2009/9820

# Report from the second meeting of the

# Working Group of the Joint Norwegian-Russian Fisheries Commission on allocation keys for the Northeast Arctic Greenland halibut stock

4-5 June 2009, Bergen

According to the Protocol of the 36th Session of the Joint Norwegian-Russian Fisheries Commission (JNRFC), item 8.1.3, the Parties agreed to establish a Working Group of JNRFC on allocation keys for the Northeast Arctic Greenland halibut stock.

The Working Group had its first meeting 25-28 August 2008 in Murmansk and the report from the meeting was presented to the 37th Session of JNRFC. Based on this reporting JNRFC clarified the mandate of the Working Group under item 8.1.3 of the Protocol from the 37th Session (Appendix 3).

The Working Group met again 4-5 June in Bergen co-chaired by Peter Gullestad from Norway and Evgeny Shamray from Russia. The members of the delegations are presented in Appendix 1.

The Parties agreed on the Agenda for the second Working Group meeting (Appendix 2).

## 1. Management Strategy and Harvest Control Rule for the stock

The Parties took note of the protocol from the joint Russian-Norwegian scientist meeting in Murmansk in March 2009.

The Working Group realizes that there is presently no international scientific agreement on the basic ageing, growth and mortality processes for Greenland halibut. The parties foresee that the current research activities may lead to an agreed ageing method in the coming years. After such an agreement is reached it will still take some time before analytical assessments based on an agreed method will be available. Until then it is not possible to use such biological target reference points as biomass or fishing mortality for stock management, since all relevant population models depend on growth information in some way or another. Pending the development of such reference points, the Parties agreed that at the initial stage a management strategy and a harvest control rule should be based on keeping the TAC within limits that have proved sustainable in the past.

In this intermediate period, TAC should be adjusted according to some rules relating to trends in abundance indices and size, sex and maturity compositions, as evaluated by ICES. A set of criteria should be developed with corresponding response levels. The Working Group requests the scientists to develop suggestions for such criteria before its next meeting.

In order to prepare the ground for future improved management of Greenland halibut after the intermediate period, the Working Group recognises the need for scientists to continue to analyse data and publish results from the research program to improve the understanding of the species biology and behaviour.

## 2. Distribution of the stock – zonal attachment

The Parties agreed to update Table 2 of the Kirkenes report. The update will be undertaken by email before the end of June 2009 and will be annexed to this report (Appendix 4).

The update of the zonal distribution of biomass and abundance per length group shall cover each year in the period 2004-2008. Both swept area estimates from survey data and estimates adjusted for areas not covered by the surveys shall be presented. Uncertainties and assumptions should be explained.

## 3. Quota allocation keys – discussion of relevant parameters

At the first meeting of the Working Group in Murmansk the Parties agreed on the relevant elements to be considered when establishing an allocation key for the Greenland halibut stock. The Parties did not however reach any conclusion with regard to how these criteria and principles should be applied. The Parties therefore put forward their respective proposals as reflected in the report from the first meeting of the Working Group of 28 August 2008.

At the present meeting of the Working Group, the Parties further explored and explained their respective proposals without reaching a common position at this stage.

## 4. Work plan until final reporting to JNRFC in autumn 2010

The Parties agreed to have another meeting in spring 2010. A detailed work plan will be decided after the 38th Session of JNRFC in October 2009.

## 5. Progress report to be presented to JNRFC in autumn 2009

The Parties agreed that the report of the second meeting of the Working Group will be presented for the 38th Session of JNRFC in English and that the report will be presented to the co-chairs of JNRFC as soon as Appendix 4 has been completed.

Signed by

Peter Gullestad

Evgeny Shamray

Bergen, 5 June 2009

**APPENDIX 1**

**Norwegian delegation:**

| | |
|---|---|
| GULLESTAD Peter | Specialist Director, Directorate of Fisheries. Head of Delegation |
| ALBERT Ole Thomas | Research Group Manager, IMR, Tromsø |
| HØINES Åge | Research Scientist, IMR, Bergen |

**Russian delegation:**

| | |
|---|---|
| SHAMRAY Evgeny | Head of Laboratory, PINRO, Murmansk |
| GORCHINSKY Konstantin | Leading expert, Barents and White Sea Territorial Department of the Russian Federal Agency for Fisheries, Murmansk |
| ONISKEVICH Oleg | Deputy Director, Department of Fishing Industry of the Murmansk Region, Murmansk |
| BORISOV Vladimir | Head of Laboratory, VNIRO, Moscow |
| SMIRNOV Oleg | Research Scientist, PINRO, Murmansk |

**APPENDIX 2**

**AGENDA for the second meeting of the Working Group of the Joint Norwegian-Russian Fisheries Commission on allocation keys for the Northeast Arctic Greenland halibut stock**

4-5 June 2009, Bergen

1. Opening of the meeting
2. Adoption of the agenda
3. Report from the March 2009 meeting of scientists in Murmansk
4. Management Strategy and Harvest Control Rule for the stock
5. Distribution of the stock – zonal attachment
6. Quota allocation key – discussion of relevant parameters
7. Working plan until final reporting to the Joint Norwegian-Russian Fisheries Commission in autumn 2010
8. Progress report to the Joint Norwegian-Russian Fisheries Commission in autumn 2009
9. Any other business
10. Closure of the meeting

**APPENDIX 3**

**8.1.3 Om felles tiltak for regulering av blåkveite som grenseoverskridende bestand**
Basert på data fra det treårige felles forskningsprogrammet for 2002–2004 erkjente Partene at blåkveitebestanden er utbredt i hele Barentshavet.

I samsvar med vedtak fra 36. sesjon i Den blandete norsk-russiske fiskerikommisjon ble det i 2008 avholdt et møte i arbeidsgruppen for etablering av fordelingsnøkkel for bestanden av nordøst-arktisk blåkveite.

Partene godkjente arbeidsgruppens foreløpige rapport, jf. Vedlegg 11.

Partene presiserte at gruppen skal:

- utrede metoder for beregning av omforente kriterier for fastsettelse av en fordelingsnøkkel for TAC av blåkveite;
- diskutere "Optimal langsiktig strategi for fisket etter blåkveite", som ble presentert i samsvar med "Program for felles norsk-russisk forskning på blåkveite".

Gruppen skal levere rapport til fiskerikommisjonen på dens 38. sesjon. Den endelige rapporten skal leveres i 2010.

Gruppen skal rapportere til formennene i fiskerikommisjonen. Formennene vil på grunnlag av den endelige rapporten fra arbeidsgruppen ta stilling til videre arbeid i denne gruppen.

**8.1.3 О совместных мерах регулирования запаса синекорого палтуса как трансграничного запаса**

На основании данных трехлетней совместной программы исследований (2002–2005 гг.) Стороны согласились с тем, что запас синекорого палтуса распространяется на всей акватории Баренцева моря.

В соответствии с решением 36-й сессии Смешанной Российско-Норвежской комиссии по рыболовству в 2008 году состоялось заседание Рабочей группы по определению ключей распределения для запаса синекорого палтуса.

Стороны одобрили предварительный отчет указанной Рабочей группы (Приложение 11). Стороны уточнили, что Рабочая группа должна:

- разработать методы расчета согласованных критериев для определения ключа распределения ОДУ запаса синекорого палтуса;
- рассмотреть представленную в соответствии с Программой совместных российско-норвежских исследований синекорого палтуса «Оптимальную долгосрочную стратегию вылова синекорого палтуса».

Рабочая группа должна представить отчет на 38-й сессии Смешанной Российско-Норвежской комиссии по рыболовству, а окончательный отчет - в 2010 году.

Рабочая группа должна отчитываться перед сопредседателями Смешанной Российско-Норвежской комиссии по рыболовству. На основании окончательного отчета Рабочей группы сопредседатели рассмотрят вопрос о ее дальнейшей деятельности.

# Update of the Kirkenes Report concerning the distribution of Greenland halibut in the Barents Sea and adjacent areas.

*Distribution*

The main new inclusion to the perspective of the distribution of Northeast Arctic Greenland halibut is the research cruises conducted by Russia in 2007 and 2008 in the Kara Sea. In 2007 only 19 valid hauls were taken, but in 2008 the area to the far north and east were covered quite well with 50 stations. The catches of the cruise in 2008 were merged with the other surveys covering the stock in the same period and the distribution map were redrawn (Fig. 1). This far northeastern part shows up as an equally important juvenile area, as the area between Spitsbergen and Franz Josef Land. Unfortunately the ice coverage in 2008 was quite extensive east of Svalbard and this area was not covered in 2008. This area is shown to be an important juvenile area by surveys in earlier years (Fig. 2).

*Swept area estimates*

A revision of the swept area analysis was done for the years 2004 and 2005, and extended with the years 2006-2008.

The biomass results for each subarea run in the analyses are given for the year 2008 (Table 1). The subareas used are also shown in Figure 3. These subareas are combined into the different main zones and the results for each year in the period 2004 – 2008 are given in Table 2.

This period is the same as the joint eco-system survey has been run, and this together with the Norwegian slope survey is regarded as the best coverage of the stock (with inclusion of the information from the Kara Sea). The southern part of the Norwegian slope was only covered in 2004 and the estimate for this part of the slope was calculated the other years by using the abundance and biomass distribution between the southern slope and the northern slope in 2004. The same ratios were used to recalculate the part of the stock abundance and biomass between 62N and 68N. The northern part (i.e. from 68 N) is covered every year. The same procedure was used to include the Kara Sea in the years before 2008. The new area was compared with an area in the northern part of the Russian EEZ and Svalbard area covered every year and this proportion was added to the earlier years estimates. The recalculated distribution of abundance and biomass in different zones in the time period is given in Table 3.

The Russian EEZ is most important for the smallest fish (up to 35 cm). The Norwegian EEZ is most important for the mature larger fish (larger than 45 cm). The International area (Loop hole) and the disputed area (Grey Zone) are of minor importance. The swept area estimates in NEZ varies between 73 000 - 108 000 t (biomass) and 56 – 109 mill. spec. (abundance) with no trend, and the Svalbard area are more or less constant during the period within limits of 47 000 – 87 000 t or 101 – 261 mill. spec. The biomass estimates from REZ steadily increases from 16 000 tons in 2004 to 77 000 tons in 2008 and the same trend is seen in the Grey zone and the Loop hole. Larger fish are also present and more common in REZ in the last years. The highest abundance in REZ (440 mill. spec.) occurred in 2006.

The main result seen from this update seems to be a gradual increasing in Greenland halibut biomass distributed in the eastern areas during the period. The reasons of this increasing are not quite clear due to absence of observations back in time, and it probably may be explained not only by warming of the Barents Sea waters.

The results from the whole period 2004 – 2008 were summarized and a mean value table was constructed (Table 4).

Compared with the preliminary report from Kirkenes the 2004 and 2005 results show some differences in the proportions in each zone. The data files from the ecosystem survey have been updated and evaluated since that report was produced and changes in valid hauls have changed the swept area estimates. In the original report all hauls were incorporated in the analyses, but later evaluation of the stations show that some of them should be excluded because they were part of small experiments done during the survey. Also overlaps between vessels have now been taken into consideration and stations have been removed from the analysis. In addition an error discovered in the algorithm used in the preliminary analysis presented in the Kirkenes report has now been corrected. The result for 2005 from the Norwegian EEZ was in the preliminary report recalculated for no coverage in the southern slope area and is thus not comparable with table 2 in this update.

Another problem with the data files is that they are constructed using data both from Norwegian and Russian sources and there have been some difficulties with conversion of data between the various databases. These problems have been addressed in the group working with the joint ecosystem survey and the conversion program has been improved. The work is continuing and there might still be slight changes to the data files. These problems are not assumed to have major impact to the main result here, but there can still be slight changes in the actual numbers when this work is proceeding forward. This update is assumed to be the best possible at the time being.

It should be emphasized that estimated proportions are imprecise because they are based on the survey data, which always have some uncertainty, and that they will also vary in dependence on environmental conditions and stock dynamics, i.e. the estimates are influenced by several factors such as performance of trawl, catchability of Greenland halibut, area coverage, distribution of fish, ice conditions, weather conditions etc. In some years and areas the estimates may be driven by one or a few large hauls and this is most pronounced in the juvenile areas. The variability in catch sizes is given by Coefficient of Variation (CV) to the abundance estimates done directly from the surveys (Table 2). These were mostly well below 0.1 (meaning that Standard deviation was less than 10% of the estimated value). In the juvenile areas CV was occasionally larger, with the largest value at 0.33 (33%). The problem of large hauls is not easily addressed, but there are some arguments for excluding extremely rich catches from the analyses (Pennington, 1983, 1996). The Greenland halibut distribution is patchy, implying that some areas have large concentrations of fish. It is neither right nor wrong to include or exclude such hauls from the analyses and it was therefore decided that these hauls should be included.

There is inconclusive information on seasonal variations in distribution and the variation observed seems to be of minor importance even if there are observed some tendency for mature fish to concentrate in the slope area in the spawning time, i.e. Nov-Dec. Due to ice conditions, the young fish areas may only be surveyed during late summer. The snapshot done every year in August – September each year is therefore assumed to give a relatively good picture of the distribution of the stock.

*References*

PENNINGTON, M. 1983. Efficient estimators of abundance, for fish and plankton surveys. Biometrics, 39: 281–286. doi:10.2307/2530830

PENNINGTON, M. 1996. Estimating the mean and variance from highly skewed marine survey data. Fishery Bulletin, 94: 48–505.

**Table 1.** Swept area estimate of Greenland halibut biomass in different areas in August 2008 based on the ecosystem survey and the Norwegian Greenland halibut survey along the slope. The shaded areas are recalculated given that these areas were not covered in 2008. L.gr is midpoint in 5 cm length groups.

| Period | L.gr | DISPUT | INTERN | NORW | RUS-N | RUS-S | SVA-NE | SVA-SW | N | NM | SM | SN | SorA | SorB | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aug 2008 | 12.5 | | | | 183 | | 2 | 6 | | | | | | | 191 |
| | 17.5 | | | | 347 | | 12 | 4 | | | | | | | 363 |
| | 22.5 | | | | 2 005 | 15 | 98 | 27 | | | | | | | 2 145 |
| | 27.5 | | | | 7 227 | 173 | 298 | 26 | 170 | 38 | 9 | | | | 7 940 |
| | 32.5 | 136 | 160 | 178 | 21 843 | 615 | 2 705 | 99 | 3 656 | 1 163 | 695 | 323 | 305 | 697 | 32 576 |
| | 37.5 | 509 | 1 093 | 646 | 17 087 | 899 | 5 294 | 1 643 | 8 703 | 3 659 | 3 124 | 1 773 | 639 | 1 639 | 46 708 |
| | 42.5 | 616 | 1 746 | 803 | 7 477 | 2 695 | 2 594 | 1 784 | 8 453 | 4 672 | 5 170 | 3 420 | 1 387 | 2 933 | 43 750 |
| | 47.5 | 1 478 | 1 253 | 410 | 2 190 | 2 544 | 870 | 6 588 | 4 715 | 3 104 | 5 678 | 4 394 | 1 060 | 2 073 | 36 358 |
| | 52.5 | 1 774 | 1 552 | 4 599 | 901 | 2 755 | 42 | 4 588 | 2 528 | 2 626 | 6 224 | 4 799 | 1 039 | 2 762 | 36 190 |
| | 57.5 | 2 855 | 352 | 1 959 | 642 | 2 614 | | 1 718 | 1 363 | 1 526 | 4 548 | 3 572 | 1 382 | 1 693 | 24 224 |
| | 62.5 | 1 330 | 974 | 151 | 191 | 1 920 | | 514 | 1 012 | 1 036 | 2 948 | 1 134 | 1 265 | 747 | 13 222 |
| | 67.5 | 1 643 | 608 | | 164 | 1 190 | 115 | 1 461 | 887 | 790 | 2 688 | 821 | 752 | 428 | 11 547 |
| | 72.5 | | | | | 750 | | 300 | 476 | 441 | 1 388 | 272 | 197 | 120 | 3 945 |
| | 77.5 | | | | | 417 | | | 420 | 135 | 474 | 110 | 53 | | 1 610 |
| | 82.5 | | | | | | | | 223 | 106 | 239 | | 46 | 21 | 635 |
| | 87.5 | | | | | | | | 975 | 67 | 172 | | | | 1 213 |
| | 92.5 | | | | | | | | | | 77 | | | | 77 |
| | 97.5 | | | | | | | | | | | | | | |
| | 102.5 | | | | | | | | | | | | | | |
| | 107.5 | | | | | | | | | | | | | | |
| | **Total** | **10 340** | **7 738** | **8 746** | **60 257** | **16 588** | **12 029** | **18 759** | **33 582** | **19 363** | **33 437** | **20 617** | **8 125** | **13 113** | **262 694** |

**Table 2.** Biomass (t) and abundance ('000) distribution of Greenland halibut in different zones in August – September in the years 2004 – 2008 based on swept area estimates. Direct estimates from the surveys, no recalculating of areas not covered were conducted. Relative values in right columns. L.gr is midpoint in 5 cm length groups.

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2004 | 12.5 | | 121 | 189 | | | 39 | 61 | |
| | 17.5 | | 455 | 1 113 | | | 29 | 71 | |
| | 22.5 | | 1 922 | 3 245 | | | 37 | 63 | |
| | 27.5 | 17 | 2 773 | 3 155 | | 0 | 47 | 53 | |
| | 32.5 | 299 | 2 804 | 1 922 | | 6 | 56 | 38 | |
| | 37.5 | 1 779 | 6 059 | 61 | 684 | 21 | 71 | 1 | 8 |
| | 42.5 | 4 069 | 7 005 | 124 | 633 | 34 | 59 | 1 | 5 |
| | 47.5 | 13 306 | 8 817 | 718 | 721 | 56 | 37 | 3 | 3 |
| | 52.5 | 29 446 | 6 566 | | 1 145 | 79 | 18 | | 3 |
| | 57.5 | 25 968 | 3 901 | | 195 | 86 | 13 | | 1 |
| | 62.5 | 14 938 | 3 077 | | | 83 | 17 | | |
| | 67.5 | 8 922 | 2 094 | | 380 | 78 | 18 | | 3 |
| | 72.5 | 5 572 | 828 | | | 87 | 13 | | |
| | 77.5 | 1 841 | 303 | | | 86 | 14 | | |
| | 82.5 | 1 270 | 195 | | | 87 | 13 | | |
| | 87.5 | 271 | 40 | | | 87 | 13 | | |
| | 92.5 | | | | | | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **107 697** | **46 960** | **10 527** | **3 757** | **64** | **28** | **6** | **2** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2004 | 12.5 | | 6 389 | 10 494 | | | 38 | 62 | |
| | 17.5 | | 11 611 | 18 250 | | | 39 | 61 | |
| | 22.5 | | 21 543 | 34 892 | | | 38 | 62 | |
| | 27.5 | 117 | 17 167 | 21 872 | | 0 | 44 | 56 | |
| | 32.5 | 967 | 10 006 | 5 650 | | 6 | 60 | 34 | |
| | 37.5 | 4 072 | 13 532 | 132 | 1 448 | 21 | 71 | 1 | 8 |
| | 42.5 | 6 247 | 10 695 | 169 | 1 029 | 34 | 59 | 1 | 6 |
| | 47.5 | 14 282 | 9 400 | 871 | 792 | 56 | 37 | 3 | 3 |
| | 52.5 | 23 504 | 5 062 | | 859 | 80 | 17 | | 3 |
| | 57.5 | 14 941 | 2 200 | | 98 | 87 | 13 | | 1 |
| | 62.5 | 6 860 | 1 388 | | | 83 | 17 | | |
| | 67.5 | 3 125 | 795 | | 124 | 77 | 20 | | 3 |
| | 72.5 | 1 406 | 229 | | | 86 | 14 | | |
| | 77.5 | 396 | 65 | | | 86 | 14 | | |
| | 82.5 | 201 | 31 | | | 86 | 14 | | |
| | 87.5 | 38 | 5 | | | 88 | 12 | | |
| | 92.5 | | | | | | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **76 154** | **110 120** | **92 329** | **4 349** | **27** | **39** | **33** | **2** |
| | **CV** | **0.099** | **0.077** | **0.067** | **0.153** | | | | |

**Table 2 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2005 | 12.5 | | 1 476 | 1 694 | | | | 47 | 53 |
| | 17.5 | 1 | 1 142 | 769 | | | 0 | 60 | 40 |
| | 22.5 | | 694 | 672 | | | | 51 | 49 |
| | 27.5 | 12 | 1 864 | 3 046 | | | 0 | 38 | 62 |
| | 32.5 | 234 | 6 854 | 4 859 | | | 2 | 57 | 41 |
| | 37.5 | 897 | 13 030 | 2 314 | 136 | | 5 | 80 | 14 | 1 |
| | 42.5 | 2 065 | 18 840 | 1 548 | 1 782 | | 9 | 78 | 6 | 7 |
| | 47.5 | 3 967 | 16 363 | 1 277 | 2 379 | | 17 | 68 | 5 | 10 |
| | 52.5 | 7 581 | 12 458 | | 2 344 | | 34 | 56 | | 10 |
| | 57.5 | 7 404 | 4 938 | | 2 144 | | 51 | 34 | | 15 |
| | 62.5 | 5 709 | 3 805 | | 1 593 | | 51 | 34 | | 14 |
| | 67.5 | 4 575 | 3 031 | | 874 | | 54 | 36 | | 10 |
| | 72.5 | 2 517 | 1 268 | | | | 67 | 33 | | |
| | 77.5 | 1 297 | 509 | | | | 72 | 28 | | |
| | 82.5 | 641 | 268 | | | | 71 | 29 | | |
| | 87.5 | 158 | 118 | | | | 57 | 43 | | |
| | 92.5 | 187 | 109 | | | | 63 | 37 | | |
| | 97.5 | 62 | | | | | 100 | | | |
| | 102.5 | | | | | | | | | |
| | 107.5 | | | | | | | | | |
| | **Total** | **37 306** | **86 767** | **16 180** | **11 251** | | **25** | **57** | **11** | **7** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2005 | 12.5 | | 91 006 | 118 925 | | | | 43 | 57 | |
| | 17.5 | 31 | 35 362 | 25 961 | | | 0 | 58 | 42 | |
| | 22.5 | | 7 039 | 7 361 | | | | 49 | 51 | |
| | 27.5 | 79 | 10 864 | 17 884 | | | 0 | 38 | 62 | |
| | 32.5 | 785 | 24 347 | 17 399 | | | 2 | 57 | 41 | |
| | 37.5 | 1 955 | 28 880 | 5 207 | 282 | | 5 | 80 | 14 | 1 |
| | 42.5 | 3 211 | 29 244 | 2 330 | 2 674 | | 9 | 78 | 6 | 7 |
| | 47.5 | 4 109 | 18 234 | 1 410 | 2 585 | | 16 | 69 | 5 | 10 |
| | 52.5 | 6 065 | 9 665 | | 1 917 | | 34 | 55 | | 11 |
| | 57.5 | 4 379 | 2 934 | | 1 261 | | 51 | 34 | | 15 |
| | 62.5 | 2 637 | 1 778 | | 762 | | 51 | 34 | | 15 |
| | 67.5 | 1 669 | 1 018 | | 315 | | 56 | 34 | | 10 |
| | 72.5 | 665 | 342 | | | | 66 | 34 | | |
| | 77.5 | 259 | 97 | | | | 73 | 27 | | |
| | 82.5 | 108 | 44 | | | | 71 | 29 | | |
| | 87.5 | 21 | 14 | | | | 59 | 41 | | |
| | 92.5 | 18 | 10 | | | | 64 | 36 | | |
| | 97.5 | 4 | | | | | 100 | | | |
| | 102.5 | | | | | | | | | |
| | 107.5 | | | | | | | | | |
| | **Total** | **25 996** | **260 878** | **196 478** | **9 796** | | **5** | **53** | **40** | **2** |
| | **CV** | **0.087** | **0.075** | **0.172** | **0.196** | | | | | |

**Table 2 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2006 | 12.5 | 18 | 274 | 1 040 | | 1 | 21 | 78 | |
| | 17.5 | 4 | 411 | 5 125 | 4 | 0 | 7 | 92 | 0 |
| | 22.5 | | 3 807 | 17 632 | 12 | | 18 | 82 | 0 |
| | 27.5 | | 3 666 | 4 559 | | | 45 | 55 | |
| | 32.5 | 219 | 2 766 | 1 114 | | 5 | 67 | 27 | |
| | 37.5 | 1 785 | 10 620 | 2 792 | 487 | 11 | 68 | 18 | 3 |
| | 42.5 | 3 351 | 14 929 | 1 077 | 1 617 | 16 | 71 | 5 | 8 |
| | 47.5 | 6 746 | 14 621 | 1 420 | 2 368 | 27 | 58 | 6 | 9 |
| | 52.5 | 11 225 | 9 841 | 1 882 | 1 821 | 45 | 40 | 8 | 7 |
| | 57.5 | 14 476 | 4 942 | 1 820 | 2 110 | 62 | 21 | 8 | 9 |
| | 62.5 | 9 597 | 3 408 | 1 816 | 358 | 63 | 22 | 12 | 2 |
| | 67.5 | 6 289 | 2 705 | 306 | 614 | 63 | 27 | 3 | 6 |
| | 72.5 | 3 108 | 1 218 | | | 72 | 28 | | |
| | 77.5 | 2 069 | 631 | | 570 | 63 | 19 | | 17 |
| | 82.5 | 1 328 | 437 | | | 75 | 25 | | |
| | 87.5 | 221 | 263 | | | 46 | 54 | | |
| | 92.5 | 86 | 29 | | | 75 | 25 | | |
| | 97.5 | | 16 | | | | 100 | | |
| | 102.5 | 72 | | | | 100 | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **60 593** | **74 585** | **40 582** | **9 960** | **33** | **40** | **22** | **5** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2006 | 12.5 | 1 558 | 16 175 | 55 451 | | 2 | 22 | 76 | |
| | 17.5 | 223 | 10 415 | 121 719 | 80 | 0 | 8 | 92 | 0 |
| | 22.5 | | 41 547 | 204 200 | 160 | | 17 | 83 | 0 |
| | 27.5 | | 23 728 | 33 604 | | | 41 | 59 | |
| | 32.5 | 31 | 6 770 | 3 718 | | 0 | 64 | 35 | |
| | 37.5 | 1 627 | 14 178 | 5 561 | 1 097 | 7 | 63 | 25 | 5 |
| | 42.5 | 4 380 | 21 901 | 1 534 | 2 539 | 14 | 72 | 5 | 8 |
| | 47.5 | 5 215 | 18 097 | 1 469 | 2 528 | 19 | 66 | 5 | 9 |
| | 52.5 | 7 389 | 13 126 | 1 354 | 1 476 | 32 | 56 | 6 | 6 |
| | 57.5 | 10 195 | 5 845 | 1 048 | 1 226 | 56 | 32 | 6 | 7 |
| | 62.5 | 7 284 | 2 578 | 866 | 176 | 67 | 24 | 8 | 2 |
| | 67.5 | 3 628 | 1 477 | 105 | 201 | 67 | 27 | 2 | 4 |
| | 72.5 | 1 864 | 790 | | | 70 | 30 | | |
| | 77.5 | 1 011 | 322 | | 124 | 69 | 22 | | 8 |
| | 82.5 | 365 | 136 | | | 73 | 27 | | |
| | 87.5 | 144 | 74 | | | 66 | 34 | | |
| | 92.5 | 32 | 34 | | | 49 | 51 | | |
| | 97.5 | 10 | 3 | | | 75 | 25 | | |
| | 102.5 | | 2 | | | | 100 | | |
| | 107.5 | 5 | | | | | | | |
| | **Total** | **44 961** | **177 198** | **430 629** | **9 606** | **7** | **27** | **65** | **1** |
| | **CV** | **0.076** | **0.052** | **0.330** | **0.086** | | | | |

**Table 2 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2007 | 12.5 | | 268 | 207 | | | | 56 | 44 |
| | 17.5 | | 529 | 350 | | | | 60 | 40 |
| | 22.5 | | 1 191 | 1 666 | 15 | | | 41 | 58 1 |
| | 27.5 | 20 | 2 779 | 7 469 | 74 | 0 | 27 | 72 | 1 |
| | 32.5 | 726 | 8 602 | 4 446 | | 5 | 62 | 32 | |
| | 37.5 | 7 920 | 17 941 | 3 440 | 459 | 27 | 60 | 12 | 2 |
| | 42.5 | 13 142 | 21 909 | 2 219 | 1 315 | 34 | 57 | 6 | 3 |
| | 47.5 | 14 117 | 16 128 | 988 | 1 484 | 43 | 49 | 3 | 5 |
| | 52.5 | 17 334 | 6 858 | 2 121 | 1 593 | 62 | 25 | 8 | 6 |
| | 57.5 | 11 918 | 4 299 | 1 889 | 2 460 | 58 | 21 | 9 | 12 |
| | 62.5 | 6 442 | 2 228 | 795 | 2 071 | 56 | 19 | 7 | 18 |
| | 67.5 | 4 510 | 1 810 | 715 | 414 | 61 | 24 | 10 | 6 |
| | 72.5 | 2 285 | 738 | | 866 | 59 | 19 | | 22 |
| | 77.5 | 618 | 408 | | | 60 | 40 | | |
| | 82.5 | 334 | 317 | | | 51 | 49 | | |
| | 87.5 | 127 | 269 | | | 32 | 68 | | |
| | 92.5 | | 35 | | | | 100 | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **79 494** | **86 308** | **26 306** | **10 750** | **39** | **43** | **13** | **5** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2007 | 12.5 | | 18 731 | 14 115 | | | | 57 | 43 |
| | 17.5 | | 14 425 | 9 698 | | | | 60 | 40 |
| | 22.5 | | 13 498 | 16 650 | 120 | | | 45 | 55 0 |
| | 27.5 | 121 | 16 136 | 42 312 | 371 | 0 | 27 | 72 | 1 |
| | 32.5 | 2 668 | 29 953 | 15 908 | | 5 | 62 | 33 | |
| | 37.5 | 18 000 | 39 593 | 6 864 | 1 058 | 27 | 60 | 10 | 2 |
| | 42.5 | 20 414 | 34 843 | 3 167 | 1 883 | 34 | 58 | 5 | 3 |
| | 47.5 | 15 675 | 17 310 | 1 032 | 1 550 | 44 | 49 | 3 | 4 |
| | 52.5 | 13 371 | 5 508 | 1 613 | 1 392 | 61 | 25 | 7 | 6 |
| | 57.5 | 7 033 | 2 638 | 1 071 | 1 268 | 59 | 22 | 9 | 11 |
| | 62.5 | 2 916 | 1 011 | 339 | 918 | 56 | 20 | 7 | 18 |
| | 67.5 | 1 658 | 655 | 259 | 216 | 59 | 23 | 9 | 8 |
| | 72.5 | 622 | 197 | | 231 | 59 | 19 | | 22 |
| | 77.5 | 141 | 81 | | | 64 | 36 | | |
| | 82.5 | 55 | 49 | | | 53 | 47 | | |
| | 87.5 | 17 | 33 | | | 34 | 66 | | |
| | 92.5 | | 4 | | | | 100 | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **82 691** | **194 665** | **113 028** | **9 008** | **21** | **49** | **28** | **2** |
| | **CV** | **0.066** | **0.041** | **0.071** | **0.126** | | | | |

**Table 2 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2008 | 12.5 | | 8 | 183 | | | 4 | 96 | |
| | 17.5 | | 16 | 347 | | | 4 | 96 | |
| | 22.5 | | 124 | 2 021 | | | 6 | 94 | |
| | 27.5 | 9 | 532 | 7 400 | | 0 | 7 | 93 | |
| | 32.5 | 1 197 | 7 623 | 22 459 | 296 | 4 | 24 | 71 | 1 |
| | 37.5 | 5 543 | 19 299 | 17 986 | 1 602 | 12 | 43 | 40 | 4 |
| | 42.5 | 9 392 | 17 504 | 10 172 | 2 361 | 24 | 44 | 26 | 6 |
| | 47.5 | 10 482 | 15 278 | 4 733 | 2 732 | 32 | 46 | 14 | 8 |
| | 52.5 | 15 623 | 9 784 | 3 655 | 3 326 | 48 | 30 | 11 | 10 |
| | 57.5 | 10 079 | 4 607 | 3 256 | 3 207 | 48 | 22 | 15 | 15 |
| | 62.5 | 4 233 | 2 562 | 2 111 | 2 304 | 38 | 23 | 19 | 21 |
| | 67.5 | 3 509 | 3 254 | 1 354 | 2 251 | 34 | 31 | 13 | 22 |
| | 72.5 | 1 661 | 1 217 | 750 | | 46 | 34 | 21 | |
| | 77.5 | 584 | 555 | 417 | | 38 | 36 | 27 | |
| | 82.5 | 239 | 329 | | | 42 | 58 | | |
| | 87.5 | 172 | 1 041 | | | 14 | 86 | | |
| | 92.5 | 77 | | | | 100 | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **62 800** | **83 733** | **76 844** | **18 078** | **26** | **35** | **32** | **7** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2008 | 12.5 | | 675 | 12 824 | | | 5 | 95 | |
| | 17.5 | | 352 | 10 310 | | | 3 | 97 | |
| | 22.5 | | 1 566 | 23 842 | | | 6 | 94 | |
| | 27.5 | 48 | 2 929 | 44 647 | | 0 | 6 | 94 | |
| | 32.5 | 3 927 | 25 035 | 77 747 | 962 | 4 | 23 | 72 | 1 |
| | 37.5 | 11 844 | 41 066 | 40 788 | 3 245 | 12 | 42 | 42 | 3 |
| | 42.5 | 14 577 | 26 972 | 15 315 | 3 471 | 24 | 45 | 25 | 6 |
| | 47.5 | 11 393 | 16 261 | 5 099 | 2 885 | 32 | 46 | 14 | 8 |
| | 52.5 | 12 112 | 7 507 | 2 743 | 2 454 | 49 | 30 | 11 | 10 |
| | 57.5 | 5 871 | 2 614 | 1 893 | 1 748 | 48 | 22 | 16 | 14 |
| | 62.5 | 1 852 | 1 159 | 887 | 1 015 | 38 | 24 | 18 | 21 |
| | 67.5 | 1 250 | 1 100 | 435 | 756 | 35 | 31 | 12 | 21 |
| | 72.5 | 428 | 326 | 213 | | 44 | 34 | 22 | |
| | 77.5 | 121 | 114 | 101 | | 36 | 34 | 30 | |
| | 82.5 | 40 | 51 | | | 44 | 56 | | |
| | 87.5 | 23 | 157 | | | 13 | 87 | | |
| | 92.5 | 9 | | | | 100 | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **63 494** | **127 883** | **236 845** | **16 538** | **14** | **29** | **53** | **4** |
| | **CV** | **0.084** | **0.039** | **0.046** | **0.130** | | | | |

**Table 3.** Biomass (t) and abundance ('000) distribution of Greenland halibut in different zones in August – September in the years 2004 – 2008 based on swept area estimates. Recalculated estimates incorporating areas not covered in the surveys (i.e. including the proportion increase due to coverage in the Kara Sea and the area south of 68 N at the Norwegian slope). Relative values in right columns. L.gr is midpoint in 5 cm length groups.

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2004 | 12.5 | | 121 | 189 | | | 39 | 61 | |
| | 17.5 | | 455 | 1 120 | | | 29 | 71 | |
| | 22.5 | | 1 922 | 3 352 | | | 36 | 64 | |
| | 27.5 | 17 | 2 773 | 7 557 | | 0 | 27 | 73 | |
| | 32.5 | 299 | 2 804 | 2 227 | | 6 | 53 | 42 | |
| | 37.5 | 1 779 | 6 059 | 244 | 684 | 20 | 69 | 3 | 8 |
| | 42.5 | 4 069 | 7 005 | 200 | 633 | 34 | 59 | 2 | 5 |
| | 47.5 | 13 306 | 8 817 | 718 | 721 | 56 | 37 | 3 | 3 |
| | 52.5 | 29 446 | 6 566 | | 1 145 | 79 | 18 | | 3 |
| | 57.5 | 25 968 | 3 901 | | 195 | 86 | 13 | | 1 |
| | 62.5 | 14 938 | 3 077 | | | 83 | 17 | | |
| | 67.5 | 8 922 | 2 094 | | 380 | 78 | 18 | | 3 |
| | 72.5 | 5 572 | 828 | | | 87 | 13 | | |
| | 77.5 | 1 841 | 303 | | | 86 | 14 | | |
| | 82.5 | 1 270 | 195 | | | 87 | 13 | | |
| | 87.5 | 271 | 40 | | | 87 | 13 | | |
| | 92.5 | | | | | | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **107 697** | **46 960** | **15 606** | **3 757** | **62** | **27** | **9** | **2** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2004 | 12.5 | | 6 389 | 10 494 | | | 38 | 62 | |
| | 17.5 | | 11 611 | 18 422 | | | 39 | 61 | |
| | 22.5 | | 21 543 | 36 076 | | | 37 | 63 | |
| | 27.5 | 117 | 17 167 | 51 916 | | 0 | 25 | 75 | |
| | 32.5 | 967 | 10 006 | 6 783 | | 5 | 56 | 38 | |
| | 37.5 | 4 072 | 13 532 | 591 | 1 448 | 21 | 69 | 3 | 7 |
| | 42.5 | 6 247 | 10 695 | 289 | 1 029 | 34 | 59 | 2 | 6 |
| | 47.5 | 14 282 | 9 400 | 1 242 | 792 | 56 | 37 | 5 | 3 |
| | 52.5 | 23 504 | 5 062 | | 859 | 80 | 17 | | 3 |
| | 57.5 | 14 941 | 2 200 | | 98 | 87 | 13 | | 1 |
| | 62.5 | 6 860 | 1 388 | | | 83 | 17 | | |
| | 67.5 | 3 125 | 795 | | 124 | 77 | 20 | | 3 |
| | 72.5 | 1 406 | 229 | | | 86 | 14 | | |
| | 77.5 | 396 | 65 | | | 86 | 14 | | |
| | 82.5 | 201 | 31 | | | 86 | 14 | | |
| | 87.5 | 38 | 5 | | | 88 | 12 | | |
| | 92.5 | | | | | | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **76 154** | **110 120** | **125 812** | **4 349** | **24** | **35** | **40** | **1** |

**Table 3 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2005 | 12.5 | | 1 476 | 1 754 | | | | 46 | 54 |
| | 17.5 | 1 | 1 142 | 769 | | 0 | | 60 | 40 |
| | 22.5 | | 694 | 672 | | | | 51 | 49 |
| | 27.5 | 12 | 1 864 | 9 684 | | 0 | | 16 | 84 |
| | 32.5 | 599 | 6 854 | 6 347 | | 4 | | 50 | 46 |
| | 37.5 | 2 061 | 13 030 | 3 105 | 136 | 11 | | 71 | 17 | 1 |
| | 42.5 | 5 166 | 18 840 | 1 790 | 1 782 | 19 | | 68 | 6 | 6 |
| | 47.5 | 9 209 | 16 363 | 1 277 | 2 379 | 32 | | 56 | 4 | 8 |
| | 52.5 | 15 984 | 12 458 | | 2 344 | 52 | | 40 | | 8 |
| | 57.5 | 15 607 | 4 938 | | 2 144 | 69 | | 22 | | 9 |
| | 62.5 | 10 741 | 3 805 | | 1 593 | 67 | | 24 | | 10 |
| | 67.5 | 7 352 | 3 031 | | 874 | 65 | | 27 | | 8 |
| | 72.5 | 3 575 | 1 268 | | | 74 | | 26 | | |
| | 77.5 | 1 642 | 509 | | | 76 | | 24 | | |
| | 82.5 | 990 | 268 | | | 79 | | 21 | | |
| | 87.5 | 181 | 118 | | | 61 | | 39 | | |
| | 92.5 | 187 | 109 | | | 63 | | 37 | | |
| | 97.5 | 62 | | | | 100 | | | | |
| | 102.5 | | | | | | | | | |
| | 107.5 | | | | | | | | | |
| | **Total** | **73 369** | **86 767** | **25 398** | **11 251** | **37** | | **44** | **13** | **6** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2005 | 12.5 | | 91 006 | 122 933 | | | | 43 | 57 | |
| | 17.5 | 31 | 35 362 | 25 961 | | 0 | | 58 | 42 | |
| | 22.5 | | 7 039 | 7 361 | | | | 49 | 51 | |
| | 27.5 | 79 | 10 864 | 59 069 | | 0 | | 16 | 84 | |
| | 32.5 | 2 002 | 24 347 | 23 197 | | 4 | | 49 | 47 | |
| | 37.5 | 4 515 | 28 880 | 7 114 | 282 | 11 | | 71 | 17 | 1 |
| | 42.5 | 7 880 | 29 244 | 2 655 | 2 674 | 19 | | 69 | 6 | 6 |
| | 47.5 | 9 859 | 18 234 | 1 410 | 2 585 | 31 | | 57 | 4 | 8 |
| | 52.5 | 12 892 | 9 665 | | 1 917 | 53 | | 39 | | 8 |
| | 57.5 | 9 347 | 2 934 | | 1 261 | 69 | | 22 | | 9 |
| | 62.5 | 4 898 | 1 778 | | 762 | 66 | | 24 | | 10 |
| | 67.5 | 2 601 | 1 018 | | 315 | 66 | | 26 | | 8 |
| | 72.5 | 934 | 342 | | | 73 | | 27 | | |
| | 77.5 | 324 | 97 | | | 77 | | 23 | | |
| | 82.5 | 165 | 44 | | | 79 | | 21 | | |
| | 87.5 | 24 | 14 | | | 63 | | 37 | | |
| | 92.5 | 18 | 10 | | | 64 | | 36 | | |
| | 97.5 | 4 | | | | 100 | | | | |
| | 102.5 | | | | | | | | | |
| | 107.5 | | | | | | | | | |
| | **Total** | **55 573** | **260 878** | **249 700** | **9 796** | **10** | | **45** | **43** | **2** |

**Table 3 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2006 | 12.5 | 18 | 274 | 1 100 | | 1 | 20 | 79 | |
| | 17.5 | 4 | 411 | 5 158 | 4 | 0 | 7 | 92 | 0 |
| | 22.5 | | 3 807 | 17 676 | 12 | | 18 | 82 | 0 |
| | 27.5 | | 3 666 | 4 559 | | | 45 | 55 | |
| | 32.5 | 389 | 2 766 | 1 478 | | 8 | 60 | 32 | |
| | 37.5 | 2 671 | 10 620 | 3 934 | 487 | 15 | 60 | 22 | 3 |
| | 42.5 | 5 490 | 14 929 | 1 077 | 1 617 | 24 | 65 | 5 | 7 |
| | 47.5 | 9 375 | 14 621 | 2 020 | 2 368 | 33 | 52 | 7 | 8 |
| | 52.5 | 14 953 | 9 841 | 1 882 | 1 821 | 52 | 35 | 7 | 6 |
| | 57.5 | 18 491 | 4 942 | 1 820 | 2 110 | 68 | 18 | 7 | 8 |
| | 62.5 | 12 863 | 3 408 | 1 816 | 358 | 70 | 18 | 10 | 2 |
| | 67.5 | 8 030 | 2 705 | 306 | 614 | 69 | 23 | 3 | 5 |
| | 72.5 | 3 640 | 1 218 | | | 75 | 25 | | |
| | 77.5 | 2 159 | 631 | | 570 | 64 | 19 | | 17 |
| | 82.5 | 1 479 | 437 | | | 77 | 23 | | |
| | 87.5 | 221 | 263 | | | 46 | 54 | | |
| | 92.5 | 86 | 29 | | | 75 | 25 | | |
| | 97.5 | | 16 | | | | 100 | | |
| | 102.5 | 72 | | | | 100 | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **79 941** | **74 585** | **42 825** | **9 960** | **39** | **36** | **21** | **5** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2006 | 12.5 | 1 558 | 16 175 | 58 796 | | 2 | 21 | 77 | |
| | 17.5 | 223 | 10 415 | 122 519 | 80 | 0 | 8 | 92 | 0 |
| | 22.5 | | 41 547 | 204 677 | 160 | | 17 | 83 | 0 |
| | 27.5 | | 23 728 | 33 604 | | | 41 | 59 | |
| | 32.5 | 31 | 6 770 | 5 030 | | 0 | 57 | 43 | |
| | 37.5 | 2 080 | 14 178 | 8 054 | 1 097 | 8 | 56 | 32 | 4 |
| | 42.5 | 7 134 | 21 901 | 1 534 | 2 539 | 22 | 66 | 5 | 8 |
| | 47.5 | 8 150 | 18 097 | 2 138 | 2 528 | 26 | 59 | 7 | 8 |
| | 52.5 | 11 205 | 13 126 | 1 354 | 1 476 | 41 | 48 | 5 | 5 |
| | 57.5 | 13 915 | 5 845 | 1 048 | 1 226 | 63 | 27 | 5 | 6 |
| | 62.5 | 9 898 | 2 578 | 866 | 176 | 73 | 19 | 6 | 1 |
| | 67.5 | 4 656 | 1 477 | 105 | 201 | 72 | 23 | 2 | 3 |
| | 72.5 | 2 191 | 790 | | | 73 | 27 | | |
| | 77.5 | 1 064 | 322 | | 124 | 70 | 21 | | 8 |
| | 82.5 | 408 | 136 | | | 75 | 25 | | |
| | 87.5 | 144 | 74 | | | 66 | 34 | | |
| | 92.5 | 32 | 34 | | | 49 | 51 | | |
| | 97.5 | 10 | 3 | | | 75 | 25 | | |
| | 102.5 | | 2 | | | | 100 | | |
| | 107.5 | 5 | | | | 100 | | | |
| | **Total** | **62 702** | **177 198** | **439 725** | **9 606** | **9** | **26** | **64** | **1** |

**Table 3 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2007 | 12.5 | | 268 | 331 | | | 45 | 55 | |
| | 17.5 | | 529 | 387 | | | 58 | 42 | |
| | 22.5 | | 1 191 | 1 819 | 15 | | 39 | 60 | 0 |
| | 27.5 | 20 | 2 779 | 25 839 | 74 | 0 | 10 | 90 | 0 |
| | 32.5 | 1 166 | 8 602 | 5 672 | | 8 | 56 | 37 | |
| | 37.5 | 10 730 | 17 941 | 4 010 | 459 | 32 | 54 | 12 | 1 |
| | 42.5 | 18 360 | 21 909 | 3 157 | 1 315 | 41 | 49 | 7 | 3 |
| | 47.5 | 17 584 | 16 128 | 1 185 | 1 484 | 48 | 44 | 3 | 4 |
| | 52.5 | 21 237 | 6 858 | 2 121 | 1 593 | 67 | 22 | 7 | 5 |
| | 57.5 | 15 220 | 4 299 | 1 889 | 2 460 | 64 | 18 | 8 | 10 |
| | 62.5 | 8 851 | 2 228 | 795 | 2 071 | 63 | 16 | 6 | 15 |
| | 67.5 | 5 577 | 1 810 | 715 | 414 | 65 | 21 | 8 | 5 |
| | 72.5 | 2 567 | 738 | | 866 | 62 | 18 | | 21 |
| | 77.5 | 654 | 408 | | | 62 | 38 | | |
| | 82.5 | 410 | 317 | | | 56 | 44 | | |
| | 87.5 | 127 | 269 | | | 32 | 68 | | |
| | 92.5 | | 35 | | | | 100 | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **102 503** | **86 308** | **47 918** | **10 750** | **41** | **35** | **19** | **4** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2007 | 12.5 | | 18 731 | 22 744 | | | 45 | 55 | |
| | 17.5 | | 14 425 | 10 722 | | | 57 | 43 | |
| | 22.5 | | 13 498 | 18 172 | 120 | | 42 | 57 | 0 |
| | 27.5 | 121 | 16 136 | 153 929 | 371 | 0 | 9 | 90 | 0 |
| | 32.5 | 4 198 | 29 953 | 20 524 | | 8 | 55 | 38 | |
| | 37.5 | 24 535 | 39 593 | 8 163 | 1 058 | 33 | 54 | 11 | 1 |
| | 42.5 | 28 291 | 34 843 | 4 520 | 1 883 | 41 | 50 | 6 | 3 |
| | 47.5 | 19 637 | 17 310 | 1 237 | 1 550 | 49 | 44 | 3 | 4 |
| | 52.5 | 16 415 | 5 508 | 1 613 | 1 392 | 66 | 22 | 6 | 6 |
| | 57.5 | 9 039 | 2 638 | 1 071 | 1 268 | 64 | 19 | 8 | 9 |
| | 62.5 | 3 953 | 1 011 | 339 | 918 | 64 | 16 | 5 | 15 |
| | 67.5 | 2 041 | 655 | 259 | 216 | 64 | 21 | 8 | 7 |
| | 72.5 | 699 | 197 | | 231 | 62 | 17 | | 21 |
| | 77.5 | 149 | 81 | | | 65 | 35 | | |
| | 82.5 | 66 | 49 | | | 57 | 43 | | |
| | 87.5 | 17 | 33 | | | 34 | 66 | | |
| | 92.5 | | 4 | | | | 100 | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **109 160** | **194 665** | **243 293** | **9 008** | **20** | **35** | **44** | **2** |

**Table 3 (cont.)**

Biomass

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2008 | 12.5 | | 8 | 183 | | | 4 | 96 | |
| | 17.5 | | 16 | 347 | | | 4 | 96 | |
| | 22.5 | | 124 | 2 021 | | | 6 | 94 | |
| | 27.5 | 9 | 532 | 7 400 | | 0 | 7 | 93 | |
| | 32.5 | 2 198 | 7 623 | 22 459 | 296 | 7 | 23 | 69 | 1 |
| | 37.5 | 7 821 | 19 299 | 17 986 | 1 602 | 17 | 41 | 39 | 3 |
| | 42.5 | 13 713 | 17 504 | 10 172 | 2 361 | 31 | 40 | 23 | 5 |
| | 47.5 | 13 615 | 15 278 | 4 733 | 2 732 | 37 | 42 | 13 | 8 |
| | 52.5 | 19 424 | 9 784 | 3 655 | 3 326 | 54 | 27 | 10 | 9 |
| | 57.5 | 13 154 | 4 607 | 3 256 | 3 207 | 54 | 19 | 13 | 13 |
| | 62.5 | 6 245 | 2 562 | 2 111 | 2 304 | 47 | 19 | 16 | 17 |
| | 67.5 | 4 689 | 3 254 | 1 354 | 2 251 | 41 | 28 | 12 | 19 |
| | 72.5 | 1 978 | 1 217 | 750 | | 50 | 31 | 19 | |
| | 77.5 | 637 | 555 | 417 | | 40 | 34 | 26 | |
| | 82.5 | 306 | 329 | | | 48 | 52 | | |
| | 87.5 | 172 | 1 041 | | | 14 | 86 | | |
| | 92.5 | 77 | | | | 100 | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **84 038** | **83 733** | **76 844** | **18 078** | **32** | **32** | **29** | **7** |

Abundance

| Period | L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|---|
| Aug 2008 | 12.5 | | 675 | 12 824 | | | 5 | 95 | |
| | 17.5 | | 352 | 10 310 | | | 3 | 97 | |
| | 22.5 | | 1 566 | 23 842 | | | 6 | 94 | |
| | 27.5 | 48 | 2 929 | 44 647 | | 0 | 6 | 94 | |
| | 32.5 | 7 218 | 25 035 | 77 747 | 962 | 7 | 23 | 70 | 1 |
| | 37.5 | 17 017 | 41 066 | 40 788 | 3 245 | 17 | 40 | 40 | 3 |
| | 42.5 | 20 956 | 26 972 | 15 315 | 3 471 | 31 | 40 | 23 | 5 |
| | 47.5 | 14 944 | 16 261 | 5 099 | 2 885 | 38 | 41 | 13 | 7 |
| | 52.5 | 15 100 | 7 507 | 2 743 | 2 454 | 54 | 27 | 10 | 9 |
| | 57.5 | 7 672 | 2 614 | 1 893 | 1 748 | 55 | 19 | 14 | 13 |
| | 62.5 | 2 678 | 1 159 | 887 | 1 015 | 47 | 20 | 15 | 18 |
| | 67.5 | 1 657 | 1 100 | 435 | 756 | 42 | 28 | 11 | 19 |
| | 72.5 | 511 | 326 | 213 | | 49 | 31 | 20 | |
| | 77.5 | 132 | 114 | 101 | | 38 | 33 | 29 | |
| | 82.5 | 49 | 51 | | | 49 | 51 | | |
| | 87.5 | 23 | 157 | | | 13 | 87 | | |
| | 92.5 | 9 | | | | 100 | | | |
| | 97.5 | | | | | | | | |
| | 102.5 | | | | | | | | |
| | 107.5 | | | | | | | | |
| | **Total** | **88 013** | **127 883** | **236 845** | **16 538** | **19** | **27** | **50** | **4** |

**Table 4.** Biomass (t) and abundance ('000) distribution in different zones based on swept area estimates. Mean values of the recalculated estimates for the period 2004-2008. Relative values in right columns. L.gr is midpoint in 5 cm length groups.

Biomass

**Mean August 2004 - 2008**

| L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|
| 12.5 | 4 | 430 | 711 | 0 | 0 | 38 | 62 | 0 |
| 17.5 | 1 | 510 | 1 556 | 1 | 0 | 25 | 75 | 0 |
| 22.5 | 0 | 1 548 | 5 108 | 5 | 0 | 23 | 77 | 0 |
| 27.5 | 12 | 2 323 | 11 008 | 15 | 0 | 17 | 82 | 0 |
| 32.5 | 930 | 5 730 | 7 636 | 59 | 6 | 40 | 53 | 0 |
| 37.5 | 5 012 | 13 390 | 5 856 | 673 | 20 | 54 | 23 | 3 |
| 42.5 | 9 359 | 16 037 | 3 279 | 1 541 | 31 | 53 | 11 | 5 |
| 47.5 | 12 618 | 14 241 | 1 987 | 1 937 | 41 | 46 | 6 | 6 |
| 52.5 | 20 209 | 9 101 | 1 532 | 2 045 | 61 | 28 | 5 | 6 |
| 57.5 | 17 688 | 4 537 | 1 393 | 2 023 | 69 | 18 | 5 | 8 |
| 62.5 | 10 728 | 3 016 | 944 | 1 265 | 67 | 19 | 6 | 8 |
| 67.5 | 6 914 | 2 578 | 475 | 907 | 64 | 24 | 4 | 8 |
| 72.5 | 3 466 | 1 054 | 150 | 173 | 72 | 22 | 3 | 4 |
| 77.5 | 1 387 | 481 | 83 | 114 | 67 | 23 | 4 | 6 |
| 82.5 | 891 | 309 | 0 | 0 | 74 | 26 | 0 | 0 |
| 87.5 | 194 | 346 | 0 | 0 | 36 | 64 | 0 | 0 |
| 92.5 | 70 | 35 | 0 | 0 | 67 | 33 | 0 | 0 |
| 97.5 | 12 | 3 | 0 | 0 | 79 | 21 | 0 | 0 |
| 102.5 | 14 | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| 107.5 | 0 | 0 | 0 | 0 | | | | |
| **Total** | **89 510** | **75 671** | **41 718** | **10 759** | **41** | **35** | **19** | **5** |

Abundance

**Mean August 2004 - 2008**

| L.gr | NEZ | Sval | REZ | Int&Grey | NEZ | Sval | REZ | Int&Grey |
|---|---|---|---|---|---|---|---|---|
| 12.5 | 312 | 26 595 | 45 558 | 0 | 0 | 37 | 63 | 0 |
| 17.5 | 51 | 14 433 | 37 587 | 16 | 0 | 28 | 72 | 0 |
| 22.5 | 0 | 17 039 | 58 026 | 56 | 0 | 23 | 77 | 0 |
| 27.5 | 73 | 14 165 | 68 633 | 74 | 0 | 17 | 83 | 0 |
| 32.5 | 2 883 | 19 222 | 26 656 | 192 | 6 | 39 | 54 | 0 |
| 37.5 | 10 444 | 27 450 | 12 942 | 1 426 | 20 | 53 | 25 | 3 |
| 42.5 | 14 101 | 24 731 | 4 863 | 2 319 | 31 | 54 | 11 | 5 |
| 47.5 | 13 374 | 15 861 | 2 225 | 2 068 | 40 | 47 | 7 | 6 |
| 52.5 | 15 823 | 8 174 | 1 142 | 1 620 | 59 | 31 | 4 | 6 |
| 57.5 | 10 983 | 3 246 | 802 | 1 120 | 68 | 20 | 5 | 7 |
| 62.5 | 5 657 | 1 583 | 418 | 574 | 69 | 19 | 5 | 7 |
| 67.5 | 2 816 | 1 009 | 160 | 322 | 65 | 23 | 4 | 7 |
| 72.5 | 1 148 | 377 | 43 | 46 | 71 | 23 | 3 | 3 |
| 77.5 | 413 | 136 | 20 | 25 | 70 | 23 | 3 | 4 |
| 82.5 | 178 | 62 | 0 | 0 | 74 | 26 | 0 | 0 |
| 87.5 | 49 | 57 | 0 | 0 | 46 | 54 | 0 | 0 |
| 92.5 | 12 | 10 | 0 | 0 | 55 | 45 | 0 | 0 |
| 97.5 | 3 | 1 | 0 | 0 | 81 | 19 | 0 | 0 |
| 102.5 | 0 | 0 | 0 | 0 | 0 | 100 | 0 | 0 |
| 107.5 | 1 | 0 | 0 | 0 | 100 | 0 | 0 | 0 |
| **Total** | **78 321** | **174 149** | **259 075** | **9 859** | **15** | **33** | **50** | **2** |

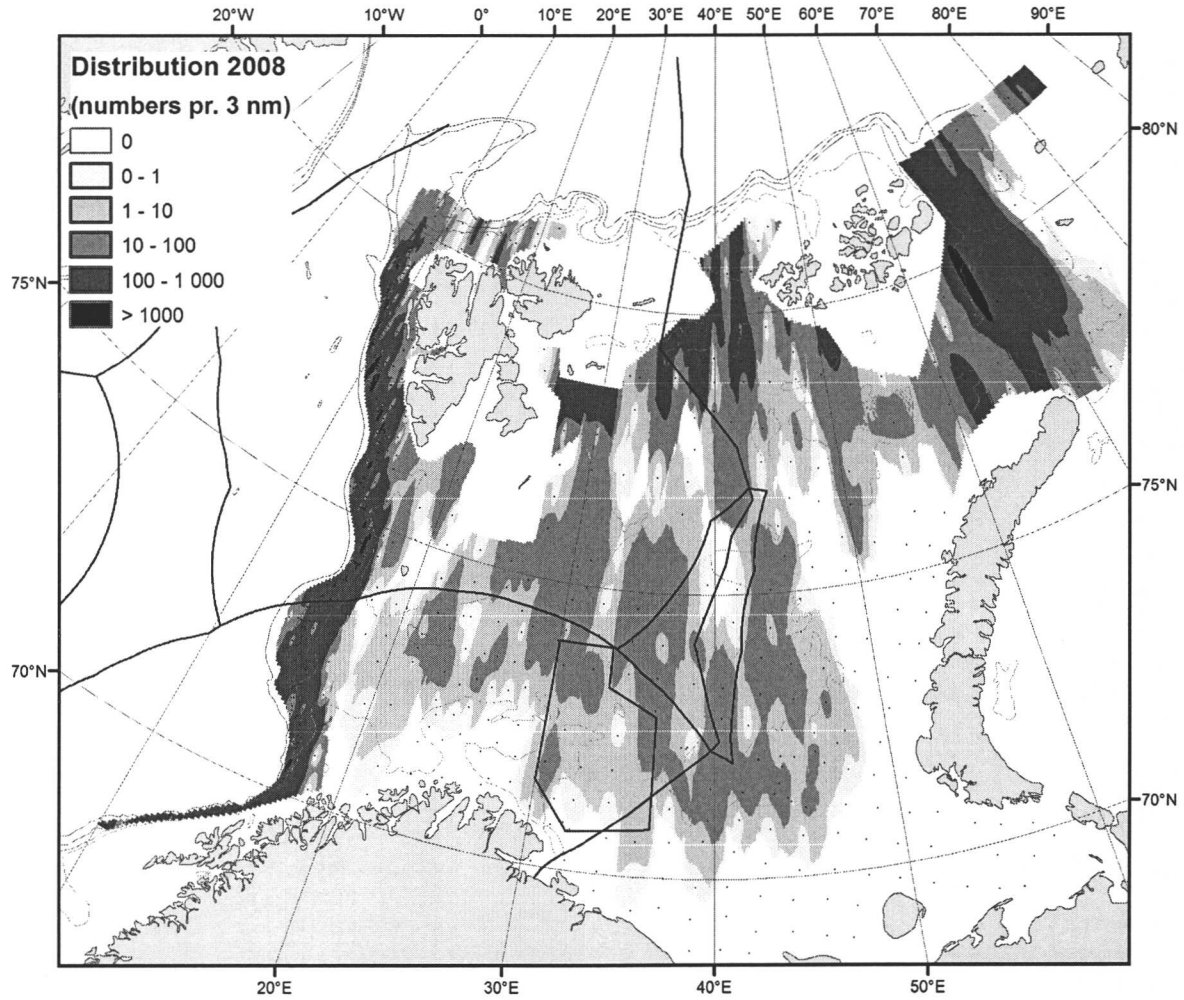


**Figure 1.** Total distribution of Greenland halibut in August-September 2008. The catches were standardized to numbers pr. 3 nm (a proxy for numbers pr. trawl hour).

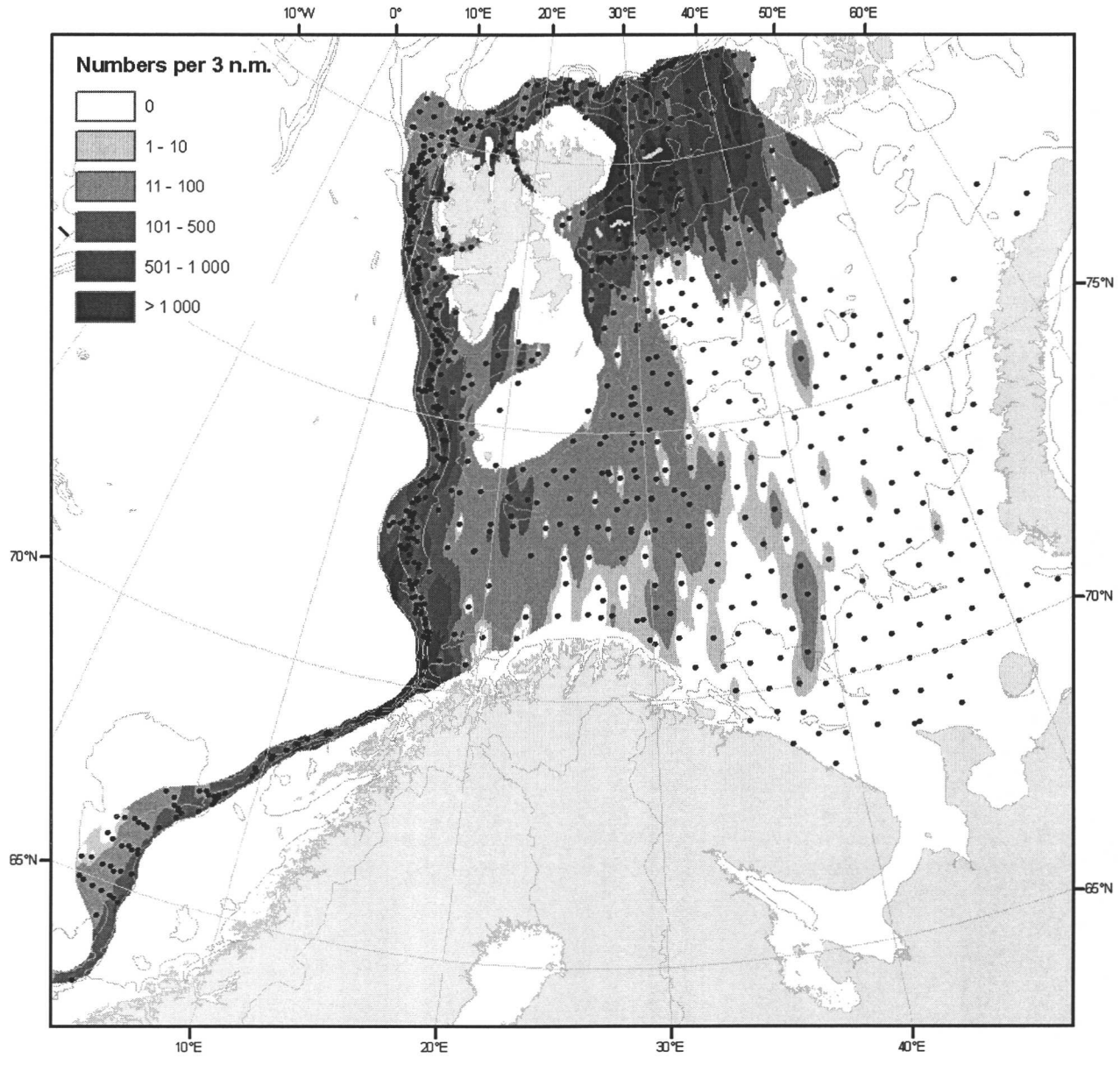


**Figure 2.** Total distribution of Greenland halibut in August-September 2004. The catches were standardized to numbers pr. 3 nm (taken from the original report).

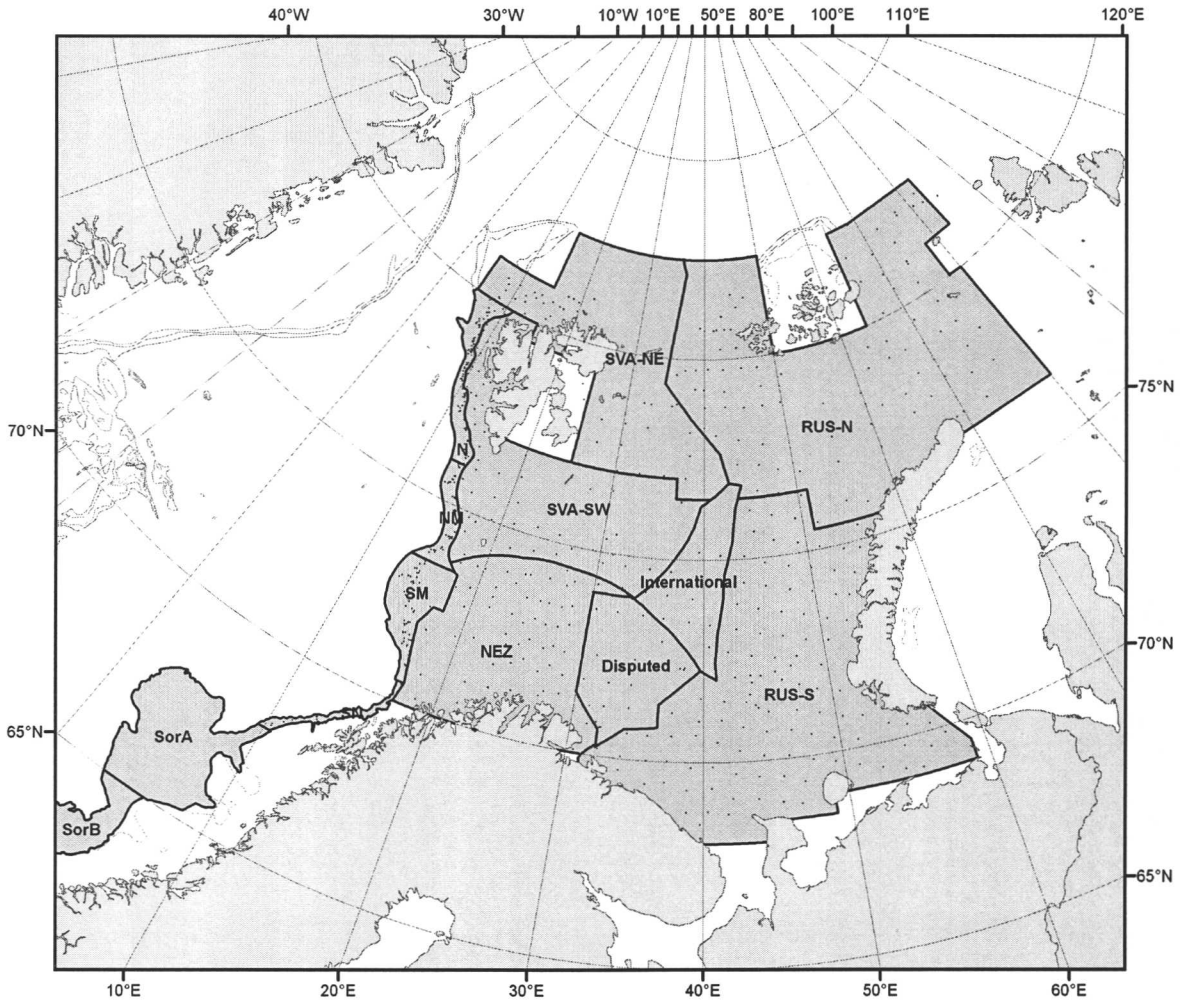


**Figure 3.** Sub-areas used for summarizing the results from the swept area analyses. Black dots are stations in 2008.