%. The fishery took place in a depth range from 400 to 800 m. The abundance of cod in commercially sufficient concentrations below 600 m appears as a special feature of the year 1991. In this fishery only otter trawls were used and it was highly selective. The overall c.p.u.e. from January to June was about 51 t per fishing day. From January to March the c.p.u.e. was about 69, 42 and 37 t per fishing day, respectively (see Table 8).

Directed Redfish Fishery

The fishery was carried out by factory trawlers (FAO code 090) of the fleet of Rostock (former G.D.R.) within the Divisions 3L, M, N in the period from January till December. The quota was used total. The catch was done by pelagic trawl only and generally along the southwestern, southern and southeastern slope in depth between 300 and 550 m. The c.p.u.e. was stable more or less and amounted to 11.5t/day in average of the year (total catch 6,615 tons).

B. Special Studies

1. Environment

No research in relation to environment was carried out by Germany in the NAFO Subarea 3.

2. Biological studies

Redfish (*S. mentella* TRAV.), Div. 3M

Biological data are available from commercial samplings (March, April, May). The range of total lengths amounted to 20-47cm (Lt) and the range of main lengths amounted 26-33 cm (Lt), respectively.

The results of the analysis were processed according to NAFO requirements and are available at the NAFO secretariate.

Cod (*G. morhua* L.) in Div. 3L

Biological data were available from one market sample for January and from samples from one factory trawler for February and March which result in a reasonably good coverage of the fishery by samples. In February and March 28 and 57 samples were taken respectively. The modal value of the length frequencies was observed at 51 cm. (see Table 9).

References

Cornus, H.-P. 1992. Assessment of Redfishes (*Sebastes marinus* and *Sebastes mentella*) in NAFO Subarea 1. NAFO SCR Doc. 92/30

Ernst, P. et al. 1991. Results on the Greenland halibut survey in Divisions 0B, 1B, 1C, and 1D in 1990. NAFO SCR Doc. 91/21

Rätz, H.-J. 1992. Decrease in Fish Biomass off West Greenland (Subdivision 1B-1F) Continued. NAFO SCR Doc. 92/40

Stein, M. 1992 a. On the Consistency of Thermal Events in the East Greenland/West Greenland Current System. NAFO SCR Doc. 92/20

Stein, M. 1992 b. Variability of Climate-Impact on Cod Recruitment off West Greenland? NAFO SCR Doc. 92/19

Wieland, K. 1992. Distribution of O-Group Redfish off West Greenland in Autumn 1991. NAFO SCR Doc. 92/32

Table 1: German nominal catches (tons) of species by Divisions in 1991 of the Subareas 1 and 3.

	1E	1F	1	3K	3L	3M	3N	3	total
									Σ
Cod	1	81	82	-	6,459	-	-	6,459	6,541
Redfish		8	8	-	898	5,847	12	6,757	6,765
Greenl. halibut		-	-	-	7	3	-	10	10
Catfish		2	2	-	1	1	-	2	4
others		2	3	-	19	-	-	19	21
Total	1	93	95	-	7,384	5,851	12	13,247	13,341

Table 2: Results of the Greenland halibut survey ("Mean Trawlable Biomass" - MTB) in NAFO Divisions 0B, 1B, 1C and 1D, 2G and 2H in 1989, 1990 and 1991.

Division	Year/Period	MTB (1,000 t)	Abundance (1,000,000)	Investigated Area (1,000 nm ²)
0B	1989 Oct.	79.0	82.2	36.6
	1990 Oct./Nov.	72.4	79.4	36.6
	1991 Nov.	45.6	53.8	36.6
1B,C,D	1989 -	-	-	-
	1990 Oct.	87.9	74.2	15.2
	1991 -	-	-	-
2G,H	1989 Oct./Nov.	38.7	25.9	7.9
	1990 -	-	-	-
	1991 Oct./Nov.	12.3	18.0	16.8

Table 3: Length distribution of redfish (*S. mentella* TRAV.) NAFO Division 0B, Nov. 1991 (joint Russia Federation/German groundfish survey RV "Kapitan Shaytanov")

cm	♂♂		♀♀		juvenil		Total	
	n	o/oo	n	o/oo	n	o/oo	n	o/oo
8					1	1	1	1
9					4	5	4	5
10					6	8	6	8
11					13	17	13	17
12					34	45	34	45
13					27	36	27	36
14					16	21	17	22
15	1	3			3	4	26	34
16	15	20	8	11			44	58
17	26	34	18	24			50	66
18	26	34	24	32			52	69
19	30	40	22	29			22	29
20	11	15	11	15			71	94
21	34	45	37	49			69	91
22	41	54	28	37			97	128
23	57	75	40	53			95	126
24	62	82	33	44			51	67
25	29	38	22	29			36	48
26	19	25	17	22			9	12
27	3	4	6	8			8	11
28	6	8	2	3			6	8
29	2	3	4	5			6	8
30	1	1	5	7			3	4
31	2	3	1	1			1	1
32	1	1	1	1			2	3
33	2	3					1	1
34	1	1					1	1
35	1	1					2	3
36	1	1	1	1				
n	371		281		104		756	
o/oo		491		372		137		999

Table 4: Length distribution of redfish (*S. mentella* TRAV.), NAFO Division 2G, Nov. 1991 (joint Russia Federation/German groundfish survey RV "Kapitan Shaytanov")

cm	♂♂		♀♀		juvenil		Total	
	n	o/oo	n	o/oo	n	o/oo	n	o/oo
8					18	4	18	4
9					43	9	43	9
10					14	3	14	3
11					2	+	2	+
12					11	5	11	5
13					12	2	12	2
14					3	+	3	3
15	13	3	26	6			39	8
16	37	8	43	9			80	17
17	99	21	127	27			226	49
18	138	30	158	34			296	64
19	80	17	94	20			174	37
20	77	16	99	21			176	38
21	148	32	110	24			258	55
22	408	88	354	76			762	164
23	521	112	391	84			912	196
24	371	80	240	52			611	131
25	220	47	138	30			358	77
26	54	12	36	8			90	19
27	64	14	38	8			102	22
28	54	12	31	7			85	28
29	62	13	39	8			101	22
30	44	9	18	4			62	13
31	17	4	11	2			28	6
32	20	5	11	2			31	7
33	21	4	16	3			37	8
34	17	4	11	2			28	6
35	11	2	10	2			21	4
36	11	2	4	1			15	3
37	7	2	4	1			11	2
38	6	1	6	1			12	2
39	3	+	5	1			8	2
40	5	1	4	1			9	2
41	5	1	1	+			6	1
42	1	+	1	+			2	+
43	4	1	2	+			6	1
44								
45								
46	1	+					1	+
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n	2,519		2,028		103		4,650	
o/oo		541		434		23		1,000

Table 5: Length distribution of roundnose grenadier (*C. rupestris* GUNN.), NAFO Division OB, Nov. 1991 (joint Russia Federation/German groundfish survey RV "Kapitan Shaytanov")

cm	♂♂		♀♀		Total	
	n	o/oo	n	o/oo	n	o/oo
18	1	10			1	10
21						
24	3	31			3	31
27			4	41	4	41
30	2	20			2	20
33	4	41			4	41
36	1	10	1	10	2	20
39	4	41			4	41
42	5	51	2	20	7	71
45	6	61	5	51	11	112
48	8	82	4	41	12	122
51	6	61	7	71	13	133
54	3	31	5	51	8	82
57	5	51	1	10	6	61
60			2	24	2	20
63	3	31	1	10	4	41
66	4	41	3	31	7	71
69	2	20	3	31	5	51
72	1	10	2	20	3	31
<hr/>						
n	58		40		98	
o/oo		592		411		999

Table 6: Length distribution of Greenland halibut (*R. hippoglossoides* WALB.), NAFO Division OB, Nov. 1991 (Joint Russia Federation/German groundfish survey RV "Kapitan Shaytanov")

cm	♂♂		♀♀		juvenil		Total	
	n	%/oo	n	%/oo	n	%/oo	n	%/oo
8					3	1	3	1
10								
12	3	1	2	1			5	2
14	8	3	6	2			14	5
16	-		4	1			4	1
18	3	1	2	1			5	2
20	7	3	3	1			10	4
22	22	8	20	8			42	15
24	56	20	45	17			101	36
26	32	12	33	12			65	23
28	31	11	17	6			48	17
30	33	12	29	10			62	22
32	35	13	31	11			66	24
34	61	22	49	18			110	40
36	51	18	35	13			86	31
38	73	26	36	13			109	39
40	87	31	60	22			147	53
42	107	38	62	23			169	61
44	187	67	69	25			256	92
46	221	79	77	28			298	107
48	215	77	90	32			305	110
50	244	88	80	29			324	116
52	126	46	64	23			190	68
54	82	29	64	23			146	52
56	31	11	29	10			60	22
58	19	7	32	12			51	18
60	8	3	29	10			37	13
62	6	3	18	6			24	9
64	5	2	13	5			18	6
66	1	+	8	3			9	3
68			2	1			2	1
70	2	1	3	1			5	2
72			3	1			3	1
74			3	1			3	1
76								
78								
80			3	1			3	1
82								
84			1	+			1	+
86								
88								
90								
92			1	+			1	+
94								
n	1,756		1,023		3		2,782	
%/oo		632		370		1		998

Table 7: German groundfish survey off West Greenland (Division 1B-1F), October and November 1991. Numbers of valid hauls and numbers of length measurements splitted by species and division.

Division	1B, 1C	1D	1E	1F	Total
Hauls	30	30	18	19	97
Cod	49	75	299	333	756
Golden Redfish	67	195	210	445	917
Beaked Redfish	184	34	608	260	1,086
American Plaice	1,273	1,699	394	314	3,670
Atl. Wolffish	359	388	485	150	1,382
Spot. Wolffish	45	13	8	18	84
Starry Skate	219	367	121	25	732

Table 8: Catch rates of German Trawlers in the cod fishery in 3L (preliminary)

month	catch rate (t/day)	catch (t)
January	68.7	3,483
February	42.3	779
March	36.8	2,198
overall	51.1	6,460

Table 9: Length distribution of cod in 1. quarter of 1991 in NAFO Div. 3L sampled catches from trawlers

cm	Jan.		Feb.		Mar.	
	N	%/oo	N	%/oo	N	%/oo
18					4	.0
21					-	-
24					18	0.1
27					129	0.6
30					478	2.4
33			24	0.1	1,762	8.7
36	4,135	18.9	737	4.4	4,562	22.6
39	9,649	44.0	2,909	17.4	9,527	47.2
42	23,433	106.9	8,974	53.7	16,656	82.6
45	62,028	282.9	18,474	110.6	23,044	114.2
48	26,190	119.5	31,452	188.3	36,581	181.4
51	35,839	163.5	33,224	198.9	37,954	188.2
54	9,448	43.1	23,015	137.8	24,016	119.1
57	22,501	102.6	14,540	87.1	12,850	63.7
60	11,622	53.0	9,155	54.8	9,339	46.3
63	6,934	31.6	6,187	37.0	5,108	25.3
66	2,653	12.1	4,162	24.9	4,156	20.6
69	1,705	7.8	3,737	22.4	4,564	22.6
72	1,182	5.4	3,729	22.3	3,624	18.0
75	699	3.2	2,076	12.4	1,994	9.9
78	403	1.8	1,763	10.6	1,897	9.4
81	317	1.4	1,379	8.3	1,611	8.0
84	186	0.8	770	4.6	707	3.5
87	129	0.6	420	2.5	387	1.9
90	51	0.2	149	0.9	269	1.3
93	51	0.2	49	0.3	145	0.7
96	39	0.2	49	0.3	111	0.6
99	28	0.1	12	0.1	94	0.5
102			8	0.0	50	0.2
105			4	0.0	23	0.1
108					12	0.1
111					6	0.0
114					17	0.1
117					6	0.0
Σ	219,222	1,000	166,998	1,000	201,701	1,000
kg	252,177		243,192		271,107	