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Denmark (Greenland) Research Report for 1986

by

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This report contains information on the fisheries by Greenland vessels and on research carried out by the Greenland Fisheries and Environment Research Institute (Grønlands Fiskeri- og Miljøundersøgelser) in the NAFO Area and at East Greenland (ICES Subarea XIV) in 1986. Such work which is of minor interest to NAFO, e.g. work related to environmental protection is not mentioned. Some of it, namely that related to marine studies has been reported to ICES Marine Environmental Quality Committee (Doc. CM 1986/E:1). Various scientists in the institute have contributed to the report. Some information on fisheries by Danish, Faroese and Japanese vessels in joint-venture arrangements is also given.

SUBAREA 0

Two of the 28 stations operated in the shrimp survey by the R/V ADOLF JENSEN in July-August were on the shrimp grounds adjacent to the major offshore grounds in Div. 1B (NAFO SCR Doc. 87/8).

SUBAREA 1

A. STATUS OF THE FISHERIES

1. General trends

Preliminary statistics for the fisheries in 1986 are given in Table 1. Preliminary figures supplied for the year prior to the NAFO June meeting are usually very close to the final figures. However, due mainly to the more and more complex fleet composition and the decentralized production and trade, the preliminary figures here supplied for 1986 may differ relatively much from the final figures to be supplied later in the year.

Although the total catch in 1986 was at the same level as that for 1985 some trends should be mentioned:

Total catch of cod was nearly halved as compared to 1985, while catches of shrimp increased to a new high level of 58.000 tons. This increase more than counterbalanced the drastic decline in cod catches. The redfish landings showed a minor increase while the landings of Greenland cod showed some decline.

Salmon catches increased from 857 tons in 1985 to 960 tons in 1986.

2. Cod

a) The fisheries

Total landings of cod decreased dramatically from 24,000 tons in 1984 to about 12,000 tons in 1985 and 6,500 tons in 1986, which is the lowest catch on record in the last fifty years.

In 1986 directed trawl fishery for cod was not allowed, and the pound net fishery was banned from mid-July with few dispensations in certain areas. These regulations were introduced in order to protect small cod, especially the 1984 year class.

The landings of 1986 have the following rough estimate of the distribution on gears: Trawlers accounted for 20% of total landings in 1986. All cod taken in trawls were by-catches in the redfish fishery in Div. 1E and 1F. Gillnet fishery accounted for 45% and longline fishery for 7% of the landings. Most of the cod landed from gillnet- and longline fishery also came from Div. 1E and 1F (both inshore and offshore). About 14% is estimated to have been taken by pound nets, mainly in Div. 1B, 1D and 1E.

b) Forecast

The recently predominating 1979 year class was still dominating in the landings in 1986 when the year class accounted for 44% by number. The year classes of 1980 and 1981 accounted for 11% and 23% (by number), respectively, while the year classes of 1982 and 1983 were landed in very small numbers only, supporting the expectance of these year classes as being very poor.

Due to fishery regulation in 1987 with a minimum size of 55 cm in trawler landings and other technical regulations it is expected that the 1979, 1980 and 1981 year classes will continue to dominate the landings in 1987.

The 1984 year class expected strength is the strongest since

the 1973 year class. The 1985 year class strength is about one third of the 1984 year class, and an initial guess of the 1986 year class is that this year class is poor. (ICES C.M. 1987/Assess:10)

The 1984 and 1985 year classes will recruit to the fisheries mainly during the years 1988-1990.

Thus, unless a substantial migration into the West Greenland stock should occur no improvement in the fishable stock situation can be expected in 1987. From 1988 to 1992 a substantial improvement is expected to take place with the recruitment of the 1984 year class.

3. Shrimp

a) The fisheries

The total nominal catch of shrimp in Subarea 1 in 1986 by Greenland vessels was about 58,000 tons, of which approx. 50,000 tons were taken in the offshore area including 11,045 tons from a trial fishery north of the Davis Strait.

In contrast to earlier years - but similar to 1985 - ice did not hamper the access to the main shrimp fishing areas in Division 1B at the beginning of the year. In general the fishing in 1986 took place in the same main areas as in 1985, with more fishing effort being expended in the southern parts (Divisions 1C and 1D) compared to earlier years (NAFO SCR Doc. 87/8).

The trial fishery North of the Davis Strait north of 70° 52'N, in which 27 vessels participated in 1986, took place from May to November.

b) Forecast for 1987

The status of the offshore shrimp stock in Subarea 1 was assessed by the Shrimp Working Group of STACFIS in January 1987. Data presented at this meeting indicated continued stability in shrimp abundance since 1982, and it was therefore advised that the overall TAC in 1987 for the offshore fishing grounds in Subarea 1 and adjacent parts of Subarea 0 should not exceed 36,000 tons, which is of the same magnitude as the TAC advised for 1986. Giving this advice, the Working Group however noted that the apparent stability in the stock might not be present, as catch rates in recent years could be biased upwards due to the introduction of more efficient gears in the fishery.

4. Salmon

The reported nominal catch of salmon off West Greenland in 1986 was 960 tons, 51 tons higher than the set TAC.

The total catch was taken by gill nets, mostly drift nets. The effort data and the catches during the first two weeks of the fishery indicated a higher abundance than in previous years. The spatial distribution of the catches differs considerably from earlier, where the greater part of the catches was taken in NAFO divisions 1B to 1E. In 1986 the largest part was taken in Div. 1F and the lowest catches in Div. 1A and 1B.

5. Capelin

Capelin is fished inshore and in the spawning season only. In 1985 and 1986 a fishery on roe-bearing females of capelin was initiated, which together with the catch for frozen and dried products totalled 980 and 1067 tons in the two years, respectively. Furthermore, a small catch for local consumption has been taken. More than half the catch in 1987 was taken in Div. 1B.

6. Redfish

2780 tons were landed in 1986 compared to 1800 tons in 1985. This increase is due to greater effort by the trawlers, incl. joint-venture arrangements. The catch was taken offshore in a directed redfish trawl fishery.

7. Greenland halibut

The landings in 1986 of Greenland halibut were 8705 tons which is a decrease of 5% compared to 1985. The fishery for Greenland halibut is mainly an inshore fishery with gill nets and longlines. A small by-catch occurred in the offshore trawl fishery. The greater part of the fishery took place in Div. 1A (75%). Most of the remainder landings was fished in Div. 1D (14%), 1E (6%) and 1F (4%) respectively.

8. Other fish

Landings of halibut in 1985 and 1986 decreased compared to former years mainly due to decreased trawl effort for cod since halibut is caught primarily as by-catch in the cod fishery.

The dramatic decline in the landings of lumpsucker from 3,176 tons in 1984 to 419 tons in 1985 continued in 1986 with a landing of 113 tons. It is not possible to give any explanation for this decline. There is no information of changed effort.

B. SPECIAL RESEARCH STUDIES

I. ENVIRONMENTAL STUDIES

1. Hydrography.

In 1986 two hydrographic cruises were performed with the R/V "ADOLF JENSEN". In April measurements were carried out on the standard sections between Fylla Bank and Cape Farewell. In July the sections between Fylla Bank and Disko Bay were covered. In addition to these two cruises hydrographic observations were made:

- at the Fylla Bank section regularly throughout the year.
- in connection with biological observations at various stations along the west coast of Greenland.

The parameters observed were temperature, salinity, oxygen and nutrients. During the summer cruise additional observations of chlorophyll were made by using fluorometer and filtration of watersamples.

a. Temperature.

Except for the two first months the air temperatures over the West Greenland area in 1986 has been about 2° C below normal. The sea temperatures were above normal in the area up to Store Hellefiske Bank during the summer of 1986 despite the negative anomalies of the air temperature. This was due to a very low inflow of polar water from the East Greenland Current resulting in a domination of the watermasses by the Irminger Current. In the northern areas around Disko Island the temperatures were below normal due to the colder atmospheric conditions.

2. Plankton

Zooplankton sampling was carried out in the Davis Strait and Disko Bay in June/July on some of the stations of hydrographic programme stations. Mostly, 15 minutes oblique hauls were made using a Bongo net (60 cm diameter rings, mesh size 1 mm, 225 - 0 m wire, speed 4 knots).

Most of the material has been worked up, and so far only three cod larvae (G. morrhua/ogac) have been found.

II. BIOLOGICAL STUDIES

1. Cod

a) Eggs and larvae

Sampling of cod eggs and larvae by means of Bongo-nets was carried out in June/July 1986 in West Greenland waters from Nuuk to Disko. So far only three cod larvae have been found in the samples (See Section B.I.2).

b) 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 and August, 1986.

Catches were dominated by the 1984 year class. This year class was abundant in all areas but with significant higher densities in the northernmost area (Div. 1B). The catch of the 1985 year class was significantly smaller and the size of this year class can be estimated at approximately 20% of the 1984 year class.

c) Cod in commercial landings

The 1979 year class, which made up about 60% of the 1985 landings (by number as well as by weight), continued to be the major one in 1986, accounting for about 44% by number and 47% by weight. The 1977 year class also continued to be relatively important (12% by number), partly because the longline and gillnet fisheries were more important in 1986 than in most recent years and tend to catch relatively higher proportions of big fish than do other gears.

The year classes of 1980 and 1981 accounted for 11% and 23% (by number), respectively, while year classes of 1982 and 1983 were landed in very small numbers only, supporting the expectation of these year classes as being very poor ones.

d) Studies of otolith types

In cooperation with colleagues from the Federal Republic of Germany a study on otolith types from cod in Greenland waters was initiated in 1985. After a number of workshops on the technical level three categories of annuli types have been established. The work is now in its validation phase, and it is hoped that preliminary results can be presented to the ICES Working Group on East Greenland Cod and to NAFO Scientific Council in 1988.

2. Shrimp (Pandalus borealis)

As in previous years offshore shrimp surveys were carried out mainly around Store Hellefiske Banke and west of Disko, while inshore investigations were limited.

Information on the distribution of the shrimp fishery and catch rates was obtained from logbooks of Greenland trawlers. Size composition of the stock was evaluated based on analysis of shrimp samples from research surveys and commercial trawlers (NAFO SCR Doc. 86/7 and 8).

Catch rates in Division 1B showed an upward trend compared to 1984 and 1985, indicating 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 trawling equipment in recent years. At present it is not possible to quantify the influence of this new equipment on catch rates.

Analysis of commercial and research shrimp samples showed the same size groups of shrimp as in preceeding years to be present in the stock. Difficulties in assessing the influence of vertical and horizontal distribution of the different size groups of shrimp did not allow an estimate of the strength of year classes and hence quantification of recruitment to the fishery.

Due to problems with the interpretation of results from bottom photography surveys conducted in earlier years, as this method only samples that minor and variable part of the shrimp stock which is situated on the bottom, this method was abandoned in 1986 (NAFO SCR Doc. 87/5).

3. Salmon

Samples were taken from commercial catches at fish plants in NAFO Div 1B to 1E in cooperation with scientists from Canada and USA. Altogether 3,000 scale samples and 20,000 length samples were taken, in addition 10,000 salmon were investigated for coded wire micro tags. A few hundred tissue samples were taken, used for classification of continental origin.

4. Capelin

A short cruise covering the Godthaab Fjord and Fylla Bank areas was carried out in December to observe the distribution pattern at that time of the year and to get information on age composition and maturity development in the stock.

5. Other finfish

Samples for age/length keys of Greenland halibut were taken from commercial landings in Nuuk (Div. 1D, long-line and gill-net fishery), Ilulissat and Uummannaq (Div. 1A, long-line fishery from the ice). Research samples were collected in the autumn in Disko Bay and Uummannaq Fiord with long-lines. A tagging experiment was initiated in Disko Bay, where a total of 300 fish from long-line catches were tagged. Samples in Disko Bugt and Uummannaq Fjord were taken with long-lines.

Scale samples of redfish by species (S. marinus and S. mentella) were taken from research and commercial catches. Age/length keys for 1980 to 1986 are presented in NAFO SCR Doc. 87/--.

6. Scallop (Chlamys islandica)

A commercial inshore scallop fishery was established in 1985-86. The fishery has been concentrated on scallop beds just outside Nuuk (Div. 1D) and on scallop beds north of Maniitsoq in the area around Kangerluarsussuaq (Div 1C). The development in the fishery has called for a knowledge of the efficiency of different scallop dredges used in the fishery. In June 1986 an investigation of the effectiveness of three types of scallop dredges was carried out in combination with underwater observations of the scallop distribution and abundance.

In order to investigate the possibility of an offshore scallop fishery, two offshore scallop surveys were carried out in 1986. A total of 234 survey stations were sampled in Div. 1A-1D. The first survey with the R/V "ADOLF JENSEN" in June covered Fylla Bank and Lille Hellefiske Bank. The second survey with the R/V "NORDHEIM" in July-August covered Fylla Bank, Lille Hellefiske Bank, Store Hellefiske Bank and Disko Bank.

7. Marine mammals

Collection of material for studies of the feeding habits of harp seal was carried out in May-June in Southwest Greenland (Div. 1B - 1D).

An aerial survey for narwhals was conducted between 6 and 10 August in Inglefield Bredning, North Greenland (Div. 1A).

A whale marking study was carried out in August-September in the Disko Bay area (Div. 1A).

Collection of tissues for examination of heavy-metal residue levels in marine mammals was carried out in several regions of Greenland.

EAST GREENLAND (ICES SUBAREA XIV)

A. STATUS OF THE FISHERIES

Provisional figures for the Greenland fisheries in this area (ICES Subarea XIV) show a total of 70,754 tons landed in 1986, an increase of 10% compared to the landing of 64,378 tons in 1985. The main bulk of the landings (77%) is due to the capelin fishery which is a joint-venture arrangement with Faroese trawlers. The increase is due mainly to increased catches of redfish (from 5,519 tons in 1985 to 9,542 tons in 1986, taken exclusively by trawlers), and of shrimp (a doubling from 2,596 tons to 5,781 tons). The increase in the catches of redfish is due to a joint-venture arrangement with Japanese trawlers. Catches of cod increased by 500 tons but the catches are still at a very low level. Other species were caught in negligible quantities.

Capelin.

The capelin fishery in the East Greenland offshore area was carried out during August through October, totalling 69,670 tons, which is of the same order of magnitude as the year before. The larger part of these catches were taken by Faroese vessels fishing under Greenland licences.

Table 1. Nominal catches (tons) by Greenland vessels¹⁾ in Subarea 1 in 1985 and 1986 (provisional figures), and the relative changes from 1985 to 1986.

Species	Nom. catch:	1985	1986 (provi- sional)	Percentage change from 1985
Cod		12,348	6,501	- 47
Greenland cod		6,571	4,007	- 39
Redfish		1,800	2,780	+ 54
Wolffishes		1,768	1,563	- 12
Grenadiers		36	51	+ 42
Greenland halibut		9,126	8,705	- 5
Halibut		103	91	- 12
Capelin		980	1,067	+ 9
Sandeel		0	42	+
Atlantic salmon		857	960	+ 12
Arctic char		131	77	- 41
Lumpsucker		419	113	- 73
Herring		1	5	+
A. plaice		9	4	-
Dogfishes		4	13	+
Skates		102	3	-
Industrial fish and fish not specified		44 0	40 0	-
Shrimp		49,774	58,299	+ 17
Scallops		973	705	- 28
Total		85,046	85,026	0

1) including non-Greenland vessels in joint-venture arrangements, but excluding catches by Danish and Faroese vessels.

1985: Joint-venture catches in tons:

Cod: 0 - Redfish: 1,651 - Wolffishes: 12 - Grenadiers: 3
Greenland halibut: 7 - Halibut: 0 - Fish not specified: 8

Catches of Danish vessels: Shrimp: 423 tons.

Catches of Faroese vessels: Shrimp: 570 tons.

1986: Joint-venture catches in 1986 in tons

Cod: 11 - Redfish 2,016 - Wolffishes: 8 -
Greenland halibut: 1 - Atlantic halibut 8 -

Catches of Danish vessels: Shrimp: 572 tons.

Catches of Faroese vessels: Shrimp: 481 tons.

Table 2. Nominal catches (tons) by Greenland vessels¹⁾ in ICES Subarea XIV in 1985 and 1986 (provisional figures), and the relative changes from 1985 to 1986.

Species	Nom. catch	1985	1986 (provi- sional)	Percentage change from 1985
Cod		106	606	+472
Blue whiting		0	10	+
Redfish		5,519	9,542	+ 73
Wolffishes		40	71	+ 78
Grenadiers		3	0	-
Greenland halibut		81	177	+119
Halibut		59	168	+185
Capelin		55,961	54,377	- 3
Atlantic salmon		6	19	+
Dogfishes		7	3	-
Shrimp		2,596	5,781	+123
Total		64,378	70,754	+ 10

1) including non-Greenland vessels in joint-venture arrangements, but excluding catches of Danish and Faroese vessels.

1985: Joint-venture catches in tons:

Capelin: 55,950 - Cod: 59 - Redfish: 5,519 - Greenland halibut: 66 - Atlantic halibut: 59 - Wolffishes: 40 - Grenadiers: 3

Catches of Danish vessels in tons:

Capelin: 15,280 - Shrimp: 353

Catches of Faroese vessels in tons:

Capelin: 10,000 - Shrimp: 674

1986: Joint-venture catches in tons:

Capelin: 54,370 - Cod: 97 - Redfish: 9,084 - Greenland halibut: 170 - Atlantic halibut: 162 - Wolffishes: 71 - Blue whiting: 10

Catches of Danish vessels in tons:

Capelin: 5,300 - Shrimp: 500

Catches of Faroese vessels in tons:

Capelin: 10,000 - Shrimp: 727