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Denmark/Greenland Research Report for 1994

by

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This report presents information on catch statistics from the commercial Greenland fishery and on research carried out in 1994 by the Greenland Institute of Natural Resources.

WEST GREENLAND (NAFO SUBAREA 1)

A. STATUS OF THE FISHERIES

1. General trends

Provisional statistics for the fisheries in 1993 and 1994 are presented in Table 1.

Total nominal catches in Greenland waters increased from 91,055 tons in 1993 to 97,216 tons in 1994. Landings of cod increased by 10% to 2,115 tons, landings of shrimp increased by 5% to 73,632 tons and landings of Greenland halibut increased by 11% to 14,919 tons. Catches of Greenland cod wolffishes, grenadiers, Atlantic halibut and Arctic char decreased, whereas catches of redfish, capelin, shark, lumpsucker, crabs, scallops and polar cod increased.

2. Cod

a. The fisheries

In 1994 the total landings of cod in NAFO Subarea 1 amounted to 2,115 tons. Catches have decreased very significantly over the last five years with yields of 68,000 tons in 1990, 20,000 tons in 1991, and further down to 5,724 and 1,925 tons in 1992 and 1993 respectively.

In 1994 all catches were taken by inshore fisheries. No offshore fishery has taken place since the spring of 1991.

The large fishery around 1990 was sustained by the very strong 1984 year-class, which according to tag returns and the distribution of young fish is believed to be of Icelandic origin. Due to migration and fishery induced mortality this year-class is now absent in West Greenland. The year-classes now dominating the inshore catches probably originate from the local fjords.

b. Assessment.

No assessment or forecast is given here but reference is made to the Northwestern Working Group report by ICES, May 1995. Greenland offshore trawl survey, conducted in July-September 1994, showed an extremely low biomass of cod off West Greenland. Total abundance was estimated to be 0.2 million, equivalent to a biomass of 57 tons. This by far the lowest recorded value is consistent with the findings in the German survey, conducted in the same area, and are also in line with last years estimate. Probability of stock recovery depends on future recruitment. In view of the severely depleted spawning stock and rare event of drift from Iceland, substantial stock recovery must be considered as very unlikely

3. Shrimp

a. The fisheries

The total nominal catch of shrimp by Greenland vessels in Subarea 1 in 1994 was about 73,600 tons of which approximately 68,000 tons were taken in the offshore area (including 837 tons from the fishing grounds north of 71°N).

As normally ice cover hampered the access to the main fishing grounds in Division 1A, 1B and 1C early in the year. In general the fishery took place in the same areas as in earlier years, however with still more fishing effort being expended in the southern Divisions (1C-1F). A total of 32 vessels (above 75 GRT) participated in the offshore fishery.

Standardized catch rate indices based on logbook data from Div. 1B showed a significant decrease from 1987 to 1989, relative stability from 1989 to 1993, and again a decrease from 1993 to 1994. Similar indices from Div. 1CD showed an increase from 1987 to 1988 and fluctuations with a decreasing trend from 1988 to 1994.

The offshore fishery north of 71°N, in which 9 vessels participated in 1994, took place from July to November.

b. Forecast for 1995

Results from a stratified-random trawl survey in the offshore area of Subarea 0+1 in 1994 showed a decrease in total estimated biomass from the year before to an average level observed through the period 1988-1992. The major decrease was found in the southern part of the area, and the stock was apparently more concentrated to fewer strata than earlier.

Overall size composition of the biomass in 1994 showed the occurrence of several year-classes of smaller shrimp, which will recruit to the fishery in coming years, but these new year-classes all seem far from the abundance of the important 1985 year-class, which maintained the relatively high catch rates from 1990 to 1993.

A stratified-random trawl survey in the Disko Bay area (inshore) showed an increase in total biomass estimate from 1993 to 1994 to the same level as found in the surveys in 1991 and 1992. As in the offshore area the stock was more concentrated to a few strata than earlier observed.

STACFIS advised a TAC of 60,000 tons for the total shrimp stock in inshore and offshore areas in Subarea 1 and adjacent parts of Subarea 0 for 1995. Greenland set effective offshore TACs for larger vessels (> 75 GRT) of 32,110 tons for Subarea 1 south of 68°N and 7,885 tons for Subarea 1 north of 68°N (i.e. including the area north of 71°N).

4. Greenland halibut.

a. The fisheries.

The total catches of Greenland halibut by Greenland vessels in NAFO Subarea 1 amounted in 1994 to 14919 tons. This is 11% increase compared to 1993. Additionally 2357 tons were taken by foreign ships under Greenland charter (Faroe Islands, Japan and Norway) bringing the total catch up to 17276 tons. 14238 tons were taken in inshore areas in 1994, compared to 12136 in 1993. Catches in Division 1A comprised almost 99 % of the inshore catches, amounting to 14035 tons. Furthermore, 18 tons were taken offshore in 1A (long lines). 203 tons were taken inshore in Division 1B-1F and 3014 tons were caught offshore, mainly in Division 1D of which 663 tons derived from long lines, the remaining from trawlers.

Three areas are important for the inshore fishery: Ilulissat (5200 tons), Uummannaq (4000 tons), and Upernavik (4800 tons). Long lines and gillnets are used in this fishery. The offshore fishery is conducted mainly by Norwegian and Japanese trawlers, whereas Norwegian and Faroese long-liners take insignificant catches.

b. Assessment.

No analytical assessment has been provided for the offshore stock component. However, catch composition from the inshore areas suggest stable stock components.

5. Salmon

No commercial fishery for salmon took place in 1994.

6. Capelin

The capelin fishery in West Greenland is carried out inshore and in the spawning season only (June-July). The main part of the catches is produced as whole frozen fish for bait and local consumption, while a smaller part is dried and stored as food for sledge dogs in the winter season. The nominal catch of 158 tons was a 44% increase compared to the year before. The majority of the catches were taken in Div 1A.

7. Redfish

Redfish is mainly taken by offshore trawlers a minor part by smaller vessels inshore. Nominal catch of redfish in 1994 was 1033 tons.

B. SPECIAL RESEARCH STUDIES
I. BIOLOGICAL STUDIES

1. Shrimp

The series of annual stratified-random trawl surveys initiated in 1988 was continued in 1994. In July-September 176 research trawl hauls were made in the major parts of the distributional area of the West Greenland shrimp stock, including areas in Subarea 0 and the inshore areas in Disko Bay and Vaigat.

The structure of Greenland shrimp populations (*Pandalus borealis*) was analysed by means of starch and polyacrylamide gel electrophoresis (51 enzymes) and sequencing of DNA (Cytochrome Oxidase I, microsatellites). Enzyme and COI data showed low overall levels of differentiation, but East and West Greenland populations differed significantly in frequencies of malate dehydrogenase alleles and genotypes. Whether this difference reflects a genetic subdivision of populations is still uncertain as one highly polymorphic microsatellite locus awaits further analysis.

2. Greenland halibut.

Offshore length samples were obtained from commercial trawlers and one longline vessel. Otoliths were sampled during the joint Japan/Greenland survey and on board a commercial Greenland longliner.

Length samples and otoliths were obtained from the commercial fishery in Ilulissat, Uummannaq and Upernavik in February, March and August, and otoliths were sampled during the Greenland longline survey.

A longline survey for Greenland halibut in the inshore areas of Ilulissat, Uummannaq, and Upernavik was initiated in 1993, covering the fjord areas of Upernavik and Ilulissat in July and August 1994. The survey is conducted annually, covering two of the three areas alternately, in order to obtain a CPUE index series for Greenland halibut in the inshore areas with important commercial fishery. The research longline vessel "Adolf Jensen" made 73 line settings with a total of 58,291 hooks. Mean length as well as CPUE of Greenland halibut for Ilulissat were constant relative to the 1993 survey, but below values obtained in 1985-87 by trial longline fisheries by Greenland Fisheries Research Institute. No earlier data are recorded from Upernavik.

3. Young Cod survey.

A survey using links of gill-nets with different mesh-sizes has been developed and used since 1985. The objective of the programme is to assess the abundance and distribution of pre recruit cod in inshore areas of Greenland. Results from this work are presented in the Report of The North-Western Working Group.

4. Icelandic Scallops.

A Re-examination of the abundance of Iceland Scallops, in the archipelago of Nuuk (NAFO Div. 1D) was conducted in November 1994. A stradified random survey was employed. In addition to estimate the minimum dredgeable biomass the survey should investigate the long-term effects of large-scale removal of shells from the fishing grounds on recruitment.

5. Joint-venture programs.

As a part of the joint venture program, that has been going on since 1987, between the Greenland Home Rule and the Japan Marine Fisheries Resources Research Center a trawl survey was carried out at West Greenland in August.

The survey was carried out as a stratified random bottom trawl survey covering Divisions 1B-1D at depths between 400 and 1500 m. The survey was primarily aimed at Greenland halibut and roundnose grenadier.

6. Marine mammals.

a. Small cetaceans.

Studies of white whale and narwhal continued in 1994. Details are being reported to JCCM and NAMMCO.

b. Large cetaceans.

Studies of minke whale, fin whale and humpback whale continued in 1994. Details are being reported to IWC.

c. Seals.

Studies of harp and hooded seals are being reported to the Joint ICES/NAFO Working Group on Harp and Hooded Seals

7. Crabs and sea urchins

Two inshore abundance surveys for snow crab (Chionoecetes opilio) were conducted using crab pots, one in southern Greenland and one in the Uummannaq area.

A monthly sampling program for determination of sea urchin reproduction cycle was initiated in two areas in southern Greenland.

GREENLAND FISHERY IN OTHER NAFO SUBAREAS

A. STATUS OF THE FISHERIES

In 1994 9 Greenland vessels were engaged in the Flemish Cap shrimp fishery (NAFO Division 3M). Total nominal catches amounted to 2,276 tons of shrimp, 26 tons of redfishes, and 10 tons of other species (compared to 3,783 tons of shrimp, 1 ton of Atlantic cod, and 1 ton of Greenland halibut in 1993).

EAST GREENLAND (ICES SUBAREA Va, XII and XIV)

A. STATUS OF THE FISHERIES

1. General trends

Table 2 shows provisional figures for the Greenland fisheries in ICES Subareas Va, XII and XIV. The nominal catch decreased by 56% from 13,793 tons in 1993 to 6,127 tons in 1994. The decrease was mainly caused by a significant decrease in the landings of capelin. Catches of cod decreased substantially, whereas catches of redfish, and shrimp increased. Minor changes were observed in the catches of Greenland cod, Greenland halibut, and shark.

2. Shrimp

a. The fisheries

The nominal catch of shrimp on the traditional fishing grounds in the Dohrn Banke area has been decreasing since 1988 from about 12,500 tons to about 6,600 tons in 1993 and 3,266 tons in 1994. In 1993 and 1994, however, fishery on new grounds south of 65°N yielded catches of 1,285 and 4,994 tons respectively.

Standardized catch rate indices based on logbook data from the Greenland fishery showed a continuos decrease from 1987 to 1993, followed by an increase from 1993 to 1994. The latter increase could be connected to the lower fishing pressure in 1994.

b. Forecast for 1995

Results from a trawl survey carried out in the main area of shrimp distribution in Denmark Strait indicated a shrimp biomass of 3,800 tons as an index. The estimated biomass was of the same order of magnitude as the estimate from 1989, but higher than those from the trawl surveys 1990 and 1992

Overall size composition of the biomass showed that the shift in size at sex change found in 1990 and 1992-surveys when compared to the 1989 survey still remains. Juvenile and small shrimp are absent in the survey samples as well as in commercial samples both from the traditional area and the new fishing areas south of 65°N, stressing that the total area of distribution and recruitment patterns of the stock are still unknown.

The shrimp stock abundance in Denmark Strait is still considered low compared to earlier years, although some improvement is indicated by catch-rate indices and biomass estimates. STACFIS hence advised a TAC of 5,000 tons for the shrimp stock in Denmark Strait in 1995, including the new fishing areas south of 65°N.

The total effective TAC in Greenland waters in 1995 has been set to 9,563 tons, of which 3,888 tons is for Greenland (no effective TAC set for the Icelandic side of the midline).

3. Capelin

Greenland nominal catches of capelin increased drastically in 1993 and 1994 compared to earlier years due to introduction of a Greenland vessel into this fishery. However, catches decreased somewhat from 1993 to 1994, because fishable stock concentrations occurred more easterly and mainly in the Icelandic fishing zone during the fishing season July-December 1994.

B. SPECIAL RESEARCH STUDIES
I. BIOLOGICAL STUDIES

1. Groundfish and shrimp.

A trawl survey covering the main shrimp stock area in Denmark Strait was conducted in September-October with 69 trawl stations. In contrast to earlier surveys in that area in which stratified-random sampling technique was applied, the present sampling and biomass estimations were based on the spline methodology using the "Spline Survey Designer Software System". The spline sampling method seems to be more adequate for this area due to its special characteristics in terms of topographic and hydrographic conditions as well as the behavior of the stock.

Table 1. Nominal catches (tons) by Greenland vessels at West Greenland (NAFO Subarea 1) in 1993 and 1994 (provisional data) and the relative changes from 1993 to 1994.

Species	*Nominal catch 1993*	*Nominal catch 1994*	*% change from 1993 to 1994*
Cod	1,925	2,115	+10
Greenland cod	1,896	1,833	-3
Redfish	848	1,033	+22
Wolffishes	157	100	-36
Grenadiers	28	21	-25
Greenland halibut	13,416	14,919	+11
Atlantic halibut	43	38	-12
Capelin	110	158	+44
Atlantic salmon	0	0	0
Arctic char	74	23	-69
Shark	10	34	+240
Lumpsucker	246	579	+135
Shrimp	70,334	73,632	+5
Crabs	1	72	+7100
Scallops	1,566	2,028	+30
Polar cod	0	2	+
Fish not specified	411	629	+53
Sum total	91,055	97,216	+7

Table 2. Nominal catches (tons) by Greenland vessels at East Greenland (ICES Subarea Va, XII and XIV) in 1993 and 1994 (provisional figures) and the relative changes from 1993 to 1994.

Species	*Nominal catch 1993*	*Nominal catch 1994*	*% change from 1993 to 1994*
Cod	239	72	-70
Greenland cod	0	4	+
Redfish	64	86	+34
Wolffishes	6	6	0
Grenadiers	0	0	0
Greenland halibut	33	35	+6
Atlantic halibut	0	1	+
Capelin	11,064	1,953	-82
Shrimp	2,343	3,924	+67
Greenland shark	3	0	-100
Fish not specified	41	46	+12
Sum total	13,793	6,127	-56