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German Research Reports for 1993

by

P. Cornus[1], H.-J. Rätz[2] and M. Stein[1]

[1] Institute for Sea Fisheries, Hamburg, Palmaille 9
FRG 22767 Hamburg 50, Germany

[2] Branch Office Bremerhaven, Fischkai 35, FRG 27572
Bremerhaven, Germany

Sub-area 1

A. Status of the Fishery

No fishing was conducted in 1993 due to low and unprofitable catch rates.

B. Special Studies

1. Environment

During the German groundfish survey (13.09.-27.10.93), fishery oceanographic measurements were performed at 55 fishing stations by means of CTD/rosette. Additionally, temperature and salinity at stations of 2 NAFO standard oceanographic sections off West Greenland (Cape Desolation and Fylla Bank; Stein, 1988) were measured in order to describe climatic trends. For the annual meeting of the Scientific Council of NAFO a climatic review for the Greenland area is prepared which comprises information on air temperature anomalies and ice distribution (Stein, 1994).

Vertical distribution of temperature in the upper 750m of the North Atlantic Ocean was mapped by means of XBT-sections (54 drops) during sailings for and from Greenland. These data were transmitted by METEOSAT to the IGOSS network.

2. Biological Studies

Abundance and biomass indices were derived from annual groundfish surveys commenced in 1982. During the fourth quarter, stratified random surveys covered shelf areas and the continental slope off West Greenland (Divisions 1B-1F) outside the 3-mile limit to the 400 m isobath.

In October 1993, 55 valid hauls were carried out. Although the sampling effort was reduced by 50% as compared with the period prior to 1991, the survey area was almost completely covered. Only one stratum of eight is missing due to bad weather conditions. Total catch amounted to 662 kg. 14,529 specimens were classified to 58 taxonomic units. Counts of samples and length measurements by division and species are listed in Table 1 and 2, respectively. Information about length, weight, sex, maturity and age is available for cod on individual basis. Assessments of stock abundance and biomass indices and respective length structures based on survey data for demersal fish species are documented (Rätz 1994a and b).

During the periods 1982-84 and 1988-93, pronounced negative trends in aggregate fish abundance and biomass were observed. Since 1988, overall decrease in aggregate abundance and biomass amounted to 88% and 99%, respectively. Ecologically important fish species cod (*Gadus morhua*), American plaice (*Hippoglossoides platessoides*), golden and beaked redfish (*Sebastes marinus, S. mentella*), Atlantic and spotted wolffish (*Anarhichas lupus, A. minor*) and starry skate (*Raja radiata*) contributed to the dramatic decline in total fish abundance and biomass. Length distributions revealed that at present very small individuals dominate demersal stocks. Overall mean individual weight decreased by 94% from 0.738 kg in 1988 to 0.044 kg in 1993. No significant correlations between annual cod or aggregate fish production indices (biomass) and temperature were found. A positive and a negative correlation between annual aggregate fish production (dependent) and number of cod recruits at age 3 (independent) and fishing effort (independent) were combined by a multiple regression. The production model based on these two correlations explains 87% of the observed variability in aggregate fish production identifying cod recruitment and fishing effort as probable main factors. On the basis of minor fishing effort and poor recruitment, the model prognosticates stagnant fish biomass at lowest level for 1994. Further, survey indices indicate that exploitable stocks of golden (*Sebastes marinus*,>=16cm) and beaked redfish (*Sebastes mentella*,>=16cm) decreased dramatically during the period 1982-93, and are practically no longer existent. Juveniles (<16cm) assessed separately from recruits and adults (>=16 cm) were very abundant and dominated aggregate redfish abundance since 1986 (88%). Although juveniles were very abundant, recruitment of the redfish stocks failed recently. Length distributions indicate significant year and species effects. Golden redfish were generally bigger as compared to beaked redfish and recent length structure is formed by relatively small specimens. In 1993, mean length amounted to 28cm and 27cm, respectively. No clear growth indications of strong recruiting cohorts were found in length frequencies of golden and beaked redfish between successive years. Contrarily, distinct peaks in length distributions of juvenile redfish around 6cm, 10cm and 15cm might correspond to age groups 0, 1 and 2 years.

Sub-areas 2 and 3

A. Status of the Fishery

The German fleet operating within the NAFO Convention Area consists of vessels classified as factory trawlers (Anon. 1985). In 1993, German landings taken within the NAFO Convention Area amounted to 307t only. This figure refers to the reunified Germany and redfish only taken in Division 3M during February and March. It represents a reduction by 94% as compared with 1992. The low catch level is due to a reduction in effort. Fishing activities were transfered to the oceanic redfish stock in the Reykjanes-Ridge area.

B. Special Studies

1. Environment

No research in relation to environment was carried out by Germany in NAFO Sub-areas 2 and 3.

2. Biological studies

No biological samplings or studies were performed by Germany in NAFO Sub-areas 2 and 3.

References:

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Stein, M. 1988. List of NAFO Standard Oceanographic Sections and Stations. NAFO SCR Doc. 88/01, Ser. No. N1432

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Table 1: German groundfish survey off West Greenland (Division 1B-1F), October 1993. Numbers of valid hauls and samples of length measurements by division and species.

Division	1B, 1C	1D	1E	1F	Total
Hauls	15	15	18	7	55
Cod	14	10	11	0	35
Golden Redfish (>15cm)	8	9	10	0	27
Beaked Redfish (>15cm)	1	2	1	0	4
Sebastes spp. (<=15cm)	13	10	9	1	33
American Plaice	15	14	16	6	51
Atl. Wolffish	14	13	16	6	49
Spot. Wolffish	8	4	6	4	22
Starry Skate	15	13	14	4	46

Table 2: German groundfish survey off West Greenland (Division 1B-1F), October 1993. Numbers of length measurements by division and species.

Division	1B, 1C	1D	1E	1F	Total
Cod	59	38	20	0	117
Golden Redfish (>15cm)	47	48	49	0	144
Beaked Redfish (>15cm)	2	25	1	0	28
Sebastes spp. (<=15cm)	3,521	1,853	848	1	6,223
American Plaice	487	314	287	29	1,117
Atl. Wolffish	313	139	173	28	653
Spot. Wolffish	22	13	10	5	50
Starry Skate	110	114	102	7	333