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Denmark/Greenland Research Report for 1989

by

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This report contains information on catch statistics from the commercial Greenlandic fishery and on research carried out in 1989 by the Greenland Fisheries Research Institute.

NAFO SUBAREA 0

Ten of the 137 stations operated in the stratified-random trawl survey for shrimp by the M/T *SISIMIUT* in July-August 1989 were on the shrimp grounds adjacent to the major offshore grounds in Div. 1B. Further information is presented in NAFO SCR Doc. 90/46.

WEST GREENLAND (NAFO SUBAREA 1)

A. STATUS OF THE FISHERIES

1. General trends

Provisional statistics for the fisheries in 1988 and 1989 are given in Table 1.

Total nominal catch in Greenland waters increased from 113,701 tons in 1988 to 153,270 tons in 1989. Catches of cod and shrimp increased to 83,240 tons and 59,074 tons respectively. Catches of Greenland cod, redfish, wolffishes, grenadiers, halibut, Arctic char and lumpsucker all decreased.

2. Cod

a) The fisheries

Total landings of cod increased from 48,098 tons in 1988 to 83,240 tons in 1989. The offshore trawl fishery accounted for 64% of the total catch with the major part taken in Div. 1EF. The inshore fisheries took place in all of the Divisions 1B-1F with most catches taken between May and September. Pound net was the dominant gear in the inshore fishery.

The strong 1984 year-class accounted for 86% of the catch in numbers and the 1985 year-class for 12%.

b) Forecast

The 1984 year-class is the strongest seen in the West Greenland area since the early 1960s. According to the German (Fed. Rep.) survey in 1989 the number of survivors of this year-class has been significantly reduced during 1989, and the 1985 year-class showed up as the dominant year-class in this survey. Although this finding is not supported by the age distribution in commercial catches where in March 1990 the 1984 year-class still accounted for 75% of the total catch in numbers, there are strong indications of an above average emigration to East Greenland of cod of the 1984 year-class (ICES C.M. 1990/assess:12, NAFO SCR Doc. 90/74).

The 1985 year-class is relatively good, by March 1990 accounting for 25% of the catch in numbers. The 1986, 1987 and 1988 year-classes are all very weak and the development of the fisheries is, therefore, dependent on the 1984 and 1985 year-classes.

Forecasts are somewhat difficult to make due to uncertainties on the level of future migrations and growth rate. Both the 1984 and the 1985 year-class are believed to be of Icelandic origin, and an above-average emigration to Iceland might, therefore, be expected. This will tend to reduce the yield of these year-classes in West Greenland. Growth rate, measured as change in size at age, has been unusually low for the 1984 year-class in the recent two years, and if this trend pertains this will again reduce the yield.

However, the size of the stock is high and this should result in high catches in 1990. A moderate drop is expected in 1991 followed by a significant reduction in the fisheries in 1992-1993 with the disappearance of the two important year-classes.

3. Shrimp

a) The fisheries

Total nominal catch of shrimp in Subarea 1 in 1989 by Greenland vessels was about 59,074 tons. Approximately 41,200 tons were taken in the offshore area, including 2,500 tons from the fishing grounds north of 71°N, by vessels larger than 80 GRT.

Compared to earlier years the fishery took place in the same main areas, but more effort was spent and better catches were taken in the southern parts than earlier. As usual, ice covered parts of Div. 1A and 1B early in the year, but the shrimp grounds were closed somewhat longer than normal. 51 Greenland vessels above 80 GRT participated in the offshore fishery. The mean catch-rate index for Div. 1B based on selected Greenland vessels continued the decrease from 1987 and was in 1989 reduced to the 1983 level.

The mean catch rates in the area north of 71°N were the lowest recorded since the start of the fishery in 1985. A new management area between 69°30'N and 71°00'N west of 58 W was introduced by the Greenland authorities. Mean catch rates in this area were low.

b) Forecast for 1990

No specific forecast is given here, but reference is made to the Report of the Scientific Council, June 1989, and the forthcoming report of the Council's June 1990 meeting.

4. Salmon

In 1989, the fishery, which is a small boat fishery carried out in the inshore and coastal areas, was opened on 1 August in Div. 1F and on 18 August in Div. 1A to 1E. The reported landings were 337 tons, which is 556 tons less than in 1988.

The TAC agreed upon for the period 1988 to 1990 was a total of 2,540 tons, with an annual opening date of 1 August. In addition, the catch in any of these years was not to exceed the annual average (840 tons) by more than 10%. The total landing in 1989 of 337 tons corresponds to 313 tons with an opening date of 1 August.

The spatial distribution of the fishery in 1989 differs little from previous years. Although landings in Div. 1F were relative higher in 1989 than in 1988 the main part of the total catch is still taken in Div. 1C to 1E.

5. Capelin

The capelin fishery at West Greenland is carried out inshore and in the spawning season only. In 1989, the fishery was directed mainly towards larger animals (for bait and human consumption). 228 tons were landed, mainly from Div. 1A. The catches in 1988 and 1987 were 132 and 421 tons respectively.

6. Redfish

Redfish is taken mainly as by-catch in offshore trawl fisheries directed for cod and Greenland halibut in Div. 1C-1F. The total catch of redfish decreased from 225 tons in 1988 to 195 tons in 1989.

7. Greenland halibut

The landings increased from 7,009 tons in 1988 to 7,428 tons in 1989, an increase of 6%. Landings in Div. 1A constitute 93% of the total for Subarea 1. The fishery in Div. 1A is an inshore fishery carried out as a longline and a gillnet fishery supplying equal quantities.

B. SPECIAL RESEARCH STUDIES

I. ENVIRONMENTAL STUDIES

1. Hydrography

Hydrographical observations in the West Greenland area were carried out during a survey in June-July. The standard sections between Fylla Bank and Disko Bay were operated.

Environmental conditions in 1989

Air temperatures at the Nuuk meteorological station in all months except in November and December showed negative anomalies of 2-4 degrees Celsius, but especially March was cold with a negative anomaly of 8 degrees. It has been proven (Stein and Buch, 1989) that there is a close correlation between air temperatures and the ocean temperatures in the upper 50 metres in the Greenland waters. It was, therefore, expectable that negative temperature anomalies would occur in the surface layer.

During the summer cruise negative anomalies in the order of 1 degree were observed in the upper 50 metres. In the deeper layers the following anomalies were observed:

50 - 150 m. : - 1.20°C
150 - 400 m. : - 0.40°C
400 - 600 m. : + 0.09°C

The negative anomalies in the 50-400 metre interval indicate strong inflow of East Greenland Polar Water.

II. BIOLOGICAL STUDIES

1. Cod

a) Occurrence of pre-recruit cod

A young-cod survey using gill nets with different mesh sizes was carried out in three inshore areas (Div. 1B, 1D and 1F) during July, 1989 (NAFO SCR Doc. 90/20).

In Div. 1B, catches were dominated by the 1986 and 1987 year-classes but substantial amounts of older fish were also present. In Div. 1D, the 1987 year-class dominated and few older fish were caught. In Div. 1F, catches were very low. The survey indicated that the 1987 year-class is around 70% of the size of the 1985 year-class, whereas the 1988 year-class size is small.

b) Inshore cod abundance in November

A long-line survey was carried out in inshore areas of NAFO Div. 1BCDE in November (NAFO SCR Doc. 90/29). The purpose of this survey was to estimate the abundance of inshore cod relative to the abundance found in the concurrent trawl survey by the Fed. Rep. of Germany.

The results indicate that the inshore stock component accounted for 21% of the total stock in 1989. The corresponding figures for 1987 and 1988 were 20% and 37%, respectively.

c) Tagging experiments

Tagging was conducted in August in NAFO Div. 1DEF. Approximately 2,500 cod caught by hand-line were tagged. It is assumed that a significant part of the 1984 and 1985 year-classes is of Icelandic origin. The purpose of the experiment is to evaluate whether these

year-classes will show an above average rate of migration back to the Icelandic area.

2. Shrimp (*Pandalus borealis*)

Since 1976, ICNAF/NAFO has continuously recommended that stratified-random trawl surveys should be carried out in Subarea 0+1 to improve the assessment of the shrimp stocks. However, during the years very few surveys have been carried out, and only the survey in 1988 covered a major part of the total distributional area of the stocks. In 1989, as in the year before, the Greenland Fisheries Research Institute carried out a survey in July, using a trawler owned by the Greenland Home Rule Trawler Company (now the Royal Greenland Trawler division). The survey area covered most of the stock area, from 63°52'5N to 72°30'N, including stock distribution areas in Subarea 0. During the survey a total of 137 hauls were made. Results from the survey will be presented at the STACFIS meeting in June 1990 (SCR Doc. 90/46).

Since 1986 it has been compulsory for all vessels above 50 GRT fishing at Greenland to use a logbook form and deliver a copy to the Greenland Fisheries Research Institute. Information on the distribution of the shrimp fishery and catch rates was obtained from logbooks of Greenland trawlers.

Catch rates in Division 1B have showed a continued upward trend since 1984 up to a maximum in 1987. In 1988 and 1989, a drop in catch rates occurred. Increasing catch rates indicate a stability or even an improvement in the stock. These catch rates may, however, have been biased upwards due to the introduction of more efficient trawls in recent years. At present it is not possible to quantify the influence of new gears on catch rates.

During the year, effort has been made to standardize catch rates from the different vessels. Some progress has been made, but the data series for the private part of the fleet is still too short for this analysis.

3. Salmon

Analysis of samples taken in Div. 1B, 1D and 1E in cooperation with scientists from Canada and USA gave the following composition of the landings in number.

Sea age	North American		European		Total	
	N	%	N	%	N	%
1	60020	92	50339	96	110359	94
2	3378	5	2001	4	5379	4
PS	1559	2	316	1	1875	2
Total	64957	100	52656	100	117613	100
Continent	55%		45%			

Both the age composition and the distribution between the two continents of origin are very similar to those of previous years.

4. Greenland halibut

Samples for age/length keys were obtained from the commercial fishery in February and August in Uummannaq/Upernavik (Div. 1A) and from research longline fishery in Davis Strait (Div. 1BCD) in November (NAFO SCR Doc. 90/38).

In connection with research fishery in August in Upernavik (Div. 1A) 634 Greenland halibut from longline catches were tagged.

5. Marine mammals

Seals:

Studies of harp seal feeding were continued in 1989. In August Harp seal stomachs were collected from Qaarsut, Uummannaq District (Div. 1A). Results from the analysis of harp seal stomachs collected in Greenland 1985-1988 were reported to ICES in 1989 (ICES paper C.M. 1989/N:6).

Small cetaceans:

Collection of samples from the Inuit catch of white whales was carried out in Upernavik District in October 1989. The samples include reproductive organs, and teeth for ageing. Samples for analysis of anthropogenic substances and for DNA-studies were collected as well. A total of 50 specimens including three foetuses were obtained.

Large cetaceans:

In June, two humpback whales on Fylla Banke (Div. 1D) were instrumented with VHF-transmitters with the purpose of collecting data on dive frequencies.

In July-August, aerial surveys were carried out at West Greenland between Svartenhuk and Kap Farvel (Div. 1A-1F) with the purpose of assessing the stocks of minke whale and fin whale. In addition, a cruise was conducted, also in July-August, at West Greenland collecting photographic material and biopsies for individual identification of blue, fin, and humpback whales with the purpose of determining stock discrimination and size.

6. Joint-venture program

As part of the joint-venture program between the Greenland Home Rule Trawling Company (GTC) and the Japan Marine Fishery Resource Research Center (JAMARC) two trawl surveys were carried out at West- and East Greenland, respectively.

The West Greenland survey was carried out as a stratified-random bottom trawl survey in order to make investigations primarily on Greenland halibut and roundnose grenadier between 62°30'N and 70°N (NAFO SCR Doc. 90/39).

The East Greenland survey is reported under the section on biological studies in East Greenland.

EAST GREENLAND (ICES SUBAREA XIV)

A. STATUS OF THE FISHERIES

Provisional figures for the Greenland fisheries in ICES Subarea XIV are presented in Table 2. Total nominal catch in 1989 was 22,372 tons. The main bulk of the total catches (56%) is capelin. Catches of cod increased from 345 tons in 1988 to 3,876 tons in 1989.

B. SPECIAL RESEARCH STUDIES

I. ENVIRONMENTAL STUDIES

1. Hydrography

A joint Danish-Icelandic cruise to the West Iceland Sea and the Greenland Sea was performed in September 1989. An intense net of CTD stations were operated and current moorings laid out in 1988 were recovered and replaced.

II. BIOLOGICAL STUDIES

1. Shrimp (*Pandalus borealis*)

A stratified-random trawl survey was carried out in the East Greenland area in July-September 1989 with the same vessel as used in the West Greenland survey. The areas covered corresponded to the commercially exploited fields through the later years as defined by logbook information. The adjacent area in the Iceland fishing zone was also covered by this survey. Further information is given in NAFO SCR Doc. 90/58.

2. Redfish

A joint GTC-JAMARC (see Section B,II,6 for Subarea 1) survey for pelagic redfish was carried out in the Greenlandic part of the Irminger Sea, and a general-biomass stratified-random bottom trawl survey was carried out in the area between 67°N and 72°N. Results of these surveys will be presented at the ICES Statutory Meeting in 1990.

3. Capelin

In the summer and fall period of the 1989 fishing season, only very small quantities of capelin were found in the East Greenland offshore area, and the fishery was therefore postponed to be carried out later in the season. Due to an irregular distribution of the stock the Greenland capelin fishery took place in July 1989 and January-February 1990. In total, 24,540 tons were reported to the Greenland authorities by the end of the fishing season. This amount is only about half the average reported during the later years. All catches were taken by Faroese vessels fishing under Greenland license.

Table 1. Nominal catches (tons) by Greenland vessels in West Greenland (Subarea 1) in 1988 and 1989 (provisional figures), and the relative changes from 1988 to 1989.

Species	Nominal catch 1988	1989	Percentage change from 1988 to 1989
Cod	48,098	83,240	+73
Greenland cod	1,333	364	-73
Redfish	225	195	-13
Wolffishes	1,892	970	-49
Grenadiers	138	8	-94
Greenland halibut	7,009	7,428	+6
Halibut	283	202	-29
Capelin	132	228	+73
Atlantic salmon	893	337	-62
Arctic char	61	62	+
Lumpsucker	197	162	-18
A. plaice	+	+	
Blue ling	+	+	
Cusk	+	+	
Shark	+	+	
Atlantic herring	+	+	
Industrial fish and fish not specified	+	+	
Shrimp	52,440	59,074	+13
Scallops	1,000	1,000	
Sum total	113,701	153,270	+35

Table 2. Nominal catches (tons) by Greenland vessels in East Greenland (ICES Subarea XIV) in 1988 and 1989 (provisional figures), and the relative changes from 1988 to 1989.

Species	Nominal catch 1988	1989	Percentage change from 1988 to 1989
Cod	345	3,876	+1023
Redfish	42	3	-93
Wolffishes	3	12	+300
Greenland halibut	37	13	-65
Halibut	4	7	75
Capelin	48,791	12,480	-74
Blue ling	+	+	
Blue whiting	-	-	
Atlantic salmon	+	+	
Arctic char	+	+	
Dogfishes	+	+	
Shrimp	7,579	5,979	-21
Sum total	56,801	22,372	-61