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Assessment of the Greenland Halibut Stock Component in NAFO Subarea 0 + Division 1A Offshore + Divisions 1B-1F

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Abstract

The paper presents the background and the input parameters from research surveys and the commercial fishery to the assessment of the Greenland halibut stock component in NAFO Subarea 0 + Div. 1A offshore + Div. 1B-1F. Catches peaked at 18,000 tons in 1992 but have been stable around 10,000 tons during 1993-2000. Catches increased to 13,184 tons in 2001 and further to 19,954 tons 2003 primarily due to increases in catches in Div. 0A and 1A. Catches have stayed at that level in 2004 and 2005. Catches increased to 24,155 tons due to increased effort in 0A and 1AB. Survey trawlable biomass in Div. 1CD increased between 2003 and 2005 to 80.800 tons but decreased to 77,010 tons which still is well above the average for the time series. The biomass in the Greenland shrimp survey decrease slightly between 2005 and 2006 but is still above average for the time series. The survey in Div. 0A in 2006 was not complete but the biomass estimate was considered to be at the same level as in 1999 and hence lower than the 2001 and 2004 estimates. The recruitment of age one has been above average in resent years for the time series, which dates back to 1988. Standardized CPUE indices from 0B and 1CD have showed an increasing trend since 2002 and the combined CPUE series also showed an increase and the CPUE is in 2006 at the highest level seen since 1989.

1. TAC, description of the fishery and nominal catches.

TAC

Between 1979 and 1994 a TAC was set at 25,000 tons for SA 0+1, including Div. 1A inshore. In 1994 it was decided to make separate assessments for the inshore area in Div. 1A and for SA 0 + Div. 1A offshore + Div.1B-1F. From 1995-2001 the advised TAC for the latter area was 11,000 tons. In 2000 there was set an additional TAC on 4,000 tons for Div. 0A+1AB for 2001. This TAC was in 2002 increased to 8,000 tons for 2003. Total advised TAC for 2004 and 2005 remained at 19.000 tons. In 2006 the advised TAC in Div. 0A+1AB was increased with further 5,000 tons to 13,000 tons. Total advised TAC for 2006 was hence 24,000 tons.

Catches in SA 0 + Div. 1A offshore + Div.1B-1F

During the period 1982-1989 nominal catches of Greenland halibut in SA 0 + Div. 1A offshore + Div.1B-1F fluctuated between 300 and 4,500 tons. Catches increased from 2,200 tons in 1989 to 10,500 tons in 1990. Catches stayed at that level in 1991 but increased again in 1992 to 18,100. During 1993-2000 catches have fluctuated between 8,300 and 11,400 tons. Catches increased to 13,315 tons in 2001 and increased further via 14,879 in 2002 to 18,725 tons in 2003 and catches increased slightly to 19, 680 tons in 2005. In 2006 catches increased to 24,155 tons (Fig. 1).

The increase in catches from 1989 to 1990 was due to a new trawl fishery by Canada and Norway and increased effort by Russia and Faeroe Islands in Div. 0B, while the increase from 1991 to 1992 was caused by a further

increase in effort by Russia in Div. 0B and an increase in fishing activity in SA 1. The increase in catches between 2000 and 2003 and from 2005 to 2006 was primarily due to an in increase in effort in Div. 0A and Div. 1A. The distribution of catches between 0A+1AB and 0B-1C-F has been stable in recent years.

Catches in SA 0

In 1983 annual catches in SA 0 were about 4,500 tons. Catches then dropped to a level of 1,000 tons or lower, where they remained until they increased from 907 tons in 1989 to 9,498 tons in 1990. Catches decreased in 1991 to 8,606 tons, to increase again in 1992 to 12,358 tons. Catches then decreased gradually to 3,233 tons in 1995 and fluctuated between 4,000 and 5,400 tons between 1996 and 2000. Until 2000 almost all catches in SA 0 were taken in Div. 0B. In 2001 a commercial fishery started in Div. 0A. Catches in SA 0 increased to 7,662 tons in 2001 and further to 9,201 tons in 2003 and stayed at that level in 2004 and 2005. Catches increased to 12,168 in 2006 (Table 1).

The increase in catches seen since 2000 was mainly due to an increased effort in Div. 0A where catches increased from a level about 300 ton, where they have stayed since 1996, to 2,628 tons in 2001 and further to 4,142 tons in 2003. Catches stayed at that level in 2004 and 2005. In 2006 catches increased to 6,635 tons due to increased effort

The catches in Div. 0A in 2006 were taken by trawl (444 tons) and twin trawl (3,190 tons), while 3,001 tons was taken by gill net. The gill net catches increased about 2,000 tons compared to 2005. The long lines fishery in the area has apparently stopped. The fishery was prosecuted by Canadian vessels.

Catches in Div. 0B 2006 amounted to 5,533 which is at the level seen in recent years. The 2006 catch figure excludes 72 tons taken inshore in Cumberland Sound on longlines. Offshore, longliners took 193 tons and gillnetters 2,445 tons while single- and double trawlers took 2,895 tons All catches were taken by Canadian vessels.

Catches in SA1

The catches in Subarea 1 (Div. offshore 1A Div. + 1B-1F) were below 1,600 tons during 1982-1990. In 1991 catches increased to 2,376 tons and were around 5,500 tons in the period 1992-1994, but decreased to 4,500- 5,000 in the period 1995-19999. Catches increased to 5,741 in 2000 further to 7,408 tons in 2002 and 9,524 tons in 2003 and stayed at level in 2004 and 2005. Catches increased to 11,987 in 2006 due to in creased effort by Greenland in Div. 1AB. almost all catches have been taken offshore (Table 2). The inshore catches in 2006 in Div. 1B-1F amounted to 444 tons.

Catches in Div. 1AB (mainly in Div. 1A) increased gradually from 575 tons in 2001 to 3,558 tons in 2003 and stayed at that level in 2004-2005. Catches increased again in 2006 to 6,220 tons. All catches were taken off shore by trawlers from Faeroe Islands, Russia (SCS 07/6), and Greenland (SCS 07/15).

Catches in Div 1CD have been stable around 5,600 tons in recent years and was 5,767 tons in 2006. Catches were taken by vessels from Greenland (SCS 07/15), Norway, EU/Germany (SCS 07/11), Russia (SCS 07/5) and Faeroe Islands. Almost all catches off shore were taken by trawl except about 20 tons taken by a longliner. 444 tons were taken inshore in Div. 1C-1F, mainly by gill net.

2. Input data

2.1 Research trawl survey

Div. 1C-1D GHL-survey

Since 1997 Greenland has conducted stratified random bottom trawl surveys in September-October for Greenland halibut in NAFO Div. 1C-D at depth between 400 and 1500 m. In 2006 in total 61 hauls were made (SCR 07/29). The biomass and abundance Greenland halibut in Div. 1C-D was estimated at 77,010 tons and $70.715*10^6$ compared to 80,865.4 tons and $73.001*10^6$ individuals in 2005 (Fig. 2). The mean catch per km^2 swept decreased from 1.55 tons in 2005 to 1.47 tons in 2006. Both the biomass and the abundance was above average for the time series. The highest

densities were found at 1000-1200 m in Div. 1C and 1000-1500 m in Div. 1D. The overall length distribution in Div. 1C-D was dominated by a mode at 47-50 cm and the age distribution was dominated by a mode at age 6.

Canadian deep sea survey in Baffin Bay (Div. 0A)

Canada has conducted surveys in the southern part of Div. 0A in 1999, 2001, 2004 and 2006. The biomass has increased gradually from 68,700 tons via 81,000 tons to 86, 200 tons in 2004. The biomass decreased to 52,271 t in 2006 (Fig. 2). However, the survey coverage was not complete and two of the four strata missed fell within the depths 1001-1500 m and accounted for 11,000 – 13,000 ton of biomass in previous surveys. Therefore, the current estimates are considered to be lower than the most recent surveys but comparable to the estimate from 1999. The mode in the catches was at 39 cm compared to 45 cm in 2004. The decrease in mode might reflect the poor coverage of great depth where fish generally are larger (SCR 07/41).

Greenland shrimp-survey

Since 1988 annual trawl surveys with a shrimp trawl have been conducted off West Greenland in July-September. The survey covers the area between 59°N and 72°30'N (Div. 1A-1F), from the 3-mile limit to the 600-m depth contour line. The survey area was restratificated in 2004 based on better information about depths and all biomass and abundance indices have been recalculated. The recalculation did not change the trends in the development of the different stocks.

Estimated total trawlable biomass of Greenland halibut in the offshore areas (- Disko Bay) has fluctuated between 9,258 and 31,100 tons during 1992 – 2005.

In 2006 the biomass was estimated as 24,526 tons which is a decrease from 2005 where the biomass was estimated as 27,217 tons but the 2006 estimate is still the third largest in the time series which dates back to 1991. The abundance was estimated at 334 mill. in 2006 compared to 308 mill in estimated in 2005 and the 2006 estimate is the third largest in the time series. The highest abundance was seen in Div. 1BN. As in recent years most of the abundance was comprised of one-year-old fish (SCR (07/28).

In the inshore Disko Bay the biomass was estimated at 16,538 tons compared to record high 28,229 tons estimated in 2004. The biomass estimates from last four years are by far the largest in the time series. The abundance was estimated at 106 $*10^6$, which is the lowest seen since 1999 There was a relatively higher proportion of two- and three-year-old fish in the catches compared to previous years.

The biomass in the nursery area (1AS and 1B) was estimated at 12,522 in 2006 compared to 16,036 tons in 2005. The abundance was estimated at 207 mill in 2006 compared to 177 mill. in 2005.

Recruitment

A recruitment index was provided from the Greenland shrimp trawl survey. By means of the Petersen-method ages 1, 2 and 3+ were separated in the survey catches.The number of one-year-old fish in the total survey area including Disko Bay increased gradually from 1996 to a peak of 500 million in 2001. The number of one-year old fish was in 2006 estimated to 303 which is a decrease compared to 343 mil. in 2005 but above the average for the times series (Fig. 3).

Further, a recruitment index was provided from the off shore nursery area in Div. 1AS-1B. Catches were standardized as catch in number per hour as described in Bech (1995). Data were plotted by year classes to visualize the relative year class strength and development in relative abundance (Fig. 4). In recent years the allocation of stations in the shrimp trawl survey has been changed in order to minimize the variance in the estimation of biomass and abundance of shrimp. To minimize the effect of that the CPUE index has been recalculated using stations > 300 m only. This generally increases the mean number per tow but not the trend in the index.

The recruitment index declined since the relatively large 1991 year-class, but the recruitment has been above the level in the 1980'ies. The recruitment increased again with the 1995-year class, which was the largest on record. The 1996

year-class seemed to be small but the recruitment has increased gradually until the 2000 year-class. Since then the recruitment has been around average. The recruitment of the 2005 year-class was estimate as 729 age-one per hour, some what above the average for the time series. In Disko Bay the recruitment have been good in recent years although the recruitment has been decreasing in latest four years and the 2005 year class was the lowest observed in the last decade, but still above the level in the early 90'

Generally there is a steep decline between CPUE at age 1 and age 2 and 3+ which also was observed in the 2006 survey. And it has been noted, that the year-classes estimated to be a very strong year-class at age 1 not have shown up in the fishery or in the 1CD survey for Greenland halibut, that mainly catches ages 5-8, as a particularly strong year-classes.

In order to get better information about age groups 2-5 (20-42 cm), and hence better information about the recruitment the fishery, 11 stations at depths between 669 and 958 m in Div. 1AB were fished during the 2006 survey. Fishing took place at night time. Catches are standardized to number at length per km^2 swept and converted to number at age using an age length key from the 1CD survey. In total 848 fish in the length range 12-98 cm were caught with a dominance of fish between 20 and 45 cm. This corresponds to the ages 3-5, the ages which generally speaking are missing in the shrimp survey and the survey for Greenland halibut in Div. 1CD.

It is the intention to cover the 11 stations annually in the future to investigate if it is possible to get better information of the recruitment to the fishery.

SSB/Recruitment

The relation between the spawning stock in numbers (age 10+) in Div. 1CD estimated from the joint Japan/Greenland survey and the Greenland Greenland halibut survey and recruitment, given as the number of fish age 1 in the total survey area, estimated from the Greenland shrimp trawl survey, is shown in Fig. 5. The over all recruitment of the 2005 year-class was well above average. Note that there was no survey in 1996.

2.2 Commercial fishery data.

Length distribution

SA 0

Length distributions were available from the single trawl, twin trawl and gill net fishery in Div. 0AB.

In Div. 0A the length frequencies in the trawl fishery showed modes at 48-50 cm. Modes around 48-50 cm were also seen in the previous years. The catches in the gill net fishery was dominated by a mode at 62 cm (Fig. 6).

The length distribution in the trawl fishery in Div. 0B was dominated by a mode around 48 cm, for both types gears. It is a slight increase from 2005 (46 cm) and back at the level it has been at in previous years. The length distribution for gillnet showed a mode at 66 cm where it was at 64 cm in 2005.

SA1

Length frequencies were available from Greenland and Russian trawl fishery in Div. 1AD (SCS 07/06) and from the Norwegian trawl and longline fishery in Div. 1D (SCR 07/30).
The catch composition in the Russian fishery in Div. A showed a mode at 42 cm (Fig. 7), while the mode was at 48-54 cm in the Greenland fishery (Fig. 8). The catches in Div. 1D by Russia, Norway and Greenland showed clear modes at 52, 50 and 49 cm, respectively (Fig. 7 and 9). The mode in catches has been within this range for several years. The catches in the small (20 tons) Norwegian longline fishery in Div. 1D was dominated by fish between 50 and 80 cm. (Fig. 9).

Age distribution

Catch at age was available from the Russian trawl fishery in Div. 1D. Ages 5 and 6 dominated in 2006, while the Russian catches in 2005 were dominated by the ages 6 and 7. This does not correspond to the fact that the mode in the fishery has moved from 48 cm in 2005 to 52 cm in 2006 (Fig. 10).

The Greenland and Norwegian trawl length frequencies in Div. was converted to age frequency using an age length key sampled during the Greenland deep sea survey in Div 1CD. The catches were dominated by fish age 6 to 8 (Fig. 10).

No catch-at-age information was available from SA 0, and the catch-at-age and mean-weight-at-age, in Table 3 and 4, respectively, has not been updated.

Catch rate

SA 0

Unstandardized catch rates were available from Div. 0A and standardized catch rates were available from Div. 0B.

The unstandardized trawl catch rates in Div. 0A generally increased between 2000 and 2004, decreased between 2004 and 2005 but increased again in 2006 for both single- and twin trawl (Fig. 11a).

SA1

Unstandardized catch rates were available from the Greenland trawl fishery in Div. 1A and 1D (SCS 07/15), the Russian trawlfishery in Div. 1AD (SCR 07/65) and the EU-German fishery in Div. 1D (SCS 07/11). Further, catch rates were available from logbooks submitted to the Greenland authorities. Standardized catch rates were available from the trawl fishery in Div. 1CD

Unstandardized catch rates from Greenland twin trawlers in Div 1A were relatively stable between 2001 and 2004 around 1,0 ton/hr. Catch rates decreased slightly from record high 1.11 tons per hour in 2005 to 1,06 ton/hr in 2006. The Russian catch rates (Div 1.AB and small and large trawlers combined were stable between 2004 and 2005 (0,44 ton/hr) but decreased slightly to 0,37 tons/hr in 2006 (Fig.11b).

The unstandraized catch rates from the fishery in Div. 1CD increase slightly for small and large Greenland, Russian and EU-German trawlers, while the Norwegian trawlers showed a decrease between 2005 and 2006 (Fig.12).

Standardized catch rates

Div. 0B

The standardized CPUE series, based on logooks submitted to the Canadian authorities, from Newfoundland trawlers fishing in Div. 0B was updated with the 2006 data. The index decreased gradually from 1995 to 2002, but has been increasing since then and is now at the same level as in the early 1990'ies. (Appendix 1) Fig.13a).

Div. 1CD

Standardized catch rate series, based on logbook data from the Greenland authorities, were available for the offshore trawl fishery in Div. 1CD for the period 1988-2006. The logbooks included represented 72.2% of the catches in Div.1 CD in 2006.

The standardized catch rates in Div. 1CD decreased gradually from 1989-1996 but has been stable since then with an increasing trend and the catch rates also increased slightly between 2005 and 2006 (Fig. 13b) (Appendix 2).

Combined Div. 0B-1CD

The combined (Div. 0B+1CD) standardized CPUE series has been stable in the period 1990-2001, dropped somewhat in 2002 but has increased again since then, and is in 2006 at the highest level seen since 1989 (Appendix 3) (Fig. 13c).

Due to the frequency of fleet changes in the fishery in both SA0 and SA1 and change in fishing grounds in Div. 0A and 1A, both the unstandardized and the standardized indices of CPUE should, however, be interpreted with caution.

3. **Assessment**

3.1 Yield per Recruit Analysis.

The level of total mortality has in 1994-1996 been estimated by means of catch-curves using data from the offshore longline fishery in Div. 1D. Z was estimated from regression on age 15-21. A relative F-at-age was derived from the catch curve analysis, where the trawl, longline and gillnet catches were weighed and scaled to the estimated stock composition. In all three years STACFIS considered that the estimation of Z was based on too limited samples and represented too small a part of the fishery and that the outcome of the catch curve analysis was too uncertain to be used in the yield per recruit analysis. Age frequencies were available from the longline fishery in Div. 1D 2006 fishery, but the catches only represented < 1 % of the total catches in the assessment area, hence no catch-curve analysis were made.

3.2 XSA.

Extended Survivors Analysis

An XSA has been run unsuccessful several times during the 1990'ies, using a survey series covering 1987-1995 as tuning. STAFIS considered the XSA's unsuitable for an analytic assessment due to high log-catchability residuals and S.E.'s and systematic shift in the residuals by year. Further, a retrospective plot of F_{bar} showed poor convergence. In 1999 the XSA analyses was rerun including the latest two years surveys (1997-1998, new vessel and gear) but the outcome of the analysis did not improve.

An XSA analysis was run using the stock data for SA 0+1, calibrated with trawl survey data (age 5-15) from the Greenland Deep sea surveys (1997-2001) in Div. 1CD. The assessment results are considered to be provisional due to problems with the catch-at-age data and the short time series, the assessment is, however, considered to reflect the dynamics in the stock. The rate of exploitation has been relative stable in recent years between 0.2-0.3 (F_{bar} 7-13). The input parameters to the analysis and the outcome of the analysis is given in (SCR 02/68)

The XSA was run again in 2003 year with the 2002 survey and catch data and updated catch data from 2001 (very small changes). The assessment results are considered to be provisional due to problems with the catch-at-age data and the short time series. The assessment is, however, considered to some extend to reflect the dynamics in the stock. The rate of exploitation has been relative stable in recent years between 0.2-0.3 (F_{bar} 7-13). The summary of the XSA is given in SCR (03/54).

The XSA was not run this year as no catch-at-age data were available for 2003-2006.

3.3 Spawning stock/recruitment relations.

A spawning stock/recruitment plot based on the available observations from the joint Japan/Greenland survey and the Greenland survey is shown in Fig.4. No further analysis of spawning stock recruitment relationships have been made due to few observations distributed on two different surveys, poor estimate of spawning stock biomass (survey trawl only take a very small proportion of the mature fish, poor estimates of ages of old fish, the survey covers only a restricted part of the area covered by the assessment, and knife edge maturity ogive was applied). Further, the age of the recruits is relatively poor estimated (the Petersen method).

3.4 ASPIC

ASPIC was run in 1999 with standardized CPUE data and a biomass index as inputs. Three CPUE series were available, one series covering Div. 0B during the period 1990-1998, one covering Div. 1CD during the period 1987-1998 and a series combining the two data sets. The biomass index was from 1CD and covered the period 1987-1995 and 1997-1998. Several runs showed that the combined CPUE series from Div. 0B+1CD fitted the total catch data best in terms of r^2 and "total objective function". Runs with biomass alone gave relatively bad fits in terms of "total

objective function" and r^2 and the modeled population trajectory declining drastically over the period. Runs with the CPUE series from 0B gave unrealistic high B_{msy} and negative r^2. The run with the combined CPUE series showed, however, that sensitivity analysis should be run, because "the B1-ratio constraint term contributed to loss". Several runs with different realistic values for the constraint did not solve the problem. Further, the coverage index and nearness index was equal in all runs. Several runs with different constraints on r and MSY were tried but it did not changes the outcome of the analysis. Removing the three first years from the input data gave negative r^2. To get measures of variance the run with the combined CPUE series was bootstrapped (500 resamplings).

The results showed that estimated fishing mortalities 1987-1998 have been less than the (bias-reduced) estimate of F_{msy} (0.22) except for one year (1992). A number of essential parameters are quite imprecisely estimated (r, q, F_{msy}), and it is considered that the estimates of MSY and F_{msy} were not precise enough to be used.

The input parameters from 2000-2006 (catches, survey biomass index, and CPUE index) have only varied little compared to 1999. However an ASPIC was run in 2007, but the outcome of the analysis did not change significantly from the analysis in 1999.

4. **Prognosis**

Since catches peaked with 18,000 tons in 1992 they have been stable at around 10,000 tons until 2000. Since then catches have gradually increased to 19,954 tons in 2003 and they have stayed at that level during 2004-2005. The TAC was increased with 5,000 tons in 2006 and catches increased to 24,155 and the TAC has hence been taken. The increase in catches have been due to increased effort in Div. 0A and Div. 1A .

The biomass in Div. 1CD increased between 2003 and 2005, but decreased slightly in 2006 but is still well above the average for the period 1997 – 2005.

The biomass in Div. 0A in 2006 decreased compared to 2004, but the coverage was incomplete.

The biomass in the Greenland shrimp survey was above average both in the off shore area and overall for the period 1992-2005.

The recruitment of age one in the entire survey area has been above average the last four years, and an recruitment index for the off shore nursery areas showed that the 2005 year class was a little above average.

Length compositions in the commercial catches have been stable in recent years.

Unstandardized catch rates in 0A increased slightly between 2005 and 2006.
Standardized catch rates in Div. OB decreased between 1995 and 2002, but has been increasing since then and is in 2006 at the level of the early 90'ies. In Div 1CD standardized catch rates has been increasing slightly since 1996. The combined catch rate for Div. 1CD+0B has showed very little variation during the period 1988-2006, but with an increasing trend in recent years.

5. **Biological reference points**

Yield per recruit analysis or other age-based methods are not available, for estimating biological reference points. Biomass indices and CPUE series are relative short and show little variability and are not useful for estimating reference points.

6. **References**

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Table 1. Greenland halibut catches (metric tons) by year and country for Subarea 0 (Split on Div. 0A and 0B) from 1987 to 2005. Minor (300 ton or less) catches from Div. 0A are included in some of the 0B catches prior to 2001.

Year																				
Count.	87	88	89	90	91	92	93	94	95	96	97	98	99	00[e]	01[c]	02[d]	03[f]	04	05	06
0A																				
CAN															2183	3561	4142	3751	4182	6635
POL															445					
0B																				
CAN		2		589	256	2194	883		1941	2354	3871	3924	4784	5438	5034	3910	5059	5771	5780	5533
EST							631													
FRO	388	963	596	2252	2401	463	1038			839	452									
JAP				113	232	337	252	600	1031	500										
LAV							83													
NOR			282	5016[b]	3959		373													
RUS		59	29	1528	1758	9364	4229[a]	3674	261	915										
TOT	388	1024	907	9498	8606	12358	7489	4274	3233	4608	4323	3924	4784	5438	7662	7471	9201	9522	9962	12168

[a] The Russian catch is reported as area unknown, but has previously been reported from 0B
[b] Double reported as 10031 tons
[c] Excluding 445 tons double reported, and 2 tons reported by error
[d] Excluding 782 tons reported by error
[e] STACFIS estimate
[f] excluding 2 tons reported by error

Table 2. Greenland halibut catches (metric tons) by year and country for Subarea 1 (Split on Div. 1AB and Div. 1CD) from 1987 to 2005. The Greenland catches are excl. inshore catches in Div. 1A. Offshore catches in Div. 1A prior to 2001 are negligible.

Coun.	87	88	89	90	91	92	93	94	95	96	97	98	99[a]	00	01	02	03[g]	04	05	06
1AB																				
GRL															340[c]	1619[c]	3558[c]	3500[c]	3363[bc]	5530[bc]
RUS															85	279	259	241	549	565
FRO														96	150	150	146[b]	153	125	125[b]
NOR														15						
EU																	73[e]	141[e]		
1CD																				
GRL					965	227	213	885	1405	1880	2312	2295	2549	2657[b]	2012	2284	2059	2102	2380[b]	2430[b]
FRO				54	123	151	128	780			127	242	116	147	150	150	135	150	149	150[b]
JPN	907	1581	1300	988	677	2902	1198	820	337											
NOR					611	2432	2344	3119	2472	1785	1893	1338	1360	1590	1550	1734	1423	1364	1456[b]	1421[b]
RUS							5		296	254		543	552	792	829	654	1328	1214	1147	1222
EU							46	266	527	455	446	350	330	444[b]	537[b]	536	543[d]	665[f]	549	544
Total	907	1581	1300	1042	2376	5712	3934	5870	5037	4374	4778	4769	4907	5741	5653	7408	9524	9530	9718	11987

[a] Excluding 7603 tons reported by error
[b] Reported to the Greenland authorities
[c] Offshore catches
[d] Including 2 tons taken in an experimental fishery
[e] Spanish research fishery
[f] Includes 131 tons taken in Spanish research fishery
[g] Excludes 1366 tons reported from Div. 1A by error

Table 3. Catch-at-age in numbers. Not updated for 2003 - 2006.

YEAR	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
AGE																
5	2	1	1	4	20	53	241	254	152	151	41	71	262	415	69	570
6	31	29	36	87	318	678	651	862	522	530	311	372	1092	1106	978	1975
7	182	190	244	592	1742	2967	2422	2472	1628	1818	1556	677	1759	1677	3212	4252
8	296	354	409	1711	2679	4311	2356	1692	940	1575	2110	1187	1174	1144	1802	1791
9	193	245	212	1356	1418	2604	1048	954	558	660	1042	900	672	772	1154	617
10	77	115	75	711	533	951	590	294	259	306	438	572	375	501	776	476
11	40	80	47	359	221	398	224	183	228	160	232	422	234	443	503	347
12	18	61	48	195	144	231	130	159	188	127	118	205	184	291	273	149
13	10	58	44	189	108	158	72	125	104	64	96	153	172	178	101	209
14	9	46	42	115	60	85	59	58	80	57	21	98	95	68	50	75
15	6	35	26	67	36	45	37	55	85	39	13	19	61	75	21	168
16	3	15	12	17	6	23	26	34	41	36	12	4	37	17	10	74
17	4	4	1	3	2	1	4	10	18	13	0	0	18	4	5	23
+gp	2	1	0	0	0	0	2	7	10	22	0	0	7	6	3	49
TOT.NUM	873	1234	1197	5406	7287	12505	7862	7159	4813	5558	5994	4688	6166	6717	8957	10917
TONS	1295	2605	2207	10540	10982	18070	11423	10144	8270	8982	9101	8693	9691	10689	13184	15136

Table 4. Catch weights at age (kg) Not updated for 2003-2006.

	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
AGE																
5	0.29	0.29	0.29	0.33	0.34	0.33	0.58	0.43	0.49	0.52	0.36	0.50	0.54	0.53	0.48	0.48
6	0.51	0.51	0.51	0.54	0.54	0.56	0.72	0.62	0.66	0.69	0.55	0.74	0.70	0.72	0.67	0.70
7	0.74	0.74	0.74	0.79	0.79	0.80	0.96	0.91	0.94	0.94	0.86	1.00	0.98	1.00	0.91	0.96
8	1.08	1.08	1.08	1.10	1.12	1.13	1.26	1.26	1.34	1.38	1.27	1.24	1.28	1.29	1.30	1.30
9	1.41	1.42	1.42	1.52	1.57	1.59	1.80	1.72	1.81	1.91	1.83	1.54	1.66	1.71	1.76	1.85
10	1.97	2.05	2.00	2.11	2.27	2.28	1.43	2.19	2.37	2.48	2.38	2.22	2.25	2.26	2.29	2.20
11	2.58	2.80	2.68	2.94	3.22	3.02	3.25	2.73	2.89	3.18	3.01	3.08	2.74	2.84	2.91	2.82
12	3.52	3.88	3.73	3.90	4.24	4.02	4.10	3.43	3.62	4.04	3.84	3.84	3.68	3.59	3.51	3.32
13	4.64	5.01	4.87	4.96	5.50	5.33	5.26	4.48	4.44	5.05	4.93	4.74	4.73	4.23	4.31	3.93
14	5.79	6.16	6.20	6.26	6.82	6.76	6.17	5.75	5.61	5.95	5.69	6.04	5.58	5.19	5.60	5.20
15	6.61	7.44	7.65	7.96	8.33	7.76	7.42	6.58	6.65	7.34	6.79	6.60	6.68	5.85	6.09	5.38
16	7.99	8.88	9.36	9.90	9.89	8.58	8.04	7.36	7.77	8.64	8.00	13.45	7.75	7.32	7.08	7.02
17	9.56	9.86	9.56	11.86	9.56	11.95	9.24	9.42	10.19	9.18			9.08	5.60	8.94	8.61
+gp		11.33					10.25	11.15	11.00	11.10			11.10	9.00	11.22	10.97

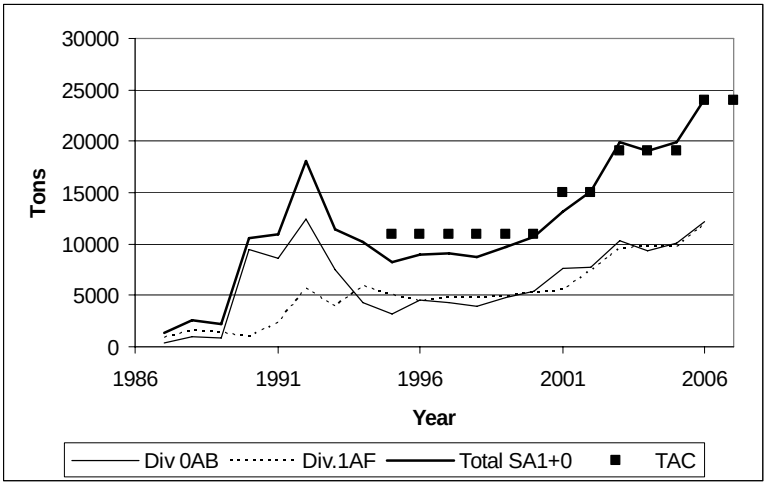

Fig. 1. Catches in SA0 and Div. 1A offshore + Div. 1B-1F and recommended TAC. For TAC before 1995 see text.

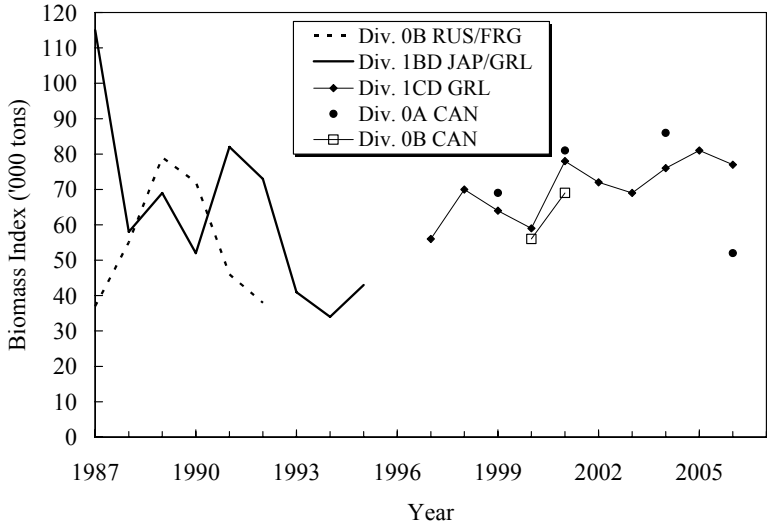

Fig. 2. Biomass estimates from various surveys in SA 0 and 1. Note that the survey in Div. 0A in 2006 had incomplete coverage (see text).

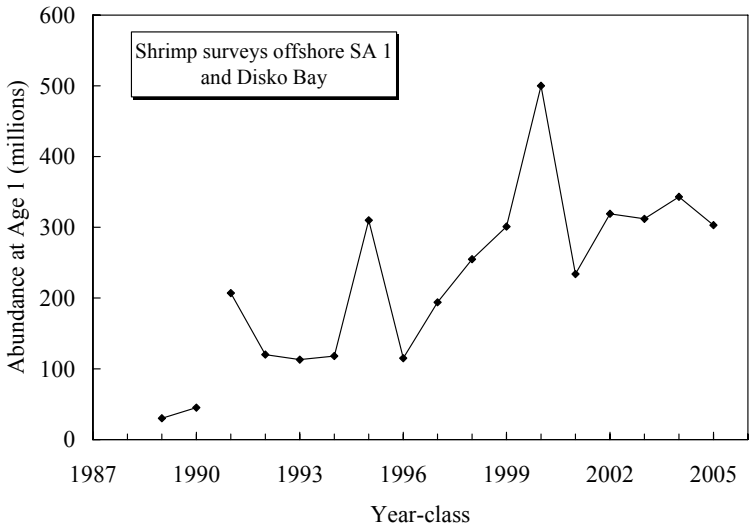

Fig.3. Abundance of age one Greenland halibut in the entire area covered by the Greenland shrimp survey including inshore Disko Bay and Div. 1AN (North of 70°N)

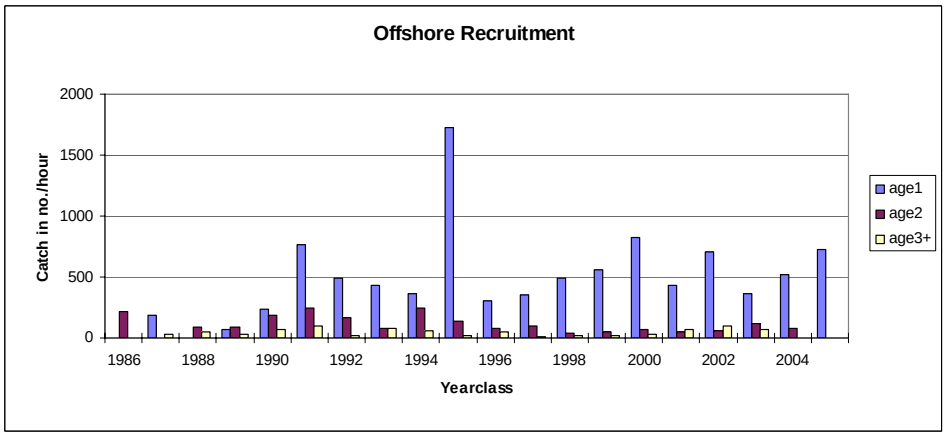

Fig. 4. Year-class strength of Greenland halibut of ages 1-3+ in number per hour trawled in the offshore nursery area (Div 1AS-1B, depths > 300 m).

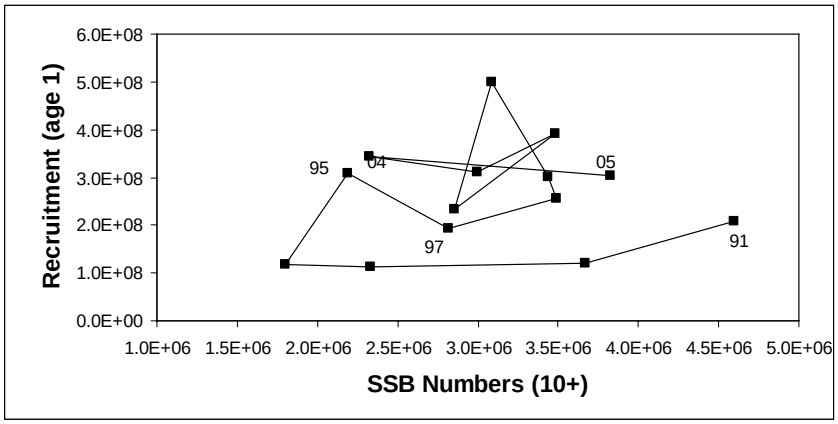

Fig. 5. Spawning stock in numbers (ages 10-18 in Div.1CD from the joint Japan/Greenland survey and the Greenland survey (1997-2001) plotted vs. number of fish age 1 the following year estimated from the Greenland shrimp trawl survey including the Disko Bay. Figures denotes year class. Note there was no deep sea survey in 1996.

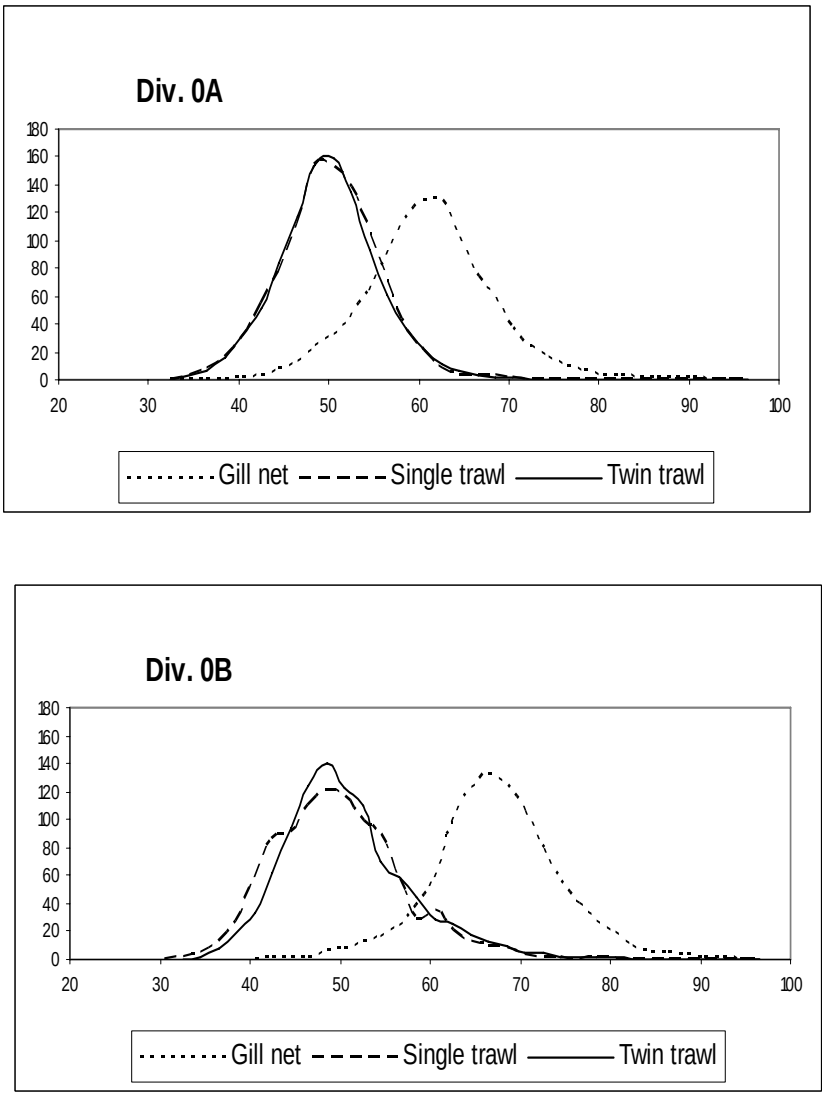

Fig.6. Length distribution from the fishery in Div 0AB in 2006 in per mill ., 2 cm groups

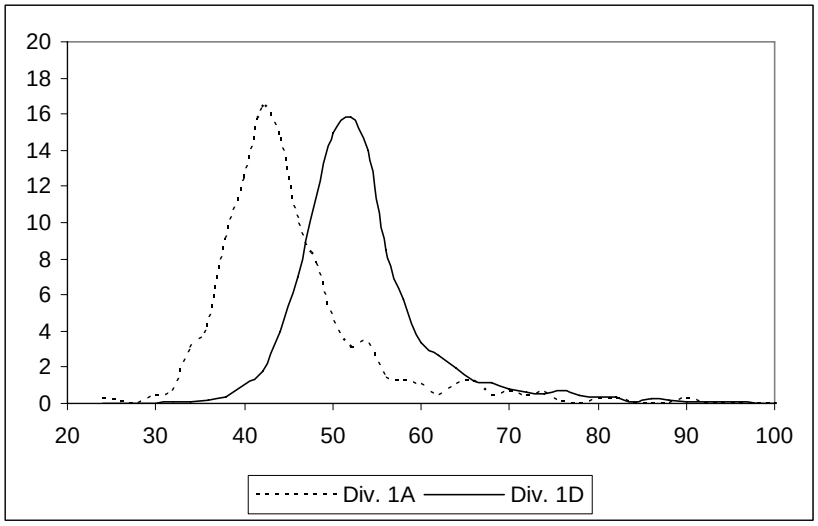

Fig. 7. Length distribution in the Russian trawl fishery in Div. 1A and 1D in 2006 in percent, 2 cm groups.

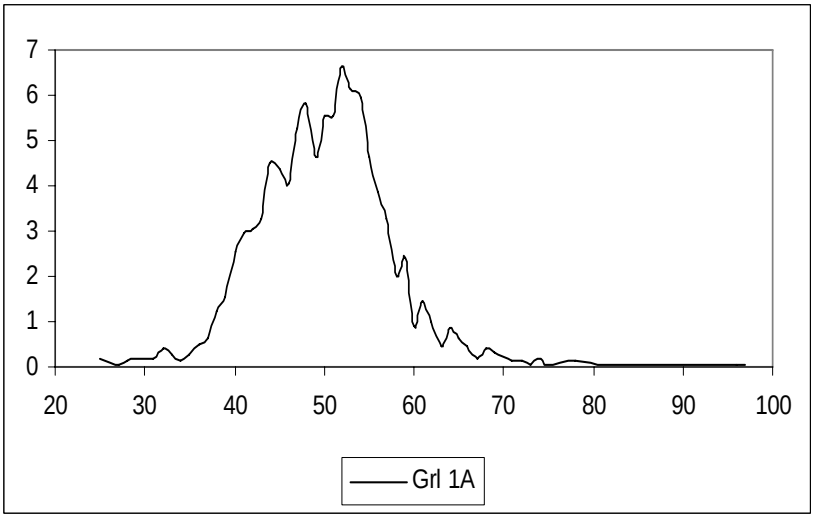

Fig. 8. Length distribution in the Greenland trawl fishery in Div. 1A in 2006 in percent, 1 cm groups.

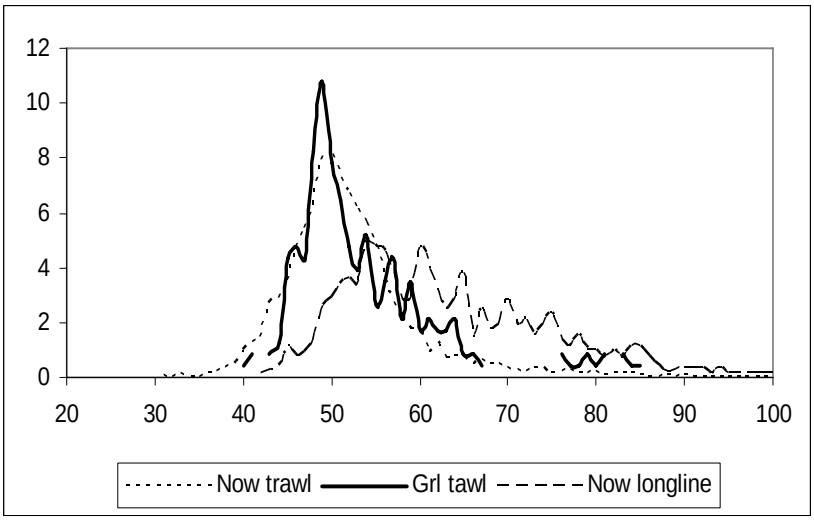

Fig. 9. Length distribution in the Greenland trawl - and Norwegian trawl - and long line fishery in Div. 1D in 2006 in percent, 1 cm groups.

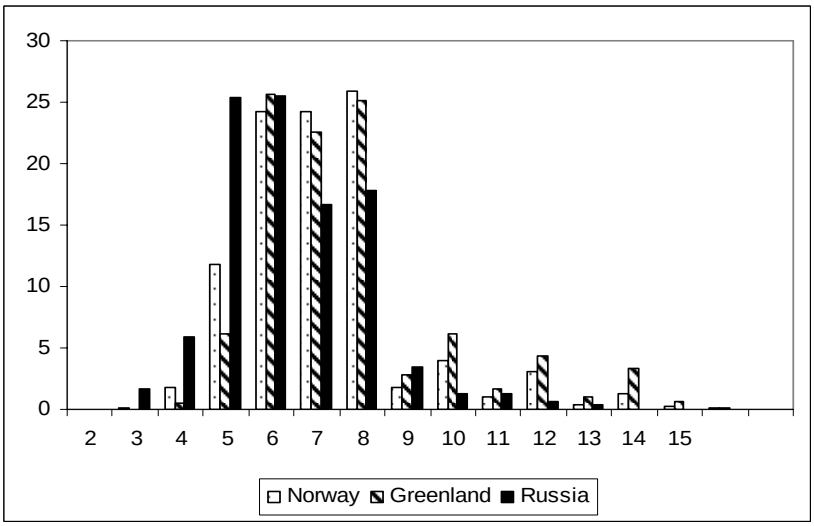

Fig. 10. Age distribution in the Greenland, Russian and Norwegian trawl fishery in Div. 1D in 2006 in percent.

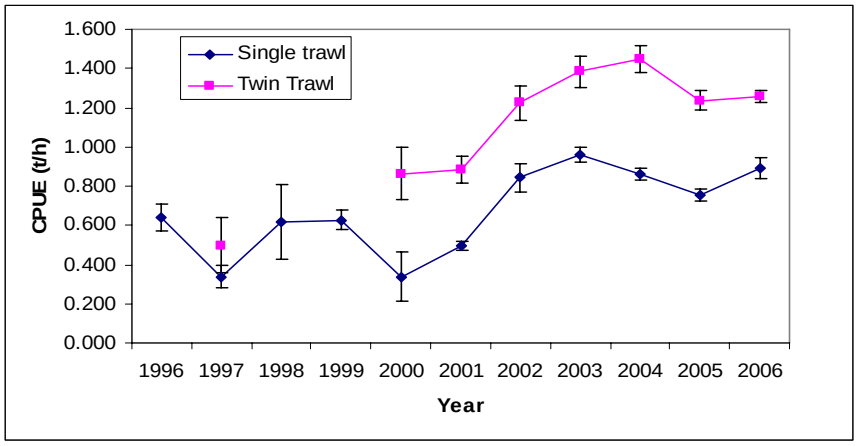

Fig. 11a. Unstandardized CPUE from the trawl fishery in Div. 0B

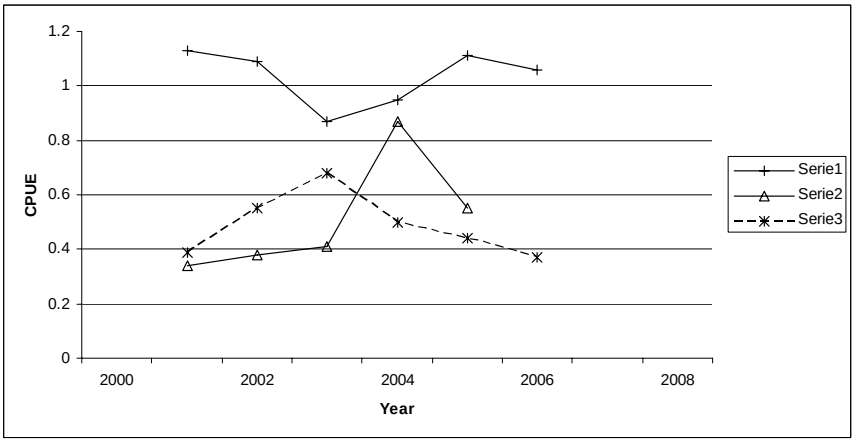

Fig. 11b. Unstandardized trawl CPUE series from Div. 1AB.

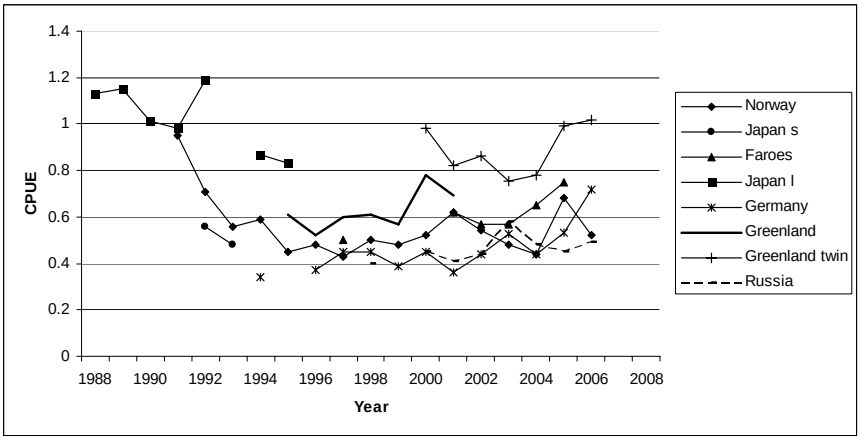

Fig. 12. Unstandardized catch rates from different fleets fishing in Div. 1CD.

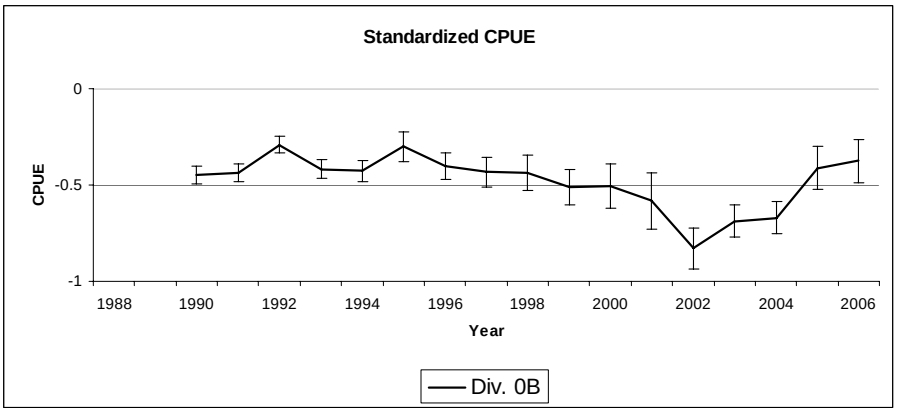

Fig 13a. Standardized CPUE series from trawlers in Div. 0B with +/- S.E.

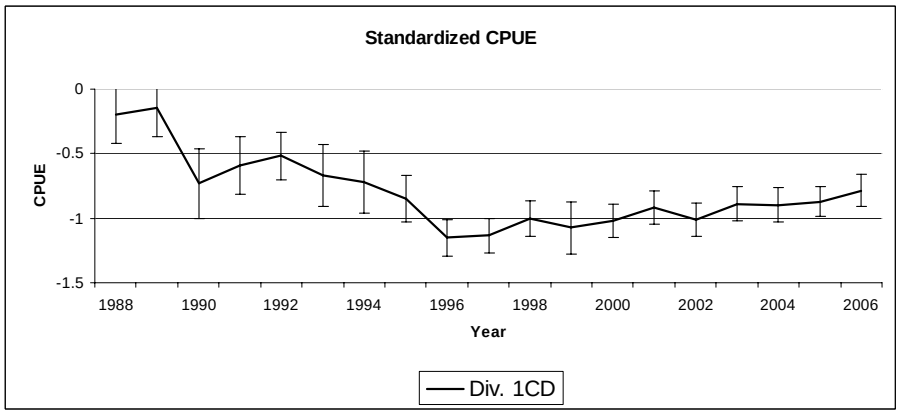

Fig. 13b. Standardized trawl CPUE index from trawlers in Div. 1CD with +/- S.E.

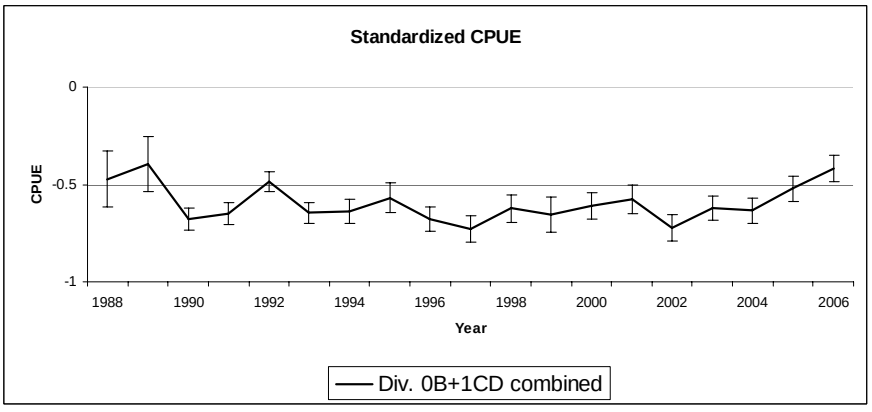

Fig. 13c. Combined standardized trawl CPUE index from trawlers in Div. 0B +1CD with +/- S.E.

Appendix 1. Standardized CPUE index from trawlers in Div. 0B

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The GLM Procedure

Class Level Information

Class	Levels	Values
YR	17	1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006
md	10	1 4 5 6 7 8 9 10 11 12
CGT	11	2126 2127 5126 5127 14124 14125 15126 15127 20126 20127 31927

Number of Observations Read 441
Number of Observations Used 441

Greenland halibut, 0B trawlers 23
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The GLM Procedure

Dependent Variable: lcph

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	35	96.4639852	2.7561139	50.80	<.0001
Error	405	21.9732987	0.0542551		
Corrected Total	440	118.4372839			

R-Square	Coeff Var	Root MSE	lcph Mean
0.814473	-32.01565	0.232927	-0.727542

Source	DF	Type I SS	Mean Square	F Value	Pr > F
YR	16	54.53136616	3.40821038	62.82	<.0001
md	9	4.73216251	0.52579583	9.69	<.0001
CGT	10	37.20045652	3.72004565	68.57	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
YR	16	2.73369101	0.17085569	3.15	<.0001
md	9	4.71977208	0.52441912	9.67	<.0001
CGT	10	37.20045652	3.72004565	68.57	<.0001

Parameter		Estimate	Standard Error	t Value	Pr > |t|
Intercept		0.329175369 B	0.14369049	2.29	0.0225
YR	1990	-0.072956652 B	0.12916254	-0.56	0.5725
YR	1991	-0.060690470 B	0.13010986	-0.47	0.6411
YR	1992	0.084201883 B	0.12853119	0.66	0.5128
YR	1993	-0.042770633 B	0.13048424	-0.33	0.7432
YR	1994	-0.052577858 B	0.13343856	-0.39	0.6938
YR	1995	0.074723050 B	0.14252080	0.52	0.6004
YR	1996	-0.027920409 B	0.13487516	-0.21	0.8361
YR	1997	-0.057748821 B	0.13492635	-0.43	0.6689
YR	1998	-0.059343710 B	0.13814668	-0.43	0.6677
YR	1999	-0.137309626 B	0.13310411	-1.03	0.3029
YR	2000	-0.131379643 B	0.14389159	-0.91	0.3618
YR	2001	-0.207577298 B	0.17367995	-1.20	0.2327
YR	2002	-0.454769499 B	0.13826656	-3.29	0.0011
YR	2003	-0.311483941 B	0.12052258	-2.58	0.0101
YR	2004	-0.294131839 B	0.12313325	-2.39	0.0174

Greenland halibut, 0B trawlers 24
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The GLM Procedure

Dependent Variable: lcph

Parameter		Estimate		Standard Error	t Value	Pr > |t|
YR	2005	-0.036757094	B	0.14407646	-0.26	0.7988
YR	2006	0.000000000	B	.	.	.
md	1	-0.159578812	B	0.13344170	-1.20	0.2324
md	4	0.047503278	B	0.10419959	0.46	0.6487
md	5	0.279083937	B	0.08315456	3.36	0.0009
md	6	0.017008474	B	0.08182463	0.21	0.8354
md	7	-0.290672152	B	0.06168013	-4.71	<.0001
md	8	-0.190013205	B	0.05574596	-3.41	0.0007
md	9	-0.280411847	B	0.05307071	-5.28	<.0001
md	10	-0.319264497	B	0.05017715	-6.36	<.0001
md	11	-0.175104186	B	0.05098394	-3.43	0.0007
md	12	0.000000000	B	.	.	.
CGT	2126	-0.812362747	B	0.12279554	-6.62	<.0001
CGT	2127	-0.372393405	B	0.08362676	-4.45	<.0001
CGT	5126	-0.532209185	B	0.13650720	-3.90	0.0001
CGT	5127	-0.339089702	B	0.10601930	-3.20	0.0015
CGT	14124	-0.906877469	B	0.11222116	-8.08	<.0001
CGT	14125	-0.841162376	B	0.16031203	-5.25	<.0001
CGT	15126	-0.140851901	B	0.11274333	-1.25	0.2123
CGT	15127	-0.168845892	B	0.12672842	-1.33	0.1835
CGT	20126	-1.220989652	B	0.10416496	-11.72	<.0001
CGT	20127	-1.237611530	B	0.10960722	-11.29	<.0001
CGT	31927	0.000000000	B	.	.	.

NOTE: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The GLM Procedure
Least Squares Means

YR	lcph LSMEAN	Standard Error	Pr > |t|
1990	-0.44841653	0.04785083	<.0001
1991	-0.43615035	0.04662463	<.0001
1992	-0.29125800	0.04441689	<.0001
1993	-0.41823052	0.04768924	<.0001
1994	-0.42803774	0.05463529	<.0001
1995	-0.30073683	0.07671848	0.0001
1996	-0.40338029	0.06762322	<.0001
1997	-0.43320870	0.07944148	<.0001
1998	-0.43480359	0.09253556	<.0001
1999	-0.51276951	0.09200898	<.0001
2000	-0.50683953	0.11665819	<.0001
2001	-0.58303718	0.14610501	<.0001
2002	-0.83022938	0.10641098	<.0001
2003	-0.68694382	0.08150791	<.0001
2004	-0.66959172	0.08380107	<.0001
2005	-0.41221698	0.11271220	0.0003
2006	-0.37545988	0.11142400	0.0008

Appendix 2. Standardized CPUE index for trawlers in Div.1CD.

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The GLM Procedure

Class Level Information

Class	Levels	Values
YR	19	1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006
MD	11	1 2 4 5 6 7 8 9 10 11 12
CGT	9	2 3 4 5 6 7 8 9 10

Number of Observations Read 204
Number of Observations Used 204

Greenland halibut, 1CD trawlers 15
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The GLM Procedure

Dependent Variable: lcph

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	36	26.73347320	0.74259648	9.64	<.0001
Error	167	12.86638470	0.07704422		
Corrected Total	203	39.59985789			

R-Square	Coeff Var	Root MSE	lcph Mean
0.675090	-47.83151	0.277568	-0.580305

Source	DF	Type I SS	Mean Square	F Value	Pr > F
YR	18	11.67564023	0.64864668	8.42	<.0001
MD	10	7.45818383	0.74581838	9.68	<.0001
CGT	8	7.59964913	0.94995614	12.33	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
YR	18	3.05284056	0.16960225	2.20	0.0049
MD	10	6.29671674	0.62967167	8.17	<.0001
CGT	8	7.59964913	0.94995614	12.33	<.0001

Parameter		Estimate		Standard Error	t Value	Pr > |t|
Intercept		0.109357578	B	0.09665489	1.13	0.2595
YR	1988	0.587666407	B	0.31029300	1.89	0.0600
YR	1989	0.640517436	B	0.30254917	2.12	0.0357
YR	1990	0.053819530	B	0.33376475	0.16	0.8721
YR	1991	0.195370229	B	0.30037349	0.65	0.5163
YR	1992	0.270060486	B	0.27148356	0.99	0.3213
YR	1993	0.118375031	B	0.32273682	0.37	0.7142
YR	1994	0.064365494	B	0.31060377	0.21	0.8361
YR	1995	-0.064215338	B	0.24814197	-0.26	0.7961
YR	1996	-0.367751316	B	0.10787466	-3.41	0.0008
YR	1997	-0.350849022	B	0.10292040	-3.41	0.0008
YR	1998	-0.217646900	B	0.10009798	-2.17	0.0311
YR	1999	-0.290442363	B	0.17931980	-1.62	0.1072
YR	2000	-0.234408580	B	0.09054359	-2.59	0.0105
YR	2001	-0.133712786	B	0.09286730	-1.44	0.1518
YR	2002	-0.224524382	B	0.09463094	-2.37	0.0188

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The GLM Procedure

Dependent Variable: lcph

Parameter		Estimate		Standard Error	t Value	Pr > |t|
YR	2003	-0.103268037	B	0.09497405	-1.09	0.2785
YR	2004	-0.112772810	B	0.09555038	-1.18	0.2396
YR	2005	-0.086143889	B	0.09144386	-0.94	0.3475
YR	2006	0.000000000	B	.	.	.
MD	1	-0.442514655	B	0.21560344	-2.05	0.0417
MD	2	-1.448680577	B	0.25049506	-5.78	<.0001
MD	4	-0.527412308	B	0.32268397	-1.63	0.1040
MD	5	-0.529698373	B	0.18985596	-2.79	0.0059
MD	6	-0.757154276	B	0.13832518	-5.47	<.0001
MD	7	-0.608622184	B	0.12081718	-5.04	<.0001
MD	8	-0.332918167	B	0.09545701	-3.49	0.0006
MD	9	-0.125258773	B	0.08080304	-1.55	0.1230
MD	10	-0.162519914	B	0.07659730	-2.12	0.0353
MD	11	-0.152636462	B	0.07716159	-1.98	0.0496
MD	12	0.000000000	B	.	.	.
CGT	2	-0.498998696	B	0.07306515	-6.83	<.0001
CGT	3	-0.524653618	B	0.28826719	-1.82	0.0705
CGT	4	-0.564385377	B	0.07951372	-7.10	<.0001
CGT	5	-0.793621363	B	0.31374619	-2.53	0.0123
CGT	6	-0.520192173	B	0.10346417	-5.03	<.0001
CGT	7	-0.125691104	B	0.27070659	-0.46	0.6430
CGT	8	-0.586812564	B	0.07493872	-7.83	<.0001
CGT	9	-0.271159477	B	0.08135975	-3.33	0.0011
CGT	10	0.000000000	B	.	.	.

NOTE: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The GLM Procedure
Least Squares Means

YR	lcph LSMEAN	Standard Error	Pr > |t|
1988	-0.19719217	0.22346616	0.3788
1989	-0.14434114	0.22146036	0.5154
1990	-0.73103905	0.26929584	0.0073
1991	-0.58948835	0.22366192	0.0092
1992	-0.51479809	0.18452492	0.0059
1993	-0.66648355	0.24109311	0.0063
1994	-0.72049308	0.23715908	0.0028
1995	-0.84907391	0.18306506	<.0001
1996	-1.15260989	0.14134923	<.0001
1997	-1.13570760	0.13493822	<.0001
1998	-1.00250548	0.13442155	<.0001
1999	-1.07530094	0.20052999	<.0001
2000	-1.01926716	0.12590627	<.0001
2001	-0.91857136	0.12823119	<.0001
2002	-1.00938296	0.12884902	<.0001
2003	-0.88812661	0.12957576	<.0001
2004	-0.89763139	0.13060394	<.0001
2005	-0.87100247	0.11737574	<.0001
2006	-0.78485858	0.12740852	<.0001

Appendix 3. Combined Standardized CPUE index for trawlers in Div. 1CD and Div. 0B.

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The GLM Procedure

Class Level Information

Class	Levels	Values
YR	19	1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006
MD	11	1 2 4 5 6 7 8 9 10 11 12
CGT	20	2 3 4 5 6 7 8 9 10 2126 2127 5126 5127 14124 14125 15126 15127 20126 20127 31927

Number of Observations Read 645
Number of Observations Used 645

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The GLM Procedure

Dependent Variable: lcph

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	47	120.1258384	2.5558689	37.28	<.0001
Error	597	40.9350347	0.0685679		
Corrected Total	644	161.0608731			

R-Square	Coeff Var	Root MSE	lcph Mean
0.745841	-38.45299	0.261855	-0.680974

Source	DF	Type I SS	Mean Square	F Value	Pr > F
YR	18	49.16526005	2.73140334	39.84	<.0001
MD	10	12.94642548	1.29464255	18.88	<.0001
CGT	19	58.01415286	3.05337647	44.53	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
YR	18	3.51840951	0.19546719	2.85	<.0001
MD	10	5.81123520	0.58112352	8.48	<.0001
CGT	19	58.01415286	3.05337647	44.53	<.0001

Parameter		Estimate		Standard Error	t Value	Pr > |t|
Intercept		0.402887015 B		0.10643803	3.79	0.0002
YR	1988	-0.053228237 B		0.16207826	-0.33	0.7427
YR	1989	0.025074551 B		0.16185256	0.15	0.8769
YR	1990	-0.257348679 B		0.08923198	-2.88	0.0041
YR	1991	-0.229961027 B		0.09024828	-2.55	0.0111
YR	1992	-0.068357515 B		0.08897830	-0.77	0.4426
YR	1993	-0.226579686 B		0.09137946	-2.48	0.0134
YR	1994	-0.217487116 B		0.09634773	-2.26	0.0243
YR	1995	-0.149845695 B		0.10162026	-1.47	0.1409
YR	1996	-0.255796868 B		0.08086401	-3.16	0.0016
YR	1997	-0.307894543 B		0.07871008	-3.91	0.0001
YR	1998	-0.203650595 B		0.07866848	-2.59	0.0099
YR	1999	-0.236056796 B		0.09674534	-2.44	0.0150
YR	2000	-0.192822301 B		0.07471391	-2.58	0.0101
YR	2001	-0.157375152 B		0.07901711	-1.99	0.0469
YR	2002	-0.301925612 B		0.07664039	-3.94	<.0001

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The GLM Procedure

Dependent Variable: lcph

Parameter		Estimate		Standard Error	t Value	Pr > |t|
YR	2003	-0.200290872	B	0.07255534	-2.76	0.0059
YR	2004	-0.214098986	B	0.07316938	-2.93	0.0036
YR	2005	-0.101039378	B	0.07438730	-1.36	0.1749
YR	2006	0.000000000	B	.	.	.
MD	1	-0.304724524	B	0.11455519	-2.66	0.0080
MD	2	-1.200214977	B	0.19875100	-6.04	<.0001
MD	4	-0.118363842	B	0.10215814	-1.16	0.2471
MD	5	0.052806844	B	0.07898124	0.67	0.5040
MD	6	-0.255795668	B	0.07363323	-3.47	0.0006
MD	7	-0.326832515	B	0.05677022	-5.76	<.0001
MD	8	-0.204238418	B	0.04987165	-4.10	<.0001
MD	9	-0.216060618	B	0.04596630	-4.70	<.0001
MD	10	-0.243298673	B	0.04364281	-5.57	<.0001
MD	11	-0.141084918	B	0.04444011	-3.17	0.0016
MD	12	0.000000000	B	.	.	.
CGT	2	-0.805304438	B	0.09621261	-8.37	<.0001
CGT	3	-0.442166908	B	0.15724581	-2.81	0.0051
CGT	4	-0.815893558	B	0.10293379	-7.93	<.0001
CGT	5	-0.710553337	B	0.15047909	-4.72	<.0001
CGT	6	-0.736662521	B	0.11886674	-6.20	<.0001
CGT	7	-0.063062913	B	0.12756195	-0.49	0.6212
CGT	8	-0.837791958	B	0.09766441	-8.58	<.0001
CGT	9	-0.636497769	B	0.09812330	-6.49	<.0001
CGT	10	-0.253699137	B	0.09950118	-2.55	0.0110
CGT	2126	-0.769599231	B	0.12868159	-5.98	<.0001
CGT	2127	-0.338026541	B	0.08622871	-3.92	<.0001
CGT	5126	-0.422298984	B	0.13786903	-3.06	0.0023
CGT	5127	-0.249397764	B	0.10485865	-2.38	0.0177
CGT	14124	-0.844851947	B	0.11551785	-7.31	<.0001
CGT	14125	-0.636939416	B	0.16546319	-3.85	0.0001
CGT	15126	-0.082792298	B	0.11629792	-0.71	0.4768
CGT	15127	-0.115200166	B	0.13318276	-0.86	0.3874
CGT	20126	-1.148991717	B	0.10588794	-10.85	<.0001
CGT	20127	-1.172095663	B	0.11247074	-10.42	<.0001
CGT	31927	0.000000000	B	.	.	.

NOTE: The X'X matrix has been found to be singular, and a generalized inverse was used to solve the normal equations. Terms whose estimates are followed by the letter 'B' are not uniquely estimable.

The GLM Procedure
Least Squares Means

YR	lcph LSMEAN	Standard Error	Pr > |t|
1988	-0.47332411	0.14297874	0.0010
1989	-0.39502132	0.14310313	0.0060
1990	-0.67744455	0.05522283	<.0001
1991	-0.65005690	0.05436957	<.0001
1992	-0.48845339	0.05063184	<.0001
1993	-0.64667556	0.05454224	<.0001
1994	-0.63758299	0.06142338	<.0001
1995	-0.56994157	0.07620160	<.0001
1996	-0.67589274	0.06200857	<.0001
1997	-0.72799041	0.06661803	<.0001
1998	-0.62374647	0.07054585	<.0001
1999	-0.65615267	0.08882488	<.0001
2000	-0.61291817	0.06778014	<.0001
2001	-0.57747102	0.07227189	<.0001
2002	-0.72202148	0.06891602	<.0001
2003	-0.62038674	0.06359358	<.0001
2004	-0.63419486	0.06431995	<.0001
2005	-0.52113525	0.06471415	<.0001
2006	-0.42009587	0.06750444	<.0001