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Denmark/Greenland Research Report for 2001

by

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This report presents information on preliminary catch statistics from the commercial Greenland fishery in 2001 and if possibly a forecast for the coming years. The report also includes research carried out in 2001 by the Greenland Institute of Natural Resources.

WEST GREENLAND (NAFO SUBAREA 1)

A. Status of the fisheries

Provisional statistics for the fisheries in 1999, 2000 and 2001 are presented in Table 1. The catch figures from 2001 are a rough estimate as no official catch figures has been given from Greenland. Additional information on the status of the fisheries is as follows:

1. Shrimp

Northern shrimp (*Pandalus borealis*) occurs off West Greenland in NAFO Divisions 0A and 1A–1F. Greenland and Canada exploit the stock in Subarea 1 and Division 0A respectively (Fig. 1). After reaching a maximum in 1992 of 87 000 tons catches have decreased somewhat to around 66 000 tons in 1998 due to management measures. Since then catch quotas have been raised again and with that catches. The projected catch of 2001 is expected to be about 83 500 tons. The inshore fishery (vessels below 80 GRT) accounts for around 20% of the total landings. Reported discard and by-catch is low. The stock is evaluated as being in good condition, and supportive of the current level of exploitation (Fig. 2)(Anon., 2001).

2. Greenland halibut

The total catches of Greenland halibut by Greenland vessels in NAFO Subarea 1 amounted to 2,337 tons in 2001 including 330 tons taken during a research fishery north of 68°50N. Greenland trawlers took 1,569 tons while 768 tons was taken by gillnet. Almost all fishery took place in Div. 1D at depths between 1100 and 1500 m. The catch level in 2001 level is almost the same as in 2000. Additionally, 3,322 tons were taken by foreign vessels offshore (EU, Norway, Faroe Island and Russia). The total catch offshore in NAFO Subarea 1 was thus 5,659 tons. Fig. 3.

The inshore fishery in Div. 1A was concentrated in three areas Disko Bay (7, 072 tons), Uummannaq (6,558 tons) and Upernavik (3,239 tons). (Fig. 5.) The fishery was conducted by long lines and gill nets.

Inshore catches in Div. 1B-1F are negligible.

No analytical assessment has been made for either inshore or offshore stock components.

Commercial fisheries data. The mean trawl CPUE, based on logbooks reported to the Greenland authorities, was estimated at 0.73 ton/hour which is a decrease from 0.82 tons/hr in 2000, CPUE by month (only October–December, where almost all the fishery takes place) and over all (all month) is given in Fig. 4. In 1999 logbooks was introduced in the inshore fishery on a voluntary basis. The reporting has been very limited in both 1999 and 2000 and no logbooks have been provided from the fishery in 2001.

3. Cod

Since 1992 the inshore cod fishery at West Greenland are based on possibly self-sustained fjord populations. In recent years the catches has decreased dramatically from about 2000 tons yearly in 1993-1995 to only 326 tons in 1998. In 1999 the catches has rose to 622 tons but decreased again to 500 tons in 2000. For 2001 preliminary catches has been reported to about 1.300 tons. Information from fishermen suggests that catches in 2001 and 2002 also consist of young year-classes coming from Iceland, i.e. the strong 1997 and 1998 year-classes.

The inshore fishery takes place from small vessels (<40 GRT). Pound nets, gillnets and hand lines are used to take about 95% of the inshore catch. A commercial pound net CPUE series are available since 1992 (total catch from pound nets pr day/total number of poundnet landings pr day). The CPUE decreases from 1994 until 1998 and levels off in 1999. No commercial catch per unit effort data from 2001 was available.

The Greenland cod stocks is assessed by ICES, see the Northwestern Working Group report, April 2002 (ICES CM2002 ACFM.:20) and ACFM report 2002: "The offshore component is severely depleted since 1990 with some recovery potential as derived from recent survey indices. The dramatic decrease in stock abundance was associated with changes in environmental conditions, emigration and high fishing mortalities. Inshore catches and CPUE are presently low and both have declined continuously since 1991. Recruitment to the inshore component has been poor since the 1993-year class and indices indicate that the inshore stock is still declining. Only the offshore catches in Greenland are subject to a TAC regulation. The inshore fishery is unregulated. This may give cause for concern about the exploitation rate of the inshore component. Given suitable climatic conditions (water temperature) and prudent management, sustained production of offshore cod is possible. However, interaction between the East Greenland and Irminger currents during the early 1970s and 1980s has apparently rendered climatic conditions unsuitable for offshore cod in some years. Combined with high fishing mortality, this caused the offshore cod stock to be severely depleted. In order to take advantage of suitable climatic conditions, when they occur, it is necessary to protect the remaining biomass of offshore cod."

3. Salmon

The abundance of non-maturing 1SW salmon has declined steadily during the recent 30 years both in the Southern European and the North American continental areas. Some improvement in the number of returning spawners is observed in some of the Canadian rivers. The estimated pre-fishery abundance is still at a historical low level, however with a minor increase compared to the preceding year, but the predicted level of abundance for 2001 offered no positive difference between this level and the estimated number of required spawners. At its annual meeting in 2001 the West Greenland Commission of NASCO introduced and agreed to a new *ad hoc* management programme for the 2001 fishery season that incorporated the use of real-time data to allocate quota for the commercial part of the fishery. A total of 114 tons was allocated for the fishery. The season was opened August 13 and was closed after seven weeks September 30.

The total nominal catches in 2001 amounted to 42.5 tons. In 2000 and 2001 a higher proportion of the catches were taken in southern Greenland Compared to earlier years with 65 % and 66 %, respectively, taken in Div. 1F. Some unreported catches (mainly private fishery for own consumption) have probably been taken, but due to the very scattered nature of this fishery estimating of the magnitude of this fishery is difficult.

4. Capelin

The capelin fishery in West Greenland is carried out inshore and in the spawning season only (May-July). The main part of the catches amounted a total of 21 tons in 2000 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 majority of the catches were taken in Div. 1A. No catch figures are available for 2001.

5. Redfish

Redfish catches are reported as Beaked redfish, redfish (unspecified) and Golden redfish. Redfish is mainly taken as by-catch by the offshore shrimp trawlers; reported by-catches in 2000 were 880 tons (no data available for 2001), however, this must be considered an underestimate. Smaller vessels take a minor part inshore, but no catches were reported from 2001.

Pelagic redfish

Since 1999 a pelagic fishery has developed in Div. 1F in West Greenland for the pelagic *S. mentella* (beaked redfish). The *S.mentella* fished pelagic in the NAFO area is probably an extension of a stock in the Irminger Sea. The pelagic fishery is conducted by Germany and catches increased from about 500 t in 1999 to about 11000 t in 2000. In 2001 catches declined to about 5000 t.

The pelagic redfish in the Irminger Sea is assessed by ICES (ACFM report 2002). This assessment also covers the pelagic redfish caught in the NAFO Divisions 1F, 2H and 2J since 1999. The state of the pelagic stock is not precisely known. Acoustic surveys suggest that the stock may have been larger in the early 1990s. Although variable, CPUE series from the commercial fisheries on

both redfish types (above and below 500 m) indicate no trend in the stocks since 1995. Biomass estimates from a survey in 2001 suggest a biomass in the order of 2 million tonnes, but this estimate is highly uncertain. Therefore it is not known if the current exploitation rate is above or below the 5% exploitation rate considered sustainable. Possible changes in the depth distribution of the two redfish types above and below 500 m combined with the differences in geographic coverage of acoustic surveys in different years mean that the acoustic biomass series cannot be interpreted as a consistent series showing relative changes in stock size. The stock structure for pelagic *S. mentella* remain unknown, various stock discrimination studies are often contradictory and not conclusive. Fishing patterns after 1995 resulted in 2 almost distinct fishing grounds in terms of geographic distribution and trawling depth.

6. Grenadiers

There are two species of grenadiers of commercial interest in Greenland: roundnose grenadier and roughead grenadier. All catches are however reported as roundnose grenadier. The catch reported is taken as by-catch in the Greenland halibut fishery. The total catch in 2000 was 17 tons and for 2001 catches is reported to be about 10 tons.

7. Snow Crab

The total catch of snow crab by Greenland vessels conducted by traps in Subarea 1 in 2000 was 10,521 tons. The total catch in 2000 increased with 53 % compared to 1999, mainly due to development of the fishery and increasing interest in the resources. For 2001 no total catch figures were available, but the 2001 catches is estimated to be at the 2000 level. In 2000 was the inshore fishery in Div. 1A in Disko Bay (2,770 tons) concentrated in three areas Vaigat, Qeqertarsuaq and Aasiasat. In Div. 1B two areas (Kangaatsiaq 112 tons) and Sisimiut (1,428 tons), Div. 1C (Maniitsoq 560 tons), Div 1D (Nuuk 344 tons) and 1E (Paamiut 1,606 tons).

Offshore catches, take by the offshore fleet, amounted to 3,700 tons in 2000 and were increased with 41% compared to 1999. Preliminary catch figures for 2001 in the offshore areas suggest catches has increase to 4,700 tons. The off shore fishery was mainly conducted in Div. 1D and 1E.

8. Scallops

The total catches of Icelandic scallops in NAFO Subarea 1 amounted in 2000 to 1,955 tons, which is a small decrease from 1999. No catch figures were available for 2001. A total quota for the scallop is set at 2,329 tons in 2001. All catches were taken in inshore areas in Div. 1A, 1 B, 1C 1D in 2000. The fishery in Division 1A is concentrated along the Disko Island, and the area around Sønder Upernavik. Other areas are found at Attu (1B) and Nuuk (1D).

B. Special Research Studies

1. Environmental Studies

a. Hydrographic Studies

A survey of oceanographic stations along the West Greenland standard sections was carried out in 2001. The time series of mid-June temperatures and salinities on top of Fylla Bank revealed 2001 to be a year close to average conditions. Pure Irminger Water was observed only at the Cape Farewell Section, while Modified Irminger Water could be traced all the way from Cape Farewell to Holsteinsborg in June 2001.

b. Recruitment Studies in Davis Strait

A three year project entitled "Hydrographic and biological processes of importance for variability in recruitment of northern shrimp, copepods and fish in West Greenland water" was initiated in spring 1999. The main objectives of the present project are: 1) to investigate the distributions of *Pandalus* shrimp larvae (*Pandalus montagui* and *P. borealis*) and fish larvae (mainly Greenland halibut) in relation to hydrography and food abundance, 2) to identify the effect of hydrography frontal regimes on larval and juvenile shrimp and fish condition and survival potential and 3) to investigate stomach contents and tracer lipids to establish trophic relationships.

2. Biological Studies

a. Shrimp

The series of annual stratified-random trawl surveys initiated in 1988 was continued in 2001. In July-September about 230 research trawl hauls were made in the major parts of the distribution area of the West Greenland shrimp stock, including areas in Subarea 0 and the inshore areas in Disko Bay and Vaigat.

During the period of stratified random surveys in the offshore areas of shrimp distribution the biomass estimates have been relative stable until 1998 around a level of 250 thousand tons, apart from somewhat lower values in 1991, 1995 and 1997. From 1998 a significant increase is observed with record high biomasses in 2000 and 2001 of 350 thousand tons. Total number of shrimp in 2001 is at the highest level found in the survey series and recruitment to the female group appears to be secured for the coming years.

b. Greenland halibut

A Greenland offshore trawl survey for Greenland halibut was initiated in 1997. The survey is a continuing of the joint Japanese / Greenland survey carried out in the period 1987-95. In 1997-2000 the survey covered NAFO Div. 1C and 1D between the 3 nm line and the 200 nm line or the midline against Canada at depths between 400 and 1500 m. In 2001 the survey area was expanded to include NAFO Div. 1B-1A (to 74°N). The survey is carried out as a stratified random bottom trawl survey. A total of 121 hauls were made in September-November 2001

A longline survey for Greenland halibut in the inshore areas of Disko Bay, Uummannaq, and Upernavik was initiated in 1993. In 2001 14 settings were carried out in Uummannaq and Disko Bay areas.

c. Young Cod survey

The series of annual gill-net surveys initiated in 1985. The survey results from year 2000 shows an increased index for Div. 1F, which contrast to a line of years with almost no cod abundance in this area. No juvenile cod survey was conducted in 2001 due to technical problems.

Since 1988 Greenland Institute of Natural Resources has annually conducted a bottom trawl survey off West Greenland. The main purpose of the survey is to evaluate the biomass and abundance of Northern shrimp (*Pandalus borealis*), but data on most fish species have been recorded. The biomass-indices for cod were estimated to 4,000-7,000 tons in 1988-1990. In 1992 the biomass decreased with over 95% to only 250 tons and 528,000 individuals and remained at this low until recent years. There are indications of a slight improvement in the abundance of small cod. Abundance indices in 2001 were estimated to 1.6 million individuals, which is the highest estimate in the abundance time series. In 1999 to 2001 a significant amount of cod was captured in area 1AS and 1BN for the first time since 1990.

d. Snow crab

An annual monitoring program (trapping survey) was initiated in 1997 in Disko Bay (Div. 1A) and Sisimiut (Div. 1B). In 2001 the surveys were conducted in May/June with the research vessel "Adolf Jensen". The survey used baited traps with large and small mesh. All snow crabs were enumerated by sex, the carapace length, carapace width, chela height, weight and carapace condition was determined. Females were sampled in relation to studies on reproductive strategies and fecundity.

The objective of the monitoring program is to assess the abundance and distribution of snow crab in inshore areas of Greenland. Results from this survey are presented in the Technical Report Series of the Greenland Institute of Natural Resources.

e. Marine mammals

Studies of white whale and narwhal continued in 2001. Details are being reported to JCCM and NAMMCO. Studies of minke whale, fin whale and humpback whale continued in 2001. Details are being reported to IWC. Studies of harp and hooded seals are being reported to the Joint ICES/NAFO Working Group on Harp and Hooded Seals.

GREENLAND FISHERY IN OTHER NAFO SUBAREAS

A. Status of the fisheries

In 2001 no Greenland vessel was engaged in shrimp fishery at Flemish Cap (NAFO Div. 3M) and Grand Bank (NAFO Div. 3L).

Table 1. Nominal catches (tons) by Greenland vessels at West Greenland (NAFO Subarea 1) in 1999, 2000 and 2001.

| | NAFO SA | | | | |
|--------------------|------------------------|-----------------------|-----------------------|--------------|--------------|
| | Div. 1A, B, C, D, E, F | | | Div 3M | Div 3L |
| Species | Estimated catch 1999* | Estimated catch 2000* | Estimated catch 2001* | Catch 2000** | Catch 2000** |
| American Plaice | 3 | <i>nd</i> | <i>nd</i> | | |
| Arctic char | 24 | <i>nd</i> | <i>nd</i> | | |
| Atlantic halibut | <1 | 9 | <i>nd</i> | | |
| Atlantic salmon | 19 | 21 | <i>nd</i> | | |
| Capelin | 34 | 21 | <i>nd</i> | | |
| Cod | 621 | 500 | 1.300 | | |
| Crabs | 4.373 | 10.521 | 10.000 | | |
| Greenland cod | 1.899 | <i>nd</i> | 825 | | |
| Greenland halibut | 26.899 | 23.219 | 19.206 | | |
| Grenadiers | 12 | 17 | 10 | | |
| Lumpsucker | 3.057 | 3.000 | <i>nd</i> | | |
| Redfish | 78 | 1.416 | <i>nd</i> | | |
| Scallops | 2.624 | 1.995 | 2.000 | | |
| Shark | <i>nd</i> | <i>nd</i> | <i>nd</i> | | |
| Shrimp | 70.167 | 79.120 | 83.500 | 1.771 | 34 |
| Wolffishes | 26 | 37 | <i>nd</i> | | |
| Fish not specified | <i>nd</i> | <i>nd</i> | <i>nd</i> | | |
| Sum total | 109.836 | 119.876 | 116.841 | 1.771 | 34 |

* no nominal catch figures has been provided from Greenland in recent years. The catch figures is an estimate

** no catches in 2001 in Div 3M and 3L

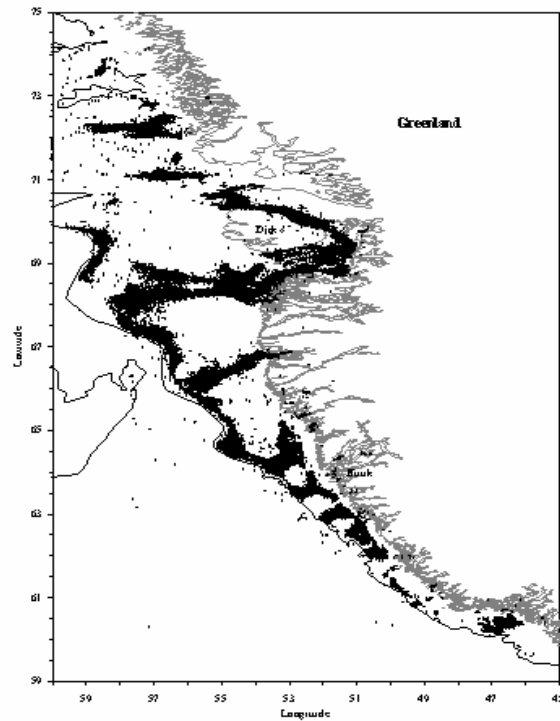


Fig 1. Distribution of hauls by Greenlandic shrimp trawlers fishing off West Greenland based on available logbooks 1975-2001. The fishery by Canadian vessels occurs in a small area extending from about 67°20' to 68°45' and 58° to 59°30' between the international boundary to the east and the 500 m depth contour to the west (Parsons and Veitch 1998). 600 m depth contour is shown as the bold line.

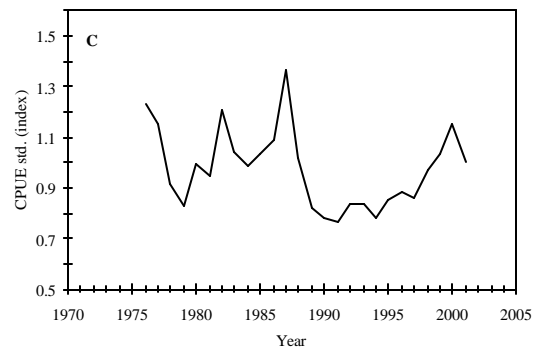


Fig 2. Standardized CPUE indices (C) of the shrimp fishery in NAFO SA 1 + Div. 0A. Catch for 2001 are projected from November to the end of the year.

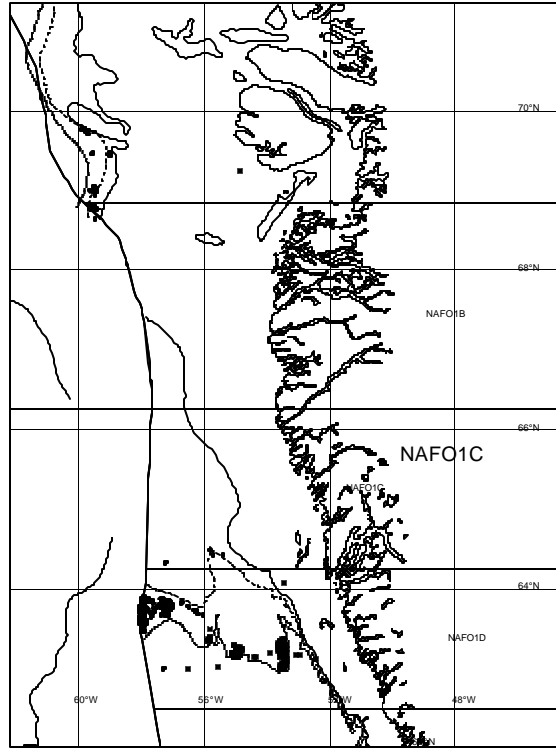


Fig 3. Distribution of the Greenland fisheries for Greenland halibut in 2001. • Trawl, × Gillnet.

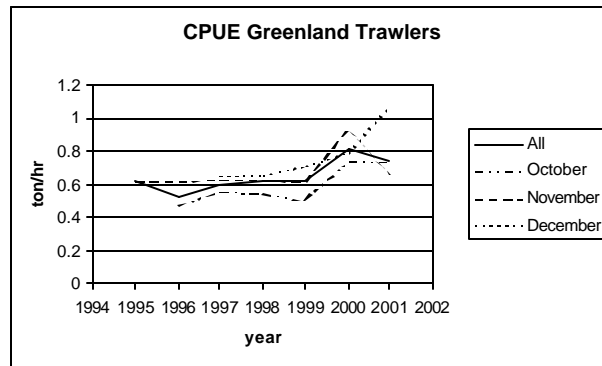


Fig. 4. Greenland halibut CPUE by month from 1995 – 2001.

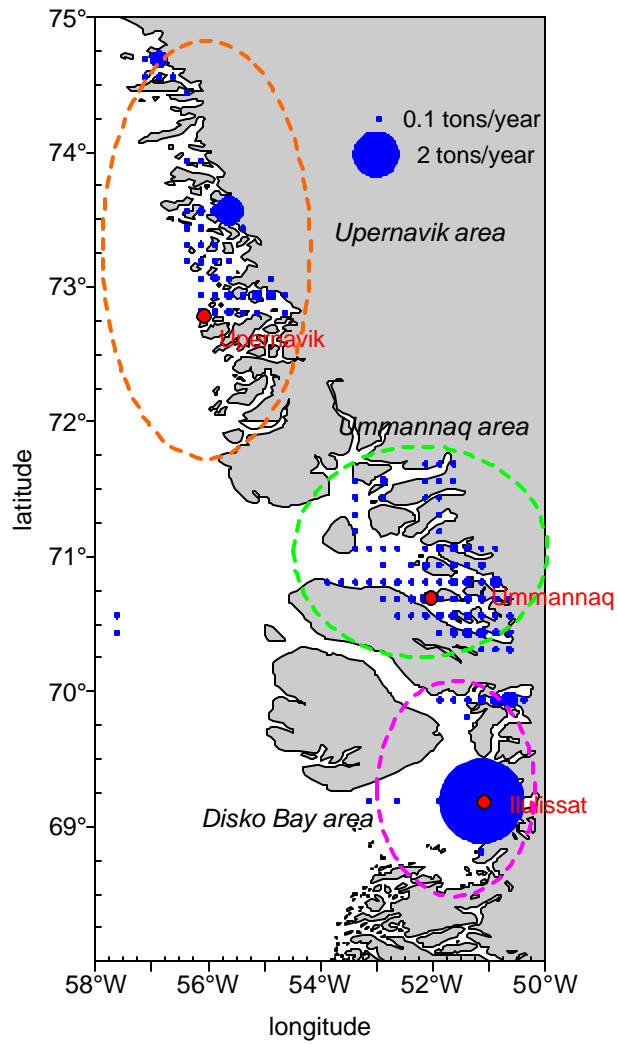


Fig. 5. Location of main inshore fishing grounds for Greenland halibut in Div.1A. Landings is shown in tons per. Squarre (field-code). Catch statistics are provensial. For Disko Bay catch statistics was available for 96%; for Uummannaq 75%; for Upernavik 100% of the total landings.

References

Anon. 2001. Scientific Council Reports. Northwest Atlantic Fisheries organization. Dartmouth Canada 2001.