

Seasonal and spatial dynamics in the distribution of Northeast Arctic Greenland halibut (*Reinhardtius hippoglossoides*)

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Most of the former investigations on Greenland halibut in the northeastern Atlantic were carried out during the short summer or early autumn. Little is known of its dynamics during the whole year as well as outside of the main areas of its distribution.

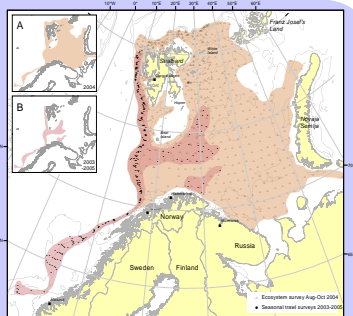
Based on recent, extensive survey coverage of the whole distribution area of the Northeast Arctic stock this study therefore attempts to describe in more detail the temporal and spatial dynamics of Greenland halibut in this region.

Trawl surveys and coverage

We used data from routine ecosystem surveys as well as bottom trawl surveys directed specifically at Greenland halibut:

A. Ecosystem + slope 2004. General coverage of most of the known distribution area of Greenland halibut by combining the ecosystem survey in August-October 2004 in the Barents Sea with Greenland halibut surveys along the continental slope from 62 to 80° N at depths between 450 and 1350 m.

B. Seasonal surveys 2003-2005. Bottom trawl surveys along the continental slope as in (A), in six time periods from 2003 to 2005 (February-March, August, and November-December of each year).



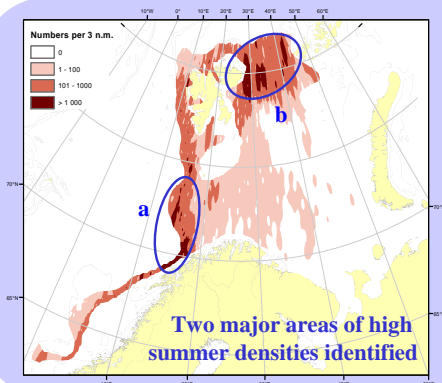
Sampling and analysis

In the Barents Sea a **Campelen research trawl** was mostly used, while along the continental slope samples were taken using a larger, commercial **Alfredo bottom trawl**. Because of the differences in catchability between the gears, catch rates were standardized by calculating a conversion factor (*CF*) from parallel trawl hauls. *CF* varied between 1 and 6 depending on fish length.



Albino specimen

Total distribution area and abundance



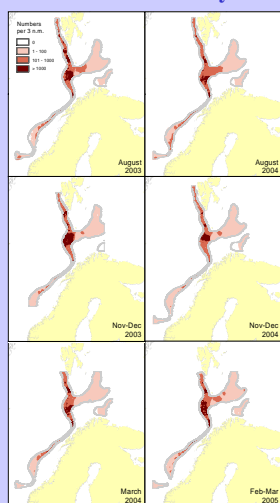
Swept area analysis using data from survey coverage **A** showed that the most important areas for Greenland halibut in its total known area of distribution during summer were the slope areas between Norway and Bear Island (**a**) and the areas north and east of Svalbard (**b**) when looking at **abundance indices in numbers**. These two areas accounted for more than 65 % of the total index (**a**: 11.9 %; **b**: 53.5 %). Less than 2 % of the stock was found in the easternmost parts of the Barents Sea.

The most important areas regarding **biomass** were the slope area from 68° N to 73° 30' N and the westernmost parts of the central Barents Sea, which together stood for 52 % of the total biomass.

The mean body weight was much lower in area **b**: 0.10-0.31 kg as opposed to 0.54-1.76 kg for the other areas, indicating that the northernmost areas form the species' **nursery grounds**.

Seasonal distribution and spawning

1. A most likely spawning related seasonal cycle in aggregation



Summer

Slightly scattered distribution in the main distribution area on the slope

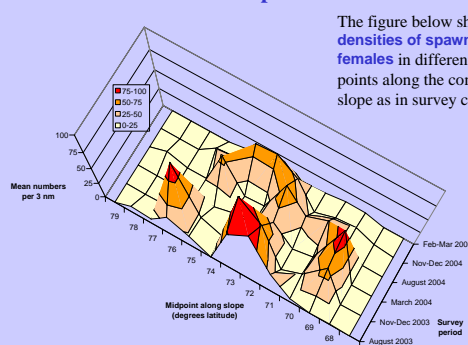
Autumn

Higher degree of concentration on the spawning grounds near Bear Island

Spring

Stock appears to disperse over the whole area again

2. Defining female spawning in time and space



The figure below shows **densities of spawning females** in different seasons at points along the continental slope as in survey coverage **B**

Peaks in spawning can be observed in November-December of each year, mainly located between 76 and 77° N and 72 and 74° N, i.e. on the upper slope and channel areas north and south of Bear Island, respectively. Some spawners also appeared to aggregate and spawn later in the season on the slope west of the Lofoten and Vesterålen island groups at c. 69-70° N.

CONCLUSIONS

- The vast majority of adult Northeast Arctic Greenland halibut throughout the year are distributed along the continental slope between the Norwegian mainland and Svalbard, while further eastwards in the Barents Sea its distribution remains limited.
- Juveniles were found in large numbers mainly north and east of Svalbard to White Island and Franz Josef's Land, thus further establishing these areas as nursery grounds for the species.
- Main spawning grounds for Greenland halibut were confirmed located largely on the upper slope areas north and south of Bear Island.



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