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# Survey Report from the joint Norwegian-Russian Ecosystem Survey in the Barents Sea August - September 2010


Institute of Marine Research - IMR

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# SURVEY REPORT

## FROM THE JOINT NORWEGIAN/RUSSIAN ECOSYSTEM SURVEY IN THE BARENTS SEA AUGUST – SEPTEMBER 2010

### Preface

The 7-th joint survey was carried out during the period 09th of August to 26th of September 2010. The survey plans and tasks were agreed in the annual IMR-PINRO meeting in March 2010 and all joint work was executed according to this plan.

The effort allocated to demersal fish investigation was reduced by 12 % compared to previous years. Other investigations were kept at the same level as in previous years. Consequently, a joint, but somewhat reduced "ecosystem survey" was carried out by IMR and PINRO also in 2010.

The content of this report covers many but not all aspects of the survey. The content will be updated and available in electronic form in the Internet (www.imr.no).

"Potato deck". Photo: Dmitry Prozorkevich

This report was prepared in Svanhovd, Finmark, Norway 27-30 September and by correspondence, and the following has contributed:

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| Bjarte Bogstad | Capelin stock analyses and prognosis (AFWG chairman) |
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The scientist and technicians taking part onboard the research vessels and executing an enormous work for data collection are listed below:
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## Synopsis

The main aim of the ecosystem survey was to collect data about distribution and abundance of all sea organisms on different stages of their life's for estimation, including pelagic and demersal fish species, zooplankton, benthos, seabirds and mammals. An important task was also to collect information about sea environment, pollution etc.

The water temperature below surface in most of the observed areas was somewhat lower than in the same period in 2009 but still higher (0.3-0.9 °C) than the long term mean.

The 2010 year-classes of cod and saithe are rich. 0-group of capelin, haddock, redfish and polar cod are near the average level. 0-group of herring and long rough dab were estimated as poor. The year-class of Greenland halibut is uncertain but possibly also poor.

The total capelin stock was estimated at 3.49 million tonnes, which is 7% lower than last year. About 2.0 million tonnes were assumed to be maturing. Estimated maturing stock is 13% below the last year's estimate but above the long term mean level.

The polar cod stock was estimated to be 1.43 million tonnes, which is 36% higher than in 2009 and above the long term mean level.

The number of juvenile Norwegian spring spawning herring in the Barents Sea has decreased considerably and was estimated to be 1.8 billion individuals. Spring spawning herring was not found in the south-eastern part.

Blue whiting of age groups 3 to 13, but mostly age 5 - 6, were observed in the western part of the surveyed area. The biomass of this stock component was estimated to be 0.18 million tonnes, which is lower than in 2009.

Investigations in the area adjacent to the sunken nuclear submarine "Komsomolets" do not indicate a significant leakage from the submarine.

Numbers of Red King Crab in the survey area are considerably reduced. Numbers of Snow crab are also reduced. The benthos biomass distribution in 2010 was generally the same as in previous years.

Numbers of observed marine mammals increased by a factor of 4 relative to 2009. At least part of this increase is likely due to very good observation conditions during the survey. Many baleen whales were observed in association with capelin and polar cod concentrations. The marine mammals were mainly observed within their traditional distribution areas, except for white-beaked dolphins were only few observations were made in the southern and eastern Barents Sea.

The level of fish pathologies is not much (0.18 %) and it was lower than in 2009 (0.7 %).

The man-made pollution of the Barents Sea by garbage on surface and on bottom is quite significant.

# CONTENT

# 1 METHODS

During the survey, data on cruise tracks, hydrography, trawl catches, integrator values etc. were exchanged by e-mail between Norwegian vessels “G.O. Sars”, “J. Hjort”, “Jan Mayen” and Russian vessel “Vilnyus”. Total Russian exchange of survey data were transmitted to the “head” IMR vessel “J. Hjort” before the Russian vessel returned to port after the survey. Final survey data from all vessels were collected during the meeting at Svanhovd after the survey.

## 1.1 Hydrography

The oceanographic investigations consisted of measurements of temperature and salinity in depth profiles distributed over the total investigated area and along the sections Fugløya-Bear Island, Bear Island-Vest, Kola, and Kanin. For the Vardø-North section, most of this was cut due to short time and only 4 stations between 75°30’N and 74°N were sampled. All vessels used CTD-probes. R/V Jan Mayen deployed 3 current meter moorings during the survey. The moorings were planned deployed on the slope between the Barents Sea and the Arctic Ocean north of Kvitøya, but due to heavy ice conditions the vessel could not reach the area. Instead one mooring was deployed south of Kvitøya and two on the slope just north of Sørkapp. Details of the moorings are given below.

Position of deployed moorings:

| Latitude | Longitude | Bottom depth (m) |
|---|---|---|
| 79°40.63’N | 31°58.70’E | 303 |
| 76°25.042’N | 14°34.113’E | 650 |
| 76°25.086’N | 13°59.281’E | 1000 |

## 1.2 0 group fish investigations

Since 1965 surveys in August/September have provided annual information on the abundance and spatial distribution of pelagically distributed 0-group fish of Barents Sea capelin (*Mallotus villosus*), Norwegian spring spawning herring (*Clupea harengus*), Northeast Arctic cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) as well as several others (polar cod *Boreogadus saida*, long rough dab *Hippoglossus platessoides*, Greenland halibut *Reinhardtius hippoglossus*, redfish *Sebastes* spp. and others).

The distribution and abundance of 0-group fish were based on the catches, and measured in number of fish per square nautical mile. The trawling procedure consisted of pelagic trawl catches from a mid-water trawl with a quadratic mouth opening of 20x20 m. Since 1980 the standard procedure have been used on all vessels and trawling procedure consist of tows covering 3 depths, each over a distance of 0.5 nautical miles, with the headline of the trawl located at 0, 20 and 40 m and with trawling speed of 3 knots. Additional tows at 60, 80 and 100 m, also of 0.5 nm, were made when the 0-group fish layer was recorded deeper than 40 m depth on the echo-sounder.

The history of development of 0-group investigation, assessment methods and recalculation of abundance indices is described in details in earlier versions of the survey report (Anon. 1980, Anon. 1983, Anon. 2007) and in Eriksen et al., 2009.

## 1.3 Acoustic survey for pelagic fish

The survey area for the acoustic survey was equal to the total survey area covered during the ecosystem survey, i.e. the acoustic method was applied throughout the survey. All regions of the Barents Sea and adjacent areas of the Norwegian Sea were covered, with course lines about 35 nautical miles apart.

All participating vessels used ER-60 echo sounders (with ER-60 software). “G.O. Sars”, “J. Hjort” and “Jan Mayen” used LSSS (“Large scale survey system”), while “Vilnyus” and “F. Nansen” used Famas for post processing of acoustic data. “G.O. Sars”, “J. Hjort” and “Jan Mayen” were equipped with transducers on adjustable keels that can be lowered in rough weather to avoid the damping effect of bubbles. Echo intensities per nautical mile were integrated continuously, and mean values per 1 nautical mile were recorded for mapping and further calculations. The echograms, with their corresponding $s_A$-values, were scrutinized every day. Contributions from the seabed, false echoes, and noise were deleted.

The corrected values for integrated echo intensity were allocated to species according to the trace patterns and the frequency responses of the echograms and the composition of the trawl catches. For pelagic species, data from pelagic trawl hauls and bottom trawl hauls considered representative for the pelagic component of the stocks, which is measured acoustically, were included in the stock abundance calculations. For demersal species, mostly bottom trawl stations were used.

The echo sounders were watched continuously, and trawl hauls in addition to the predetermined hauls were carried out whenever the recordings changed their characteristics and/or the need for biological data made it necessary. Trawling was thus carried out both for identification purposes and to obtain biological observations, i.e., length, weight, maturity stage, stomach data, and age.

The vessels gave the $s_A$-values in absolute terms based on sphere calibrations, that is, as scattering cross section in $m^2$ per square nautical mile. The acoustic equipment of the vessels was calibrated by standard spheres.

### 1.3.1 Area coverage

In 2010 a total coverage of the planned survey area was obtained. The weather conditions were favourable during most of the survey. In mid August “Vilnyus” and “F. Nansen” started surveying in the south-eastern part of the Barents Sea. “F. Nansen” worked only for two weeks, while “Vilnyus” continued to cover the REEZ northwards. From the end of August the three Norwegian vessels joined the survey. “Jan Mayen” covered the Svalbard area, “G.O.Sars” covered the central parts of the NEEZ and “J.Hjort” covered the south-western and western part of the NEEZ. From mid September to the end of the survey at the 26th September, only “J.Hjort” and “Vilnyus” took part in the survey covering the northern areas east of Svalbard. A breakdown of the satellite antenna at “J.Hjort” at 17 September prevented data exchange with “Vilnyus” for the rest of the survey. This was a serious setback for the calculation of stock size estimates and for the production of hydrographic and fish distribution charts, which had to wait till after the survey was finished.

See Fig. 2.1-2.3 for details of the survey tracks.

### 1.3.2 Computations of the stock sizes

The computations of number of individuals and biomass per length- and age-group of the pelagic fish stocks were done in the same way as in previous years. For details see the 2006 ecosystem survey report (Anon. 2006).

Acoustic registrations of demersal fish were carried out along all cruise tracks, with division of $s_A$-values by species based on trawl catches data. Acoustic stock size estimates have not been calculated for these species.

## 1.4 Bottom trawl survey

Less bottom trawl stations were made by the Norwegian vessels in 2010 compared with previous years. The number and biomass of demersal fish per length- and age-group will be calculated from bottom trawl catches using the “swept-area” method. These results will be presented later, since the age determination of demersal fish will be carried out after the survey. In this report, preliminary calculations are shown for the total stocks.

### 1.4.1 Strata system used

A new strata system was constructed in 2004 (IMR) and 2009 (PINRO) covering the whole Barents Sea to include the total survey area. The new geographic system is also depth stratified using GEBCO depth data.

## 1.5 Plankton investigations

Data on phytoplankton abundance was obtained in several ways during the joint Russian-Norwegian Survey. On the Norwegian vessels “G.O. Sars”, “Johan Hjort” and “Jan Mayen” samples for chlorophyll ***a*** were obtained at nearly all CTD stations through filtration of water from water bottles at discrete depths from 0 – 100 m including a surface sample taken using a bucket. The total number of samples varied slightly depending on bottom depth at the specific localities. Sea water samples were filtered using GFC filters, and samples were frozen for later analysis of chl ***a*** content at the IMR laboratory. For the vessels mentioned above nutrient samples were obtained from the same water bottles on most CTD stations, at depths from the surface to the bottom according to a predefined scheme as determined for the Ecosystem cruise and specific bottom depth of each station. Normally, onboard “G.O. Sars” a fluorimeter is used as an additional instrument, connected to the CTD, logging chl ***a*** fluorescence as a continuous vertical profile along with temperature and salinity for all CTD stations. These data must be calibrated with the help of chl ***a*** determined from the water bottle samples obtained at the same stations.

Samples for phytoplankton species composition and abundance have been obtained from the Norwegian vessels “G.O. Sars”, “Johan Hjort” and “Jan Mayen”. For every second or third station quantitative water samples were obtained from water bottles at 5, 10, 20 and 30 m depth. Immediate upon retrieval of the seawater rosette sampler, one 25 ml phytoplankton sample were taken from each bottle at the above mentioned depths. The samples were pooled in a dark light-protected 100 ml flask adding 2 ml lugol as fixative for later analysis. Slightly less frequent a 10 µm meshed phytoplankton net with a 0.1 $m^2$ opening was vertically operated from 0-30 m to obtain a qualitative phytoplankton sample. After gentle mixing of the water from the net cod-end, one dark light-protected 100 ml flasks was filled with approximately 80 ml seawater, then adding 2.5 ml 20% formalin for fixation. At some stations a parallel sample was taken and fixated in 2 ml lugol.

On Russian vessels species composition, species diversity, size structure, species abundance and biomass, and vertical and spatial distribution of microalgae were studied. Phytoplankton samples were obtained at the oceanographic stations using seawater rosette sampler from three depths or depth layers: the surface, a layer of 5 meters above the pycnocline, and the bottom layer (only on"Vilnjus"). Samples were preserved with buffered 40 % formalin to a final concentration of 2-4% immediately after sampling.

Zooplankton sampling on all three Norwegian vessels was carried out by WP-2 plankton nets with a 0.25 $m^2$ opening and 180 µm mesh size. Usually two hauls were made at each station; one was taken from the bottom to the surface and the other from 100 m to the surface. In addition stratified sampling was conducted with the Mocness multinet plankton sampler on board "Johan Hjort" and "G.O. Sars". The sampling on the Russian vessel was carried out by Juday-nets with 0.1 $m^2$ opening and 180 µm mesh size. Depth intervals for plankton sampling were the bottom-0m, 100-0m and 50-0m layers.

In addition, sampling of macroplankton were taken by plankton net BR (with a 0.2 $m^2$ opening and 564 µm mesh size) connected with bottom trawl on the Russian vessel "Vilnyus", and with a new macroplankton trawl as described in the manual on the Norwegian vessels.

On board the Norwegian vessels samples were normally split in two, one part was fixated in 4% borax neutralized formalin for species analysis and the other one was size-fractioned as follows; >2000 µm, 2000-1000 µm and 1000-180 µm size categories. These size-fractionated samples were weighed after drying at 60°C for 24 hours. For large organisms like medusae and ctenophores their volume fraction were determined by displacement volume. From the >2000 µm size fraction krill, shrimps, amphipods, fish and fish larvae were counted and their lengths measured separately before drying. Chaetognaths, *Pareuchaeta* sp. and *Calanus hyperboreus* from the >2000µm size fraction were counted and dried separately, but their sizes were not measured. Later all weights were determined at the IMR laboratory in Bergen.

Processing of Juday net samples from the Russian vessels included weighing of wet samples to within 0,0001 g, with removal of excessive moisture by a filtering paper for species identification and abundance determination. A more detailed processing of species and stage composition as well as numerical abundance will be undertaken in the laboratory according to standard procedures. Dry weights will be derived using a conversion factor of 0.2. All zooplankton data will be presented as biomass or numbers per 1 $m^2$ surface.

Final plankton results will be presented later, since the samples are worked up after the survey.

## 1.6 Stomach investigations

According to agreement at the Russian-Norwegian meeting in March 2006 capelin and polar cod stomachs were collected at the Norwegian (“G.O. Sars”, “J. Hjort” and ”Jan Mayen”) and Russian (“Vilnyus” and “F. Nansen”) vessels in August-September 2010. Also stomach samples of cod were taken according to standard protocol on Norwegian vessels. On board “Vilnyus” and “F. Nansen” the stomach were analyzed both in commercial (cod, haddock, other) and non-commercial fish species. About 10 000 stomachs from different fish species were analyzed or collected during ecosystem survey.

## 1.7 Marine mammals and seabirds investigations

Marine mammals observations (species and numbers observed) were recorded onboard the Norwegian research vessels “G.O. Sars”, “Johan Hjort”, “Jan Mayen” and the Russian research vessels “Vilnyus” and “F. Nansen”. Seabirds were observed from the same vessels, except for G.O. Sars were no seabirds were recorded.

Onboard the Norwegian vessels visual observations were made by three observers from the vessel bridges; one dedicated sea bird observer and two dedicated marine mammal observers. The marine mammal observers covered approximately the front 90° sector (45° each) and the sea bird observer covering one 90° sector along the ship side. While most species were recorded continuously along the cruise transects when steaming between stations, the ship-following seabird species (northern fulmars and gulls) were counted every hour.

Onboard the Russian research vessel observations of marine mammals and sea birds were carried out by one observer covering a full sector of 180° from the roof of the bridge about 9-10 m above the sea surface level. Observers were recording only along transects between stations. All species were recorded continuously along the transects. The ship-following seabird species (northern fulmars and gulls) were counted every hour.

Both observer activity and observer conditions (Beaufort Sea State, visibility and weather) were recorded continuously. Observer activity was limited by weather conditions. When the weather conditions were not sufficiently good for observations observation effort was stopped.

## 1.8 Benthos observations

The purpose of the benthos investigation was to monitor benthic habitats and communities in the Barents Sea by analysing the bycatch of the Campelen trawl on all Norwegian and Russian ships. This should lead to criteria for selection of suitable monitoring locations in the Norwegian and Russian EEZ and improved procedures for providing results on benthos relevant for an ecosystem approach to management of marine resources in the Barents Sea.

Bycatch of invertebrates were recorded from all bottom trawl hauls of the Russian “Vilnyus” (down to species-level) and “F. Nansen” (down to species-level) and the Norwegian “G.O. Sars” (down to species-level), “Johan Hjort” (down to species-level), and “Jan Mayen” (down to species-level).

At “Vilnyus”, “Johan Hjort”, “Jan Mayen”, “G.O. Sars”, and "F.Nansen" the benthic invertebrate bycatch from all hauls with bottom trawl (Campelen -1800) was processed to species level onboard. Species difficult to identify was photographed and preserved in alcohol or formalin for later identification.

## 1.9 Pollution

In 2010, the monitoring of contaminants in the Barents Sea was restricted to the sampling from “Komsomolets”, the Russian submarine which sank in international waters in the Norwegian Sea 180-190 km south-southwest of Bear Island at 73°43’16’’N 13°16’52’’ E. The submarine is lodged 2.5-3 m in muddy sediments at a depth of 1655 m. It was powered by a one pressurized-water reactor and its weapons included two nuclear torpedoes. The reactor and torpedoes are potential sources for radioactive contamination.

Samples of surface water were collected from the seawater intake on the vessel and bottom seawater was collected with large (10 L) water samplers. Sediment samples were collected with a sediment sampler of the type “Smøgen Boxcorer”. The samples will be analysed for a range of radionuclides.

During the survey the amount and types of man-made garbage in the survey area were observed. During analysis of trawl catches all types of pollutants (plastic, metal, rubber, wood, etc.) was registered and weighted. The marine mammal observers registered the presence of floating man-made garbage on the sea surface. Type of pollutant and approximate volume were indicated and noted.

## 1.10 Fish pathology research

The main purpose of the fish pathology research is annual estimation of epizootic state of codfishes, flatfishes and wolffishes. The observations are entered into a databank on fish diseases and pathology. This investigation was begun by PINRO in 1999. In 2010 fish pathology research took place on “Jan Mayen”, “G.O. Sars”, “Johan Hjort” and “Vilnyus”.

Fish pathologies were recorded according to the kinds of pathologies: ulcers, tumors, vertebral deformations, eyes and head pathologies, internal organs pathologies. Special attention was paid to pathology of Red Eyes Syndrome.

# 2 RESULTS AND DISCUSSION

Altogether, the joint survey included 134 vessel-days, compared to 127 in 2009, 141 in 2008, 210 in 2007, 205 in 2006, 208 in 2005 and 215 in 2004. Altogether, the vessels sailed about 19000 nautical miles with observations of 433000 square nautical miles. In total, the Norwegian vessels carried out 408 trawl hauls and the Russian vessels 302 trawl hauls, so in total 710 hauls were made during the survey (while 754 hauls were made in 2009, 776 in 2008, 1007 in 2007 and 999 hauls – in 2006).

Survey routes with trawl stations; hydrographical and plankton and environmental stations are shown in Fig. 2.1, 2.2 and 2.3, respectively.

## 2.1 Hydrographical conditions

### 2.1.1 Standard sections

Fig 2.1.1 shows the temperature and salinity conditions along the oceanographic sections: Fugløya – Bear Island, Bear Island –West, Kola, and Kanin. The mean temperatures in the main parts of these sections are presented in Table 2.1.1, along with historical data back to 1965. Anomalies have been calculated using the long-term mean for the period 1954-1990.

The Fugløya-Bear Island section covers the Atlantic inflow from the Norwegian Sea to the Barents Sea, while the Bear Island West section covers the Atlantic current that continues northward along the western coast of Spitsbergen. The mean temperature in the 50-200 m in the Fugløya-Bear Island sections was 0.4°C higher than the long-term mean for the period 1965-2010 and 0.2°C lower than in 2009. The mean temperature in the Bear Island-West Section was 0.3-0.7°C higher than the long-term mean increasing westwards and with depth. In the upper 50 m negative temperature anomalies (–0.1°C) were observed.

The Kola and Kanin sections cover the flow of Coastal and Atlantic waters in the southern Barents Sea. At the middle of August 2010, the positive temperature anomalies of 0.6-0.95 where found in the Kola Section. Towards the end of September, the positive temperature anomalies in the inner part of the Kola Section remained unchanged while they decreased in the central and outer part. The decrease is probably due to northerly and north-westerly winds causing more intensive inflow of cold waters from the northern Barents Sea in the upper layers.

The inner part of the Kanin section had positive temperature anomalies of 0.3-0.7°C at the end of August 2010. The outer part had a positive temperature anomaly of 1.3°C, which is 0.3°C higher than in 2009.

### 2.1.2 Horizontal distribution of water masses and Polar Front

Horizontal distribution of temperature and salinity are shown for depths of 0, 50, 100 m and near the bottom in Figs 2.1.2-2.1.9. Anomalies of temperature at the surface and near the bottom are presented in Figs 2.1.10-2.1.11, calculated position of the Polar Front in Fig 2.1.12 and stratification in Figs. 2.1.13 and 2.1.14.

The surface temperatures gradually decrease northwards and it is only in the far northern areas of the Barents Sea temperatures below 0$^{o}$C were observed. Compared to earlier observations the surface temperatures were both lower than in 2009 (0.5-1.3°C) and lower than the long-term mean (0.1-1.2°C). This shows that the summer heating of the surface this year has been less than normal or extensive downward mixing. The only area with positive surface anomalies (> 0.5°C) was near the Spitsbergen Archipelago and then mainly on the western side (Fig. 2.1.10).

Large decrease in surface temperature was observed northwest of Svalbard (Fig. 2.1.10), and this extended down to 100 m depth. In this area the temperature has decreased by close to 3$^{o}$C compared to 2009.

Arctic Waters are usually most dominant in 50 m depth, and this year high positive temperature anomalies (0.7-1.6°C) were observed in the Arctic Water north of 76$^{o}$N. Only small areas in 50 m depth had temperatures below -1$^{o}$C (Fig. 2.1.4).

In 100 m depth and close to bottom, only small areas with temperatures below 1$^{o}$C was observed (Fig. 2.1.6 and 2.1.8). The calculated position of the Polar Front shows a close to normal location (Fig. 2.1.12). Thus the warm waters north of the Polar Front were not due to shifts in the frontal position. The temperatures in the depths below 100 m were in general lower than in 2009 by 0.2$^{o}$C, but still above the long-term mean (0.1-0.6°C) in most of the Barents Sea (Fig. 2.1.11).

The high temperature in the Barents Sea is mostly due to the inflow of water masses with high temperatures from the Norwegian Sea. During the last 8 years the inflow to the Barents Sea has been warm.

### 2.1.3 Stratification

Vertical stratification of the upper 50 m was calculated as the density difference between 50 m and surface (Fig. 2.1.13 and 2.1.14). The stratification was weak (close to 0) in most of the Barents Sea in 2010 (Fig. 2.1.13). Strong stratification was found only in the far northern parts close to the ice edge, and in the far southern and eastern parts due to river runoff. Compared to a long-term mean there is significant reductions in stratification in the northern and the southern areas (Fig. 2.1.14). Weak stratification may generate stronger supply of nutrients from the lower water masses, which is necessary to maintain primary production through the summer season.

## 2.2 Distribution and abundance of 0-group fish

The distribution of eleven 0-group fish species (capelin, cod, haddock, herring, polar cod, saithe, redfish, Greenland halibut, long rough dab, wolffish, sand eel) are shown in Figs 2.2.1-2.2.11. The density grading in the figures is based on the catches, measured as number of fish per square nautical mile. More intensive colouring indicates denser concentrations. Abundance indices calculated for most ecologically important species (capelin, cod, haddock, herring, polar cod, saithe, redfish, Greenland halibut and long rough dab) from 1980-2010 are shown in Tables 2.2.1 to 2.2.2. Length frequency distributions of the main species are given in Table 2.2.3.

The 2010 the year classes of cod, haddock and saithe can be characterized as abundant. The 2010 year class of capelin is higher than average, while year classes of redfish and polar cod are close to average. Recruitments of herring, Greenland halibut, long rough dab and wolffish are poor.

### 2.2.1 Capelin *(Mallotus villosus)*

0-group capelin were distributed over a wide area - from the Norwegian and Russian coast until 77˚N and between 15˚E and 57˚E (Fig. 2.2.1), and the boundary of capelin distribution was found in all directions. Highest densities of 0-group capelin were observed in the central and south-eastern part of the Barents Sea, between 25-35˚E and 42-48˚E.

Otoliths were taken regularly, and it was easy to separate 0-group fish from older fish due to different lengths of fish this year. The most part of fish were between 3.5 and 5.5 cm, with average of 4.4 cm. Very small fish were found near the Kildin Island (Murman coast) with length about 2 cm, which indicate that summer spawning has taken place in this area.

The calculated density varied from 162 to 8 million fish per square nautical mile. Mean catch per trawl was 1362 fish.

The 2010 year class is weaker than 4 previous year classes (2006-2009), although it is higher than long term average and can be characterized as relatively strong.

### 2.2.2 Cod *(Gadus morhua)*

0-group cod were distributed over a wide area, as usually (Fig. 2.2.2). The main dense concentrations were registered in the central part of the sea between 72˚N -74˚N and 20˚-35˚E. Scattered registrations were observed until 77˚N and along the western and northern coast of the Spitsbergen up to 82˚N.

The fish length of 0-group cod were between 4 and 14 cm. Most of the fish were between 7.0 and 9.0 cm, with mean length of 8.6 cm. The mean length is higher than the long term mean, which probably indicate suitable feeding conditions this year.

The highest calculated density was as 5.6 million fish per square nautical mile. Mean catch was 586 fish per trawl haul.

The abundance index of the 2010 year-class is 2 times higher than the long term mean level and the year class of 2010 can be characterized as strong. It is, however, lower than in 2008-2009.

### 2.2.3 Haddock *(Melanogrammus aeglefinus)*

The occupation area of 0-group haddock was considerably smaller in comparison with 2009. Haddock were observed mainly in the central parts of the Barents Sea from the 72˚N up to 73˚N and between 19˚ and 29˚E. S cattered concentrations were observed along the western and northern coast of Spitsbergen and along the Norwegian coast (Fig. 2.2.3).

The length of 0-group haddock varied between 4.0 and 14.0 cm and length of most of the fish was between 7.0 and 10.0 cm. Mean length of haddock was 8 cm, which is as higher than the long term mean. Larger fish indicates suitable feeding conditions this year.

The calculated density varied from 138 to 687 thousand fish per square nautical mile. Mean catch per trawl was 103 fish.

In 2005 an extremely good year class was observed, but since then, haddock abundance has varied considerably. The 2010 year class is only half of that in 2009, but higher than the long term level, and can be characterized as relatively strong.

### 2.2.4 Herring *(Clupea harengus)*

Since 2004 no strong year classes has been observed in the Barents Sea. The occupation area of herring is much smaller than in previous years. 0-group herring were distributed in the central part of the Barents Sea. A dense concentration of herring was observed between 73-74˚N and 31-35˚E (Fig.2.2.4). Scattered concentrations were observed in the southern part of the Barents Sea and to the west of Spitsbergen.

Mean length of herring was 7.0 cm, somewhat lower than in previous years. The length of herring varied between 3.5 and 9.5 cm, and most of the fish were 6.5-8.0 cm.

Mean catch per trawl haul was 287 fish, lower than in 2007-2009. The calculated density varied from 75 to 5.3 million fish per square nautical mile.

The 2010 year-class of herring is lower than the average level, and can be characterized as poor.

### 2.2.5 Polar cod *(Boreogadus saida)*

In 2010 the distribution of polar cod was continuous, and not split into an eastern and a western component. Polar cod was distributed from the western and southern coast of Novaja Zemlja to Spitsbergen (Fig. 2.2.5). A dense concentration was observed close to the western coast of Novaja Zemlya, while scattered concentrations occurred around Spitsbergen and in the northern parts of the Barents Sea.

The abundance indices were calculated separately for the eastern component and western components of 0-group polar cod. Abundance of both (eastern and western) components were somewhat lower than the long term averages.

The mean length of 0-group polar cod was 3.7 cm, and was much lower than in the last three years and long term mean. Most of the fish had length between 3 and 4 cm.

The 2010 year class of polar cod (summing the two components) seems to be poor. 0-group polar cod distributes further north and east than the surveyed area and only a part of the total distribution was covered during this survey.

### 2.2.6 Saithe *(Pollachius virens)*

Distribution of 0-group saithe was much wider than in previous years. Scattered concentrations were observed in the central, southern areas and along the Murman coast west of 43˚E (Fig. 2.2.6). The main density was registered between 72-74˚N and 25-31˚E.

Length of 0-group saithe varied between 5.0 and 13.5 cm, and most of the fish were between 9 and 11 cm. Mean length of saithe was 9.8 cm, which is higher than the long term mean. Larger recruits this year indicate good feeding conditions during their first summer of life.

The maximum calculated density reached 77170 fish per nautical mile and the maximum catch was 458 fish. Both density and catch rates were much higher than in previous years.

Since 2006 abundance indices have continuously decreased, and in 2009 the index was 12 times lower than long term average. The 2010 year class was more than twice as high as the long term mean, and therefore the 2010 year-class of saithe in the Barents Sea may be characterized as strong.

### 2.2.7 Redfish *(Sebastes sp.)*

0-group redfish was observed in two components: one was registered in the central part of the Barents Sea between 72-74˚N and 20˚-32˚E, and another to the west and north of Spitsbergen (Fig. 2.2.7). The distribution area of redfish was somewhat smaller, but had higher concentrations than in 2009.

In 2010 the mean fish length was 4.9 cm, which is higher than the long term mean. Larger 0-group redfish in this year indicate good feeding conditions during the first months of life.

Mean catch per trawl haul reached 961 fish. The calculated density reached 24.5 million fish per square nautical mile.

The abundance of 0-group redfish is near the long term average. So the 2010 year-class may be characterized as average.

### 2.2.8 Greenland halibut *(Reinhardtius hippoglossoides)*

As in the previous four years, 0-group Greenland halibut were found in small areas and in very low densities to the north and west of Spitsbergen (Fig. 2.2.8). Greenland halibut starts to settle to the bottom before the ecosystem cruise is carried out, and there might be a strong variation in the timing of larvae settling. In addition, lack of trawling deeper than 60 m may introduce more uncertainties in abundance estimation. Therefore the calculated 0-group Greenland halibut is probably not reflecting the real year-class strength.

The mean length of fish was 6.3 cm, which is lower than in 2008 and 2009 when it was close to the long term mean. Fish length varied between 3.0 and 8 cm, while most of the fish was between 5.5 and 7.0 cm.

The calculated density reached 1797 fish per square nautical mile.

Greenland halibut increased in 2010, although the 0-group index is only half of the long term average.

### 2.2.9 Long rough dab *(Hippoglossoides platessoides)*

Long rough dab was distributed in patches in the southern, central and north-western parts of the Barents Sea (Fig.2.2.9). Dense concentrations of 0-group long rough dab were not observed during the survey.

Mean length of fish was low (3.1 cm), which is the same as in the last 5 years. In most catches fish lengths between 2.5 and 4.0 cm dominated.

Mean catch was very low and some catches reached up to 158 fish. The calculated density reached only 28.8 thousand fish per square nautical mile.

The 2010 year-class of long rough dab is approximately 5 times lower than the long term mean. Therefore the year class in 2010, may be characterized as poor as in 2009.

### 2.2.10 Wolffish *(Anarhichas sp.)*

In the Barents Sea three species of wolfish are found: Atlantic wolffish (*Anarhichas lupus*), Spotted wolffish (*Anarhichas minor*) and Northern wolffish (*Anarhichas denticulatus*). Due to uncertainty in species identification at the 0-group stage it was decided to combine the species into a larger group (genus) during the 0-group investigations.

0-group wolffish was found at some stations in the central area and south and north of Spitsbergen (Fig. 2.2.10).

The calculated density reached 1620 fish per square nautical mile, which was lower than in 2008-2009. No index is calculated for this species.

### 2.2.11 Sandeel *(Ammodytes sp.)*

In the Barents Sea Ammodytidae are represented by *Ammodytes marinus* which is distributed along the Norwegian coast, and *Ammodytes tobianus* which distributed in the southeast and between Novaya Zemlya and Bear Island. Due to uncertainty in species identification at the 0-group stage it was decided to combine species into a larger group (genus).

Some concentrations of 0-group sandeel were found in the central and south-eastern parts of the Barents Sea (Fig. 2.2.11).

Mean catch was 6 fish per trawl haul, which is much lower than in 2008-2009. The calculated density reached 221 thousand fish per square nautical mile. This is lower than in 2008-2009. No index was calculated for this species.

### 2.2.12 Blue whiting *(Micromesistius poutassou)*

Only one specimen of 0-group of blue whiting of 59 mm length was registered during the survey (74°04′ N 25°54′ E).

## 2.3 Distribution and abundance of pelagic fish

Numbers of fish sampled during the survey are presented in Appendix 1.

### 2.3.1 Capelin *(Mallotus villosus)*

#### *2.3.1.1 Distribution*

The geographical density distribution of capelin at age 1+ and for the total stock are shown in Figs. 2.3.1 and 2.3.2. The total distribution area of capelin was wider than in last year. It covered most parts of the Barents Sea and the areas to the west of Svalbard, but extended further to the north in the areas east of Svalbard, more resembling the distribution found in 2008. The main dense concentrations were found to the east of the Hopen island and northwards to King Karls Land. Young capelin were mainly found south of 76ºN, and dense concentrations were located in the Central Bank area.

Sample echograms of capelin distribution in the northern area are shown in Fig. 2.3.3 and in north-western areas – in Figs. 2.3.4a,b).

#### *2.3.1.2 Abundance estimate and size by age*

A detailed stock size estimate is given in Table 2.3.1, and the time series of abundance estimates is summarized in Table 2.3.2. The main results of the abundance estimation in 2010 are summarized in the text table below. The 2009 estimate is shown on a shaded background for comparison.

**Summary of stock size estimates for capelin**

| Year class | | Age | Number ($10^9$) | | Mean weight (g) | | Biomass ($10^3$ t) | |
|---|---|---|---|---|---|---|---|---|
| 2009 | 2008 | 1 | 247.7 | 124.0 | 3.0 | 3.4 | 739.8 | 417.4 |
| 2008 | 2007 | 2 | 127.8 | 166.4 | 10.2 | 10.9 | 1300.9 | 1821.8 |
| 2007 | 2006 | 3 | 61.2 | 61.5 | 23.4 | 24.6 | 1432.0 | 1510.2 |
| 2006 | 2005 | 4 | 0.9 | 0.3 | 26.7 | 28.4 | 25.0 | 7.1 |
| Total stock in: | | | | | | | | |
| 2010 | 2009 | 1-4 | 437.6 | 352.1 | 8.0 | 10.7 | 3498.0 | 3756.5 |
| Based on TS value: $19.1 \log L - 74.0$, corresponding to $\sigma = 5.0 \cdot 10^7 \cdot L^{1.91}$ | | | | | | | | |

The total stock is estimated at about 3.5 million tonnes. It is about 7% lower than the stock estimated last year but higher than the long term mean level. About 59 % (2.1 million tonnes) of this stock is above 14 cm and considered to be maturing. The 2008 year class (1-group) consists, according to this estimate, of about 248 billion individuals. This estimate is 2 times higher than that obtained for the 1- group last year. The mean weight (3.0 g) is 0.4 g lower than that measured last year, and 0.6 g below the long-term average. The biomass of the 2009 year class is about 0.74 million tonnes, which is 1.8 times higher than one year olds in last year and above the long term mean. It should be kept in mind that, given the limitations of the acoustic method concerning mixed concentrations of small capelin and 0-group fish and near-surface distribution, the 1-group estimate might be more uncertain than that for older capelin.

The estimated number of the 2008 year class (2-group) is about 128 billion, which is about 77% the size of the 2007 year class measured last year. Consequently the biomass of the two years old fish is about 1.3 million tonnes. The mean weight at this age is 10.2 g, which is lower than in last year (10.9 g), but is near the same as the long-term average (Table 2.3.2).

The 2007 year class is estimated at about 61 billion individuals, which is equal to the three-year-olds last year. This age group with mean weight 23.4 g (about 4.3 g above the long-term average) has a biomass of about 1.4 million tonnes. The 2006 year class (now 4 years old) is estimated at 0.9 billion individuals. With a mean weight of 26.3 g this age group makes up only about 23 thousand tonnes. Practically no capelin older than four years was found.

The capelin stock size estimate is used as input to the stock assessment and prognosis model for capelin (CapTool). The mature part of the stock is basis for the prognosis of spawning stock in spring 2011, where also mortality induced by predation enters into the calculations. The work concerning assessment and quota advice for capelin is dealt with in a separate report that will form part of the ICES Arctic Fisheries Working Group report for 2011.

#### *2.3.1.3 Total mortality calculated from surveys*

Table 2.3.3 shows the number of fish in the various year classes, and their "survey mortality" from age one to age two. As there has been no fishing on these age groups, the figures for total mortality constitute natural mortality (M) only. The estimates of M have varied considerably, and within survey uncertainties reflect quite well the predation on capelin. From 2006, the natural mortality started to decrease but increased to 47% in 2009. In 2010 the M was estimated to a small negative value, as it was for the year classes 1992, 1994, and 2006, This shows that either the one-group are underestimated or the two-group is overestimated these years. Knowing that the measurement of the 1-group is more uncertain than the older age groups due to limitations in the acoustic method, the first mentioned possibility is the most probable.

### 2.3.2 Polar cod *(Boreogadus saida)*

#### *2.3.2.1 Distribution*

As in the previous year, the polar cod distribution in the Barents Sea was almost completely covered. The polar cod stock was widely distributed in the northern and eastern parts of the Barents Sea and adjoining part of the Kara Sea (to the north of Novaja Zemlja). The geographical density distribution for fish at age 1+ and for the total stock are shown in Figs. 2.3.5 and 2.3.6. The main concentrations of adult fish were found along west coast of Novaja Zemlja and young fish in the area between the 77-78ºN 52-56ºE. The first prespawning schools of polar cod was observed in the local area between 71-72ºN and 50-52ºE in August 29. A small area of scattered concentrations were observed to the east of Spitsbergen.

Figure 2.3.7 shows a typical acoustic registration of polar cod near the Novaja Zemlja.

#### *2.3.2.2 Abundance estimation*

The stock abundance estimate by age, number, and weight was calculated using the same computer program as for capelin.

A detailed estimate is given in Table 2.3.4, and the time series of abundance estimates is summarized in Table 2.3.5. The main results of the abundance in 2010 are summarized in the text table below. The 2009 estimate is shown on a shaded background for comparison.

**Summary of stock size estimates for polar cod**

| Year class | | Age | Number ($10^9$) | | Mean weight (g) | | Biomass ($10^3$ t) | |
|---|---|---|---|---|---|---|---|---|
| 2009 | 2008 | 1 | 27.3 | 13.3 | 8.6 | 7.5 | 234.2 | 100.2 |
| 2008 | 2007 | 2 | 18.3 | 22.2 | 29.7 | 22.2 | 543.1 | 492.5 |
| 2007 | 2006 | 3 | 13.0 | 8.3 | 45.8 | 33.7 | 594.6 | 280.0 |
| 2006 | 2005 | 4 | 1.3 | 0.34 | 46.8 | 48.8 | 58.6 | 16.6 |
| Total stock in | | | | | | | | |
| 2010 | 2009 | 1-4 | 59.8 | 44.1 | 23.9 | 20.2 | 1430.5 | 889.3 |
| Based on TS value: 21.8 log L – 72.7, corresponding to $\sigma = 6.7 \cdot 10^7 \cdot L^{2.18}$ | | | | | | | | |

The number of individuals in the 2009 year-class (the one-year-olds) is 2 times higher than the one-group measured last year. The mean weight is also higher, and therefore, the biomass of one-year-olds is 2.4 times higher compared to last year. The abundance of the 2008 year class (the two-year-olds) is 18.3 billions. This is almost 18 % lower than the two-group found last year but mean weight was 7.5 g higher. The biomass, therefore, increased significantly compared to the 2007 year-class estimated last year. The three-years-old fish (2007 year class) is about 13 billions, 1.6 times higher than the three-group estimated last year. The mean weight is considerable higher and the biomass of this age group is more than two times higher than that for the corresponding age group during the 2009 survey. The four-year-olds (2006 year class) are scarcely found, but the total numbers estimated are much higher then in last year. No fish of age 5 or higher were found. The total stock, estimated at 1.4 million tonnes, is 1.6 times higher to that found in 2009, due to good recruitment, high individual growth and good survival. The present estimate indicates that the polar cod stock is in good condition now.

#### *2.3.2.3 Total mortality calculated from surveys*

Table 2.3.6 shows the "survey-mortality rates" of polar cod in the period 1985 to 2010. The mortality estimates are unstable during the whole period. Although unstable mortalities may indicate errors in the stock size estimation from year to year due to incomplete coverage and other reasons, the impression remains that there is a considerable total mortality on young polar cod. Prior to 1993, these mortality estimates represent natural mortality only, as practically no fishing took place. In the period 1993 to 2006 catches were at a level between 1 and 50 000 tonnes. Since there has been a minimum landing size of 15 cm (from 1998, 13 cm) in that fishery, a considerable amount of this could consist of two- and even one-year-olds, and this may explain some, but only a small part of the high total mortality. From 2003 to 2004, 2006-2007 and 2009-2010 there are negative survey mortalities for age groups 1-2 and in 1998-1999 with 2003-2004 also for age group 2-3, confirming the impression expressed previously that in some years the estimate for various reasons were underestimates. Apart from these years, the survey mortalities have been quite stable in recent period.

### 2.3.3 Herring (Clupea harengus)

In the Barents Sea only young Norwegian spring spawning (Atlantic) herring is present, although some older herring may be found outside the coast of western Finnmark. At age 3-4 the herring migrates to the Norwegian Sea, where it spends the rest of the adult life. The young herring have very big fluctuation and abrupt changes in numbers in the Barents Sea.

In some cases it is difficult to assess the young herring stock size during autumn. The main problem is in distribution of herring schools close to the surface, above the range of the echo sounders. It is also problematic to get representative sampling of fish schooling near the surface.

#### *2.3.3.1 Distribution*

This year, no herring was found in the eastern Barents Sea. In the western part (Figure 2.3.8) herring in age groups 1-11 was registered. This is the first year since 2002 that no young Norwegian spring spawning herring has been distributed in the eastern Barents Sea.

The herring in the western component was very scattered. For the older age groups, the covered area only covers a small part of the distribution area, which stretches westwards into the Norwegian Sea.

#### *2.3.3.2 Abundance estimation*

The estimated number and biomass of western and eastern components of Atlantic herring for total age- and length groups are given in Table 2.3.7. The time series of estimates is shown in Table 2.3.8. In the text table below the main results of the abundance estimation in 2010 are summarized for young herring only (1-4 years old). The 2009 estimate is shown on a shaded background for comparison. It is noted that because of insufficient sampling of herring, this estimate divided on age-groups should be considered highly uncertain.

**Summary of abundance estimates of the portion of the herring stock found in the Barents Sea**

| Year class | | Age | Number ($10^9$) | | Mean weight (g) | | Biomass ($10^3$ t) | |
|---|---|---|---|---|---|---|---|---|
| 2009 | 2008 | 1 | 1.047 | 1.538 | 32.9 | 31.4 | 34.5 | 48.4 |
| 2008 | 2007 | 2 | 0.315 | 0.433 | 106.9 | 119.5 | 33.7 | 51.8 |
| 2007 | 2006 | 3 | 0.234 | 1.807 | 157.7 | 159.0 | 37.0 | 287.3 |
| 2006 | 2005 | 4 | 0.251 | 0.446 | 191.1 | 184.7 | 48.1 | 82.4 |
| Total stock in: | | | | | | | | |
| 2010 | 2009 | 1-4 | 1.847 | 4.224 | 82.8 | 111.2 | 153.3 | 469.9 |
| Based on TS value: 20.0 log L – 71.9, corresponding to σ = 8.1·10-7 · L2.00 | | | | | | | | |

The total abundance of herring aged 1-4 covered during the survey was estimated at $1.8 \cdot 10^9$ specimens (less than half the value estimated in 2009). The biomass of $0.15 \cdot 10^6$ t is more than 3 times lower than what was found in 2008.

Since 1999, young Norwegian spring spawning herring has been estimated in the Barents Sea, all previous years are enclosed in table 2.3.8 for comparison. During most years one and two year olds prevailed. In 2007-2008 three and four year olds dominated in the south eastern area (from Kanin herring mostly). In 2009 and 2010 herring of 3+ year olds were distributed mainly in the south western areas.

### 2.3.4 Blue whiting (Micromesistius poutassou)

In the western part of the Barents Sea blue whiting were observed as in previous years. The target strength used for blue whiting is uncertain, and the estimate should to a greater extent than the other estimates be considered as a relative quantity only.

#### *2.3.4.1 Distribution*

The distribution of blue whiting (all age groups) is shown in Figure 2.3.9. As in previous years the distribution area stretches eastward from the western boarder of the covered area up to 32˚E and from northern coast of Norway up to 77°N to the west of Spitsbergen.

#### *2.3.4.2 Abundance estimation*

The estimated number and biomass of blue whiting per age- and length group is given in Table 2.3.9. Total abundance was estimated to be 0.9 x $10^9$ individual fish and the biomass to 0.183 · $10^6$ t. Since 2004-2005, when more than one million tonnes of blue whiting was found in this area, there has been a steady decrease in biomass (Table 2.3.10), and the age distribution has been shifted towards older fish. The main bulk of this stock component in 2010 consisted of 2001-2005 year-classes at age 5-9. Older fish were found in smaller quantities and only insignificant numbers of fish younger than 4 years old were found.

## 2.4 Demersal fish

Figs. 2.4.1-2.4.10 shows the distribution of demersal fish. Numbers of fish sampled during the survey are presented in Appendix 1.

### 2.4.1 Cod *(Gadus morhua)*

The distribution area of cod in the Barents Sea (Fig. 2.4.1) was completely covered. At this time of the year, towards the end of the feeding period, the distribution of cod is wide. Cod reach the limits of its natural habitat and could spread far north, east and northeast. Total distribution of cod was near the same as last year, but it stretched farther northwards, with high concentrations also in some areas north of 78°N (Fig. 2.4.2). The main concentrations were observed in three areas: one was to the south-west of the Novaja Zemlja archipelago, and the other ones were on Great Bank, and to the north-east of Hopen Island. The main biomass of cod was concentrated in the depth range from 150 m down to 250 m (75%).

### 2.4.2 Haddock *(Melanogrammus aeglefinus)*

The haddock distribution (Fig. 2.4.3) was totally covered during the survey. Haddock were distributed in a large area from the coast to 81°N and to east until 57°E. The main consentrations of haddock were found around Bear Island and on shallow sites in the southeast part of the Barents Sea which coincide with the distribution in 2009. Denser concentrations than last year were observed also in Pechora Sea and to the northwest of Spitsbergen. The greatest concentrations (70 % of total) were distributed on depths down to 100 m.

### 2.4.3 Saithe *(Pollachius virens)*

The survey has captured only a part of distribution of saithe around northern coast of Norway (Fig. 2.4.4). Essentially, saithe were distributed in the warm water masses along the coast of Norway and Russia between 19-33°E. 95% of the population was found in the depth range 150 to 300 m. The distribution of saithe in 2010 coincides with the distribution in 2009, but with lower densities. Also in 2010 saithe has been caught to the north of Bear Island where it has not been found in recent years.

### 2.4.4 Greenland halibut *(Reinhardtius hippoglossoides)*

During survey mainly young age groups of Greenland halibut were observed (Fig. 2.4.5). The adult part of the stock was distributed outside of the survey area. Foremost concentrations were located in traditional places on slope around Bear Island-Hopen and in the deeper part around Spitsbergen to the Franz Josef Land archipelago and in the northern part of the Kara Sea. The main biomass (62 %) of Greenland halibut has been concentrated in the depth range from 250 m to 450 m. Increasing concentration of Greenland halibut in the deep-water zone in the southeast part of the Barents Sea was the main difference of the distribution in the current year in comparison to 2009.

### 2.4.5 Golden redfish *(Sebastes marinus)*

Golden redfish (Fig. 2.4.6) were distributed in the same part of the Barents Sea basin as in previous years. The main densities were detected along the shelf slope to the west of Spitsbergen archipelago and along the shelf slope to the southwest and central part of the Barents Sea. The main part (62 %) was concentrated at depths from 250 down to 350 meters.

### 2.4.6 Deep-water redfish *(Sebastes mentella)*

The main dense concentrations of deep-water redfish were distributed in traditional places of dwelling, and were found in western and north-western parts of the Barents Sea (Fig. 2.4.7). Most concentrations were located along the shelf slope off the Bear Islands and to the northwest of Spitsbergen. Mainly young age groups of *Sebastes mentella* were found to the east of Franz Josef Land in Saint Anna trench and in deep-water zone to the east part of the Barents Sea. The main biomass of Deep-water redfish (80 %) was concentrated in the depth range from 300 m down to 450 m.

### 2.4.7 Norway redfish *(Sebastes viviparus)*

Norway redfish (Fig. 2.4.8) were distributed in the southwest part of the Barents Sea. The main biomass of Norway redfish (70 %) was concentrated at depths from 250 m down to 350 m.

### 2.4.8 Long rough dab *(Hippoglossoides platessoides)*

As in previous years, distribution of long rough dab was wider than the other species. It was found in practically all areas, and the catches were quite high in most cases (Fig. 2.4.9). Catches of long rough dab were taken as far east as 77°E and north as 80°N in area of Saint Anna trench. The greatest catches of long rough dab were to the south from Spitsbergen, near Hopen Island, and on shallow sites in the central part of the Barents Sea. The main biomass of long rough dab (85%) was concentrated in the depth range from 100 m down to 300 m.

### 2.4.9 Wolffishes *(Anarhichas sp.)*

All of the three species - Atlantic wolffish (*Anarhichas lupus*), Spotted wolffish (*Anarhichas minor*) and Northern wolffish (*Anarhichas denticulatus*) had approximately the same catch rates.

Compared to 2009 the distribution of Atlantic wolffish was more limited (Fig. 2.4.10) and catches were lower. The greatest catches of Atlantic wolffish were to the south from Spitsbergen, near Bear Island, and on shallow sites in the southeastern part of the Barents Sea. The main biomass of Atlantic wolffish (74%) was concentrated in the depth range from 50 m down to 150 m.

Compared to 2009 Spotted wolffish was distributed more widely (Fig. 2.4.11). The greatest catches of Spotted wolffish were to the east from Bear Island, and on shallow sites in the southeastern and in the central part of the Barents Sea. The main biomass of Spotted wolffish (57%) was concentrated in a range of depths from 100 m down to 200 m.

In current year distribution of Northern wolffish was similar to that observed in 2009 with decreasing in the west Spitsbergen area (Fig. 2.4.12). Most concentrations were located in the central areas. The main part of the catches (70 %) were in the depth range 250-350 m.

### 2.4.10 Abundance and biomass estimation of the demersal fish

Preliminary estimation of the abundance and biomass of demersal fish was done. Definitive results will be presented after age reading. In the table results of estimation are presented.

**Preliminary estimation of the abundance and biomass of demersal fish.**

| | Abundance, $10^6$ | Biomass, $10^3$ t |
|---|---|---|
| Atlantic wolffish | 16.6 | 17.1 |
| Spotted wolffish | 6.7 | 36.5 |
| Northern wolffish | 3.1 | 25.1 |
| Long rough dab | 2 520.1 | 355.6 |
| Norway redfish | 26.1 | 2.2 |
| Golden redfish | 22.2 | 4.3 |
| Deep-water redfish | 1 075.8 | 111.6 |
| Greenland halibut | 186.3 | 149.6 |
| Haddock | 2 289.1 | 1 406.0 |
| Saithe | 5.4 | 8.9 |
| Cod | 2 231.4 | 2 801.0 |

A list of all fish species sampled during the survey is given in Appendix 1. Some species were chosen as indicator species to demonstrate the distribution patterns of fishes from the different zoogeographic groups: the Thorny skate (*Amblyraja radiata*), Northern skate (*Amblyraja hyperborea*) and Plaice (*Pleuronectes platessa*) (Figs. 2.4.13-2.4.15).

### 2.4.11 Thorny skate *(Amblyraja radiata)*, boreal zoogeographic group

As in 2009 this species was quite widely distributed in the Barents Sea excluding southeastern and northeastern regions (Fig. 2.4.13). Most large catches were in the central area, around Bear Island and to the west of Spitsbergen and on shallow sites in the southeast corner of the Barents Sea. Catches of thorny skate were taken as far east as 50°E and north as 80°N in the area of Saint Anna trench. The Thorny skate preferred to stay in a wide range of depths from 50 m down to 150 m (44 % of total was found there).

#### 2.4.12 Northern skate *(Amblyraja hyperborea)*, boreal zoogeographic group

Northern skate was distributed in the northeast part of the Barents Sea and along the shelf slope to the west of Spitsbergen (Fig. 2.4.14). The main catches were from range of depths from 200 m down to 300 m (38 % of total).

#### 2.4.13 Plaice *(Pleuronectes platessa)*

Plaice was mainly distributed (75 % of total) in the depth range from 50 down to 100 m northwest from Kanin peninsula (Fig. 2.4.15).

#### 2.4.14 Norway pout *(Trisopterus esmarkii)*

Main dense concentrations of Norway pout were registered in the south-western areas (Fig. 2.4.16). At the same time along the warm Spitsbergen current Norway pout was observed until 79°N. Along the coastal North Cape current Norway pout were distributed eastward to 47°E. The main biomass of Norway pout (69 %) was concentrated in the depth range from 200 m down to 300 m.

#### 2.4.15 New and rare species in the Barents Sea

In the survey there were both new species to the area and recordings for rare species in the area observations (Fig. 2.4.17). Some of these species have their main distribution in the warm waters of the Norwegian Sea (*Petromyzon marinus, Eutrigla gurnardus*) or in the cold waters of the Kara Sea (*Arctogadus glacialis*) bordering the Barents Sea, while others have highly specialized habitats. The greatest quantities of rare species were observed along slope of shelf in deep areas in the eastern part of the Barents Sea.

## 2.5 Phytoplankton

Data on chlorophyll **a**, nutrients and phytoplankton species composition are now being processed and analyzed at the IMR and PINRO laboratories. A summary and some preliminary results will be presented in an electronic attachment after the data have been worked up in the laboratories.

## 2.6 Zooplankton

The map of zooplankton sampling localities and sampling gear (Russian and Norwegian vessels) are shown in Fig. 2.2. The main results of the zooplankton observations will be presented in an electronic attachment after the data have been worked up in the laboratories.
From Fig. 2.2 and Fig. 2.6.1 it is apparent that the investigated area is covered very well as seen from the number of CTD stations taken. From a total of 261 stations 373 WP2 net hauls were obtained by the Norwegian vessels “G.O. Sars”, “Johan Hjort” and “Jan Mayen”. For the second time the area north of Spitsbergen was covered with respect to mesozooplankton

distribution and abundance. Stratified sampling targeting slightly larger zooplankton (i.e. krill/amphipods) was conducted with the Mocness system, while a new Macroplankton trawl was operated in a double oblique haul from both "G.O. Sars" and "Johan Hjort", particularly in the central and northern regions of the Barents Sea to obtain integrated samples of krill and amphipods to better assess their population structure. The WP2 vertical net coverage is very satisfactory and comparable to the years 2006, 2007 and 2009. The table below gives an overview of total zooplankton hauls for different types of zooplankton sampling gear during the Ecosystem survey.

**Total number of zooplankton net hauls obtained during the Norwegian and Russian surveys in the Barents Sea in August-September 2010.**

| Net | Norwegian ships | | | Russian ships |
|---|---|---|---|---|
| | «G.O.Sars» | «J.Hjort» | «Jan Mayen» | «Vilnyus» |
| WP-2 | 117 | 182 | 64 | - |
| Juday | - | - | - | 263 |
| MOCNESS | 13 | 15 | - | - |
| Macroplankton trawl | 5 | 11 | | |
| BR | - | - | - | 32 |

A map of the zooplankton biomass distribution based on Norwegian data is shown in Fig 2.6.1. From the Norwegian data, sampled in the western part it is evident that a greater region of the Barents Sea has very low biomass in 2010, hence compares to what was observed in 2008 and 2009. There is however evidence of a higher biomass region in the western Barents Sea. The average zooplankton biomass in 2010, based only on Norwegian data (i.e. the western half of the Barents Sea, excluding the area around Svalbard) is 6.6 g/m$^2$, compared to 6.48 g/m$^2$ for 2008 and 5.87 g/m$^2$ for 2009.

According to the Russian data (i.e. the eastern half of the Barents Sea) the highest biomass were observed in the central parts of the Barents Sea. Preliminary data (as a result of processing of 11 samples) show highly variable (2.9-27.0 g/m$^2$) zooplankton biomass in the central and north-eastern areas (77-81ºN 36-70ºE). Maximum (14-27g/m$^2$) were found north of 81ºN. Arctic species dominated the zooplankton composition with *Metridia longa* being the most abundant showing up to 90 ind./m$^3$ in the central ( 81ºN 44ºE) and 440 ind./m$^3$ in the north-eastern parts (77º30'N 54º50'E). In both cases the population of this species was represented by copepodid stages I-V. A part of the individuals reproduced, and this occurred most intensively in the north-eastern areas. Also *Metridia nauplii* were observed, and *Pseudocalanus minutus* (mainly copepodid stage IV and females) was numerous. Quantitative distribution of *Calanus* varied as well. In the north-eastern areas *Calanus finmarchicus* of stages I-V and females (up to 260 ind./m$^3$) dominated followed by *C. glacialis* and *C. hyperboreus* (individuals of stage IV and females.. At this site the contribution of *C. finmarchicus* to the total biomass of *Calanus* was at a minimum – around 53%, while *C. glacialis* contributed with 38% and *C. hyperboreus* with 9%. In the north-central parts the densest concentrations were made up of *C. glacialis* of stages III-V and females. In this region reproduction of *C. glacialis* occurred and the ratio of males to females were 9:1. By means of this species around 86% of biomass was formed, which comprised 13.8 g/m$^2$. Alongside with *Copepoda*, plankton had abundant representatives of other taxons. In the east the largest concentrations were made up of *Oikopleura* and juvenile *Pteropoda*. *Sagitta* (10-30 mm), *Thysanoessa spp*. (16-20 mm), *Themisto abyssorum* (8 mm), *Pareuchaeta norvegica* occurred in small numbers. The plankton composition was more variable in the central areas with additional *Themisto libellula* (16 mm), *Eukronia hamata* (31-34 mm) and larval *Polychaeta* and *Bivalvia*. *Nauplii of Calanus* spp. were scanty.

From the Norwegian vessel "G.O. Sars" a total of 117 WP-2 hauls (100-0 m and bottom-0 m) were conducted at 59 stations. From the Norwegian vessels no Juday net was deployed during the ecosystem survey in 2010. Hauls conducted west of the 500 m depth contour at the entrance to the Barents Sea as well as 200-0m net hauls where bottom depth significantly exceeds 200 m are not included. On "Johan Hjort" a total of 182 WP-2 hauls (100-0 m and bottom-0 m) were conducted at 102 stations. A total of 183 stations from all three Norwegian ships satisfied the extraction criteria for the bottom-0m stratum.

Species composition, abundance and biomass from WP2 and Juday nets collected at the same stations in 2004 and 2005 have been partly analyzed and compared. Preliminary analysis has shown a significant variability in stage composition of key species of *Calanus*. Based on data from 2004 and 2005, including Russian data from 2006 when present, a more extensive comparison and analysis are now being undertaken to help quantify this variability. The agreement on comparative collection of zooplankton samples by WP-2 and Juday net on Norwegian and Russian vessels will be followed up by both parties with regard to working up samples, exchange of raw data, analysis and publication in relevant reports, symposia or international refereed journals. It is suggested that current and past effort is strengthened with additional sampling and also new approaches in future surveys with the ultimate goal of a unified sampling approach.

It was recommended for 2007, based on experience during field sampling in 2005 and from preliminary comparisons based on data from 2004 and the agreement outlined above, that a dual net system should be built that can hold both a WP2 and a Juday net for better performance and more efficient comparisons between the sampling gears. This was done during spring-summer 2007 and the new gear was deployed during the latter part of the "G.O. Sars" Barents Sea Ecosystem cruise 6-30 September 2007. Preliminary results from this gear comparison exercise have already been obtained, but a more thorough analysis is still needed. Additional *in situ* comparisons with the dual net system are warranted as the total number of hauls at this stage is low (19) and therefore should be expanded to obtain a data set that can be explored statistically in a reliable manner. Such an approach implies a significant effort for both IMR and PINRO plankton laboratories and their scientists, and it must be carefully evaluated how much time and effort can be dedicated to such future work. Analysis of the currently available data might give answers to this. It should be an aim to present a more complete analysis of the dual-net as electronic attachment to the Joint Ecosystem Survey Report.

## 2.7 Marine mammals and seabirds

### 2.7.1 Marine mammals

Marine mammals were observed during parts of the survey in 2010, and the observations are presented in Table **2.7.1**. and Fig. **2.7.1-2.7.3.**

In total 3400 individuals of marine mammals comprising 14 identified species were observed in the Barents Sea during the ecosystem survey in 2010. It is about 4 times the number of marine mammals individual observed in 2009, although the observed species are the same as in 2009.

Like in previous years, the most frequently observed species among marine mammals was white-beaked dolphin (about 36% of the total numbers of observations). In the eastern part, there were fewer white-beaked dolphins this year than in previous years. Most of the eastern white-beaked dolphins were recorded at Persey Hill, such as a group of 120 animals who associated with capelin aggregations. Also, many groups of white-beaked dolphins with 6-25 animals were observed in the central and western Barents Sea, possibly in association with juvenile herring and other fish species. Among the toothed whales, also the harbour porpoises, white whales, killer whales and sperm whales were observed. Small groups of harbour porpoises with 2-4 animals were recorded in the southern Barents Sea (on Fuuley Bank and Kanin Bank) and on the northern slope of Goose Bank. White whales were observed on the Kanin Bank in the southern Barents Sea only. Two groups of killer whales were recorded close to the central Novaya Zemlya (6 animals) and in the western Barents Sea (25 animals in the Kopytov Region). The first group was associated with polar cod aggregations, and the second group appeared to actively migrate northwards. Sperm whales were observed mainly individually and some times as pairs. All individuals were recorded in the western Barents Sea along the shlef edge.

Among the baleen whales, blue whale, fin whale, humpback whale and minke whale were observed. The most frequently observed was the humpback whale (about 19% of the marine mammal observations and more than 60% of baleen whale observations). This species was mostly observed on the Persey Hill and on the Novozemeliskaya Bank. The group sizes varied from 2-4 individuals to a group of 102 individuals north of the Edge Island. Several individuals were also observed close to Franz Jozef Land. Many humpback whales was recorded in capelin aggregations with varying capelin densities. Fin whales were observed in the western Barents Sea in small local groups (no more than 6 individuals). Generally, fin whales were observed in the same areas as humpback whales in the north, but also inhabited areas along the shelf edge in the western and southern Barents Sea. The fin whales were distributed in association with capelin and macro-plankton. As in previous years blue whale was recorded to north-western of West Spitsbergen Island only. Acoustic data from these areas suggest that both juvenile fish and macro-zooplankton were available prey in these areas. Minke whales were observed individually and in pairs in all areas covered by the ecosystem survey. Close to Novaya Zemlya minke whales were recorded in high polar cod densities, and near Franz Jozef Land in mixed aggregations of polar cod and capelin. On Persey Hill and near West Spitsbergen Island some minke whales were observed in capelin aggregations.

Seal species observed during the ecosystem survey were harp, ringed and hooded seals and walrus. Ringed and hooded seals were observed individually near Franz Jozef Land, western Spitsbergen and North-East Land Island. Harp seal was the most frequently observed seal species (25% of the total numbers of marine mammal observations and about 97% of pinnipedia). Harp seals were recorded as separate local groups (from 15 to 150 individuals) close to and along the ice edge. All groups were distributed in areas with capelin or macro-plankton. The walruses were observed as groups in the drift ice near the Nort-East Land Island, while one walrus also was observed west of Spitsbergen.

Polar bears were observed in the areas inhabited by the harp seals.

### 2.7.2 Seabirds

During the ecosystem cruise 50 864 individual birds from 25 species were recorded from the vessels “Vilnius”, “Nansen”, “Johan Hjort”, and “Jan Mayen” (Table 2.7.2). Northern fulmar, kittiwake and Brünnichs guillemot were the single most observed species comprising 69%, 12% and 11% of all observations, respectively.

The alcid seabirds were observed throughout the study area (Fig. 2.7.4), but species abundances and distributions varied geographically. Puffins inhabited the southern areas, common guillemots in the south-east, and Brünnichs guillemots in central and northern areas, although also common in the Pechora Sea. Little auks were numerous in the northern Barents Sea, while black guillemots were observed close to the Svalbard and Franz Josef Land archipelagos. Razorbills inhabited the southern coastal areas.

Northern fulmars, a ship-follower mainly recorded by the Norwegian observers, dominated more or less throughout most the surveyed area (Fig. 2.7.5). Among the tubenosed birds (*Procellariformes*) also 4 sooty shearwaters were observed (Table 2.7.2).

The distributions of the gull species are shown in Figure 2.7.5. Kittiwakes dominated numerically and were widely distributed. Great black-backed gulls and herring gulls inhabited the southern and south-eastern Barents Sea, while glaucous gulls were observed in the central Barents Sea. Six lesser black-backed gulls were observed in the Pechora Sea.

Skuas were abundant in the central, eastern and the northern Barents Sea, and pomarine skua dominated numerically (Fig. 2.7.6). Arctic skua was distributed in the central and eastern Barents Sea, great skua the in southern Barents Sea and around Bear Island, while 11 long-tailed skuas were observed in the central Barents Sea.

More anecdotal observations of other aquatic birds were also registered; Arctic terns were observed in throughout the Barents Sea. Few individuals gannets, purple sandpiper, blakthroated loon and bean goose were also observed (Table 2.7.2).

The observed distributions of birds shown in Figures 2.7.1-.2.7.3 are not effort corrected. Greater observation effort on the vessels Jan Mayen and Johan Hjort (one dedicated seabird observer) than on Vilnius and Nansen(one combined marine mammal and seabird observer) likely bias the observed sea bird densities towards the western Barents Sea. Note also that no seabird observer was on board GO Sars.

The quality and effectiveness of marine mammal and seabird investigations during the ecosystem surveys could be improved by the additional use of Russian aircraft as an airborne observation platform, particularly if covering the areas close to the ice edge. In particular, it is important to identify the distribution of the harp seals this time of year, as harp seals are not observed from the research vessels. Aerial surveys should thus continue as a part of the annual joint Russian-Norwegian ecosystem surveys and research.

## 2.8 Benthos investigations

Five vessels which were involved in the ecosystem survey in 2010 were recording benthos and shellfish in bottom trawling the Barents Sea. A standardized bottom trawling (Campelen-trawl) was used across all the involved research vessels and covered the whole area of the Barents Sea (Fig 2.1). The biomass of invertebrates varied from 1 g to 2000 kg among trawl hauls.

The total biomass of all registered invertebrate catch (except *Pandalus borealis* "deep sea prawn") was summarized per station and is presented in Fig 2.8.1

The benthos biomass distribution in 2010 was generally the same as in previous years. The highest recorded biomass (2 tons of Geodia sponges "Porifera") was located in the northern part of the Kara Sea in the Saint Anna trough. In the south-western part of the Barents Sea there has been recorded up to 4 tons of Geodia (sponges) in previous years. But in this part of the Barents Sea, a dramatically reduction in catches was observed of this animal-group in 2010. This might partly be caused by increased effort to avoid such catches.

The benthos was splitted into eight animal groups – Annelida, Bryozoa, Coelenterata, Crustacea, Echinodermata, Mollusca, Porifera and Varia in order to show their distribution (Fig 2.8.2). This showed that the distribution was in accordance to all previous years and tells that the echinoderms (sea stars, sea urchins, brittle stars, sea cucumbers and sea lilies) make up the largest proportion of the biomass in the central and northern part of the Barents Sea. The crustacean biomass is mainly found in central and eastern parts of the Barents Sea, and, as the crustaceans, the mollusks (bivalves and snails) are present with their largest biomasses in the north-eastern part of the Barents Sea.

### 2.8.1 Red King crab *(Paralithodes camtschaticus)*

The Ecosystem Survey shows that the distribution area for the red king crab was located between 28-42° E, and therefore close to the coast (Fig 2.8.3). The westernmost catch was near the Nord cape. The maximal quantity of king crab was 6 specimens per nautical mile.

Compared with previous years, the total area and number of king crab catches on the Ecosystem Surveys has decreased.

### 2.8.2 Snow crab *(Chionoecetes opilio)*

The Ecosystem Surveys in the Barents Sea shows an eastern distributed of the snow crab (Fig 2.8.4). This was also shown last year, but the frequency of occurrence of the snow crab has decreased in 2010 compared to earlier years. The snow crab was registered on 53 stations with abundances of 8-10 species in nearly all trawls.

### 2.8.3 Northern shrimp *(Pandalus borealis)*

Northern shrimp is widely distributed in the Barents Sea and were registered at 75 % of the stations (Fig 2.8.5). The density ranged between 0 and 124 kg tons/nml. As in previous years, the densest concentrations were found round Svalbard and in the central parts of the Barents Sea. The 2010 result also show relative large (about 50 kg/nml) catches of the Northern shrimp in the St. Anna trough in the northern part of the Kara Sea.

## 2.9 Pollution

### 2.9.1 The sunken submarine “Komsomolets”

Samples of sediment, surface and bottom water in the vicinity of “Komsomolets” from 2009 do not indicate a leakage of significance from the submarine, and the levels are comparable to those found in adjacent areas. Analysis of the samples collected in 2010 will be finished in late November 2010.

### 2.9.2 Garbage

Surface observations showed that floating garbage was found everywhere including ice cover in the northern regions. Areas of intensive fishery and navigation were the most polluted. The type of garbage observed floating at the surface is shown in Figure 2.9.1. Plastic dominates in the southern and central Barents Sea. According to the distribution it is likely that this garbage is brought into the area by the ocean currents.
Several observations of wood were made in the central Barents Sea between 75°30'-77°20'-N and 28°10'-44°00' E. The wood might be brought to the area by ocean currents from the eastern seas because of the timber-rafting from the Siberian rivers, or it might possibly be lost from ships.

Garbage was found in the 13 % of trawls, and plastic was dominant in both the pelagic and the bottom trawls (Figure 2.9.2 and 2.9.3). There were frequent observations of garbage in the eastern Barents Sea (north of the White Sea) and along a line going from the south-western Barents Sea toward northeast. Possibly this garbage was dumped from vessels along these lines.

Because the bottom trawl **catchability** is low for small density polymer materials the amount of the anthropogenic garbage in the Barents Sea may be larger.

Dangerous and potential dangerous objects were seldom presented in the observations. In the majority of cases only inactive objects were found, which do not have a direct harmful effect on the environment.

## 2.10 Fish pathology research

Fish health investigations were made onboard the Russian R/V "Vilnyus" and Norwegian R/V "Jan Mayen", "J Hjort" and "G.O. Sars". Of the 150 000 specimens observed during the survey only 289 (0.18 %) had pathologies. Fishes with different pathologies (ulcers, tumours, vertebral deformations, eyes and head pathologies, internal organs pathologies) were evenly distributed over the survey area (Figure 2.10.1).

Most pathologies were found on cod (0.46 % of cod), polar cod (0.31 %), haddock (0.19 %) and capelin (0.15 %).

More than half of all the registered pathologies (73.7 %) were "red eyes syndrome". This pathology was found among polar cod (42.7 % of polar cod with pathologies), cod (24.4 %) and capelin (22.1 %).

In the central part of the Barents Sea 0.22 % of 0-group cod had tumors of an abdominal cavity side because of parasites inside cells (Figure 2.10.2). In the rest of the Barents Sea tumors were found only in 0.06 % of the 0-group cod.

In general, the level of fish pathologies (0.18 %) was lower than in 2009 (0.7 %).

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# 4 TABLES

**Table 2.1.1**. Mean water temperatures in the main parts of standard oceanographic sections in the Barents Sea and adjacent waters in August-September 1965-2010. The sections are: Kola (70º30´N – 72º30´N, 33º30´E), Kanin S (68º45´N – 70º05´N, 43º15´E), Kanin N (71º00´N – 72º00´N, 43º15´E), North Cape – Bear Island (NCBI, 71º33´N, 25º02´E – 73º35´N, 20º46´E), Bear Island – West (BIW, 74º30´N, 06º34´E – 15º55´E), Vardø – North (VN, 72º15´N – 74º15´N, 31º13´E) and Fugløya – Bear Island (FBI, 71º30´N, 19º48´E – 73º30´N, 19º20´E).

| Year | Section and layer (depth in metres) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Kola | Kola | Kola | Kanin S | Kanin N | NCBI | BIW | VN | FBI |
| | 0-50 | 50-200 | 0-200 | 0-bot. | 0-bot. | 0-200 | 0-200 | 50-200 | 50-200 |
| 1965 | 6.7 | 3.9 | 4.6 | 4.6 | 3.7 | 5.1 | - | 3.8 | 5.2 |
| 1966 | 6.7 | 2.6 | 3.6 | 1.9 | 2.2 | 5.5 | 3.6 | 3.2 | 5.3 |
| 1967 | 7.5 | 4.0 | 4.9 | 6.1 | 3.4 | 5.6 | 4.2 | 4.4 | 6.3 |
| 1968 | 6.4 | 3.7 | 4.4 | 4.7 | 2.8 | 5.4 | 4.0 | 3.4 | 5.0 |
| 1969 | 6.7 | 3.1 | 4.0 | 2.6 | 2.0 | 6.0 | 4.2 | 3.8 | 6.3 |
| 1970 | 7.8 | 3.7 | 4.7 | 4.0 | 3.3 | 6.1 | - | 4.1 | 5.6 |
| 1971 | 7.1 | 3.2 | 4.2 | 4.0 | 3.2 | 5.7 | 4.2 | 3.8 | 5.6 |
| 1972 | 8.7 | 4.0 | 5.2 | 5.1 | 4.1 | 6.3 | 3.9 | 4.6 | 6.1 |
| 1973 | 7.7 | 4.5 | 5.3 | 5.7 | 4.2 | 5.9 | 5.0 | 4.9 | 5.7 |
| 1974 | 8.1 | 3.9 | 4.9 | 4.6 | 3.5 | 6.1 | 4.9 | 4.3 | 5.8 |
| 1975 | 7.0 | 4.6 | 5.2 | 5.6 | 3.6 | 5.7 | 4.9 | 4.5 | 5.7 |
| 1976 | 8.1 | 4.0 | 5.0 | 4.9 | 4.4 | 5.6 | 4.8 | 4.4 | 5.8 |
| 1977 | 6.9 | 3.4 | 4.3 | 4.1 | 2.9 | 4.9 | 4.0 | 3.6 | 4.9 |
| 1978 | 6.6 | 2.5 | 3.6 | 2.4 | 1.7 | 5.0 | 4.1 | 3.2 | 4.9 |
| 1979 | 6.5 | 2.9 | 3.8 | 2.0 | 1.4 | 5.3 | 4.4 | 3.6 | 4.7 |
| 1980 | 7.4 | 3.5 | 4.5 | 3.3 | 3.0 | 5.7 | 4.9 | 3.7 | 5.5 |
| 1981 | 6.6 | 2.7 | 3.7 | 2.7 | 2.2 | 5.3 | 4.4 | 3.4 | 5.3 |
| 1982 | 7.1 | 4.0 | 4.8 | 4.5 | 2.8 | 5.8 | 4.9 | 4.1 | 6.0 |
| 1983 | 8.1 | 4.8 | 5.6 | 5.1 | 4.2 | 6.3 | 5.1 | 4.8 | 6.1 |
| 1984 | 7.7 | 4.1 | 5.0 | 4.5 | 3.6 | 5.9 | 5.0 | 4.2 | 5.7 |
| 1985 | 7.1 | 3.5 | 4.4 | 3.4 | 3.4 | 5.3 | 4.6 | 3.7 | 5.6 |
| 1986 | 7.5 | 3.5 | 4.5 | 3.9 | 3.2 | 5.8 | 4.4 | 3.8 | 5.5 |
| 1987 | 6.2 | 3.3 | 4.0 | 2.7 | 2.5 | 5.2 | 3.9 | 3.5 | 5.1 |
| 1988 | 7.0 | 3.7 | 4.5 | 3.8 | 2.9 | 5.5 | 4.2 | 3.8 | 5.7 |
| 1989 | 8.6 | 4.8 | 5.8 | 6.5 | 4.3 | 6.9 | 4.9 | 5.1 | 6.2 |
| 1990 | 8.1 | 4.4 | 5.3 | 5.0 | 3.9 | 6.3 | 5.7 | 5.0 | 6.3 |
| 1991 | 7.7 | 4.5 | 5.3 | 4.8 | 4.2 | 6.0 | 5.4 | 4.8 | 6.2 |
| 1992 | 7.5 | 4.6 | 5.3 | 5.0 | 4.0 | 6.1 | 5.0 | 4.6 | 6.1 |
| 1993 | 7.5 | 4.0 | 4.9 | 4.4 | 3.4 | 5.8 | 5.4 | 4.2 | 5.8 |
| 1994 | 7.7 | 3.9 | 4.8 | 4.6 | 3.4 | 6.4 | 5.3 | 4.8 | 5.9 |
| 1995 | 7.6 | 4.9 | 5.6 | 5.9 | 4.3 | 6.1 | 5.2 | 4.6 | 6.1 |
| 1996 | 7.6 | 3.7 | 4.7 | 5.2 | 2.9 | 5.8 | 4.7 | 3.7 | 5.7 |
| 1997 | 7.3 | 3.4 | 4.4 | 4.2 | 2.8 | 5.6 | 4.1 | 4.0 | 5.4 |
| 1998 | 8.4 | 3.4 | 4.7 | 2.1 | 1.9 | 6.0 | - | 3.9 | 5.8 |
| 1999 | 7.4 | 3.8 | 4.7 | 3.8 | 3.1 | 6.2 | 5.3 | 4.8 | 6.1 |
| 2000 | 7.6 | 4.5 | 5.3 | 5.8 | 4.1 | 5.7 | 5.1 | 4.2 | 5.8 |
| 2001 | 6.9 | 4.0 | 4.7 | 5.6 | 4.0 | 5.7 | 4.9 | 4.2 | 5.9 |
| 2002 | 8.6 | 4.8 | 5.8 | 4.0 | 3.7 | - | 5.4 | 4.6 | 6.5 |
| 2003 | 7.2 | 4.0 | 4.8 | 4.2 | 3.3 | - | - | 4.7 | 6.2 |
| 2004 | 9.0 | 4.7 | 5.7 | 5.0 | 4.2 | - | 5.8 | 4.8 | 6.4 |
| 2005 | 8.0 | 4.4 | 5.3 | 5.2 | 3.8 | 6.7 | - | 5.0 | 6.2 |
| 2006 | 8.3 | 5.3 | 6.1 | 6.1 | 4.5 | - | 5.8 | 5.3 | 6.9 |
| 2007 | 8.2 | 4.6 | 5.5 | 4.9 | 4.3 | 6.9 | 5.6 | 4.9 | 6.5 |
| 2008 | 6.9 | 4.6 | 5.2 | 4.2 | 4.0 | 6.2 | 5.1 | 4.8 | 6.4 |
| 2009 | 7.2 | 4.3 | 5.0 | - | 4.3 | - | - | 5.2 | 6.4 |
| 2010 | 7.8 | 4.7 | 5.5 | 4.9 | 4.5 | - | 5.4 | - | 6.2 |
| Average | 7.5 | 4.0 | 4.8 | 4.4 | 3.4 | 5.8 | 4.8 | 4.3 | 5.8 |

**Table 2.2.1 0-group abundance indices (in millions) with 95% confidence limits, not corrected for capture efficiency**

| Year | Capelin | | | Cod | | | Haddock | | | Herring | | | Redfish | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | |
| 1980 | 197278 | 131674 | 262883 | 72 | 38 | 105 | 59 | 38 | 81 | 4 | 1 | 8 | 277873 | 0 | 701273 |
| 1981 | 123870 | 71852 | 175888 | 48 | 33 | 64 | 15 | 7 | 22 | 3 | 0 | 8 | 153279 | 0 | 363283 |
| 1982 | 168128 | 35275 | 300982 | 651 | 466 | 835 | 649 | 486 | 812 | 202 | 0 | 506 | 106140 | 63753 | 148528 |
| 1983 | 100042 | 56325 | 143759 | 3924 | 1749 | 6099 | 1356 | 904 | 1809 | 40557 | 19526 | 61589 | 172392 | 33352 | 311432 |
| 1984 | 68051 | 43308 | 92794 | 5284 | 2889 | 7679 | 1295 | 937 | 1653 | 6313 | 1930 | 10697 | 83182 | 36137 | 130227 |
| 1985 | 21267 | 1638 | 40896 | 15484 | 7603 | 23365 | 695 | 397 | 992 | 7237 | 646 | 13827 | 412777 | 40510 | 785044 |
| 1986 | 11409 | 98 | 22721 | 2054 | 1509 | 2599 | 592 | 367 | 817 | 7 | 0 | 15 | 91621 | 0 | 184194 |
| 1987 | 1209 | 435 | 1983 | 167 | 86 | 249 | 126 | 76 | 176 | 2 | 0 | 5 | 23747 | 12740 | 34755 |
| 1988 | 19624 | 3821 | 35427 | 507 | 296 | 718 | 387 | 157 | 618 | 8686 | 3325 | 14048 | 107027 | 23378 | 190675 |
| 1989 | 251485 | 201110 | 301861 | 717 | 404 | 1030 | 173 | 117 | 228 | 4196 | 1396 | 6996 | 16092 | 7589 | 24595 |
| 1990 | 36475 | 24372 | 48578 | 6612 | 3573 | 9651 | 1148 | 847 | 1450 | 9508 | 0 | 23943 | 94790 | 52658 | 136922 |
| 1991 | 57390 | 24772 | 90007 | 10874 | 7860 | 13888 | 3857 | 2907 | 4807 | 81175 | 43230 | 119121 | 41499 | 0 | 83751 |
| 1992 | 970 | 105 | 1835 | 44583 | 24730 | 64437 | 1617 | 1150 | 2083 | 37183 | 21675 | 52690 | 13782 | 0 | 36494 |
| 1993 | 330 | 125 | 534 | 38015 | 15944 | 60086 | 1502 | 911 | 2092 | 61508 | 2885 | 120131 | 5458 | 0 | 13543 |
| 1994 | 5386 | 0 | 10915 | 21677 | 11980 | 31375 | 1695 | 825 | 2566 | 14884 | 0 | 31270 | 52258 | 0 | 121547 |
| 1995 | 862 | 0 | 1812 | 74930 | 38459 | 111401 | 472 | 269 | 675 | 1308 | 434 | 2182 | 11816 | 3386 | 20246 |
| 1996 | 44268 | 22447 | 66089 | 66047 | 42607 | 89488 | 1049 | 782 | 1316 | 57169 | 28040 | 86299 | 28 | 8 | 47 |
| 1997 | 54802 | 22682 | 86922 | 67061 | 49487 | 84634 | 600 | 420 | 780 | 45808 | 21160 | 70455 | 132 | 0 | 272 |
| 1998 | 33841 | 21406 | 46277 | 7050 | 4209 | 9890 | 5964 | 3800 | 8128 | 79492 | 44207 | 114778 | 755 | 23 | 1487 |
| 1999 | 85306 | 45266 | 125346 | 1289 | 135 | 2442 | 1137 | 368 | 1906 | 15931 | 1632 | 30229 | 46 | 14 | 79 |
| 2000 | 39813 | 1069 | 78556 | 26177 | 14287 | 38068 | 2907 | 1851 | 3962 | 49614 | 3246 | 95982 | 7530 | 0 | 16826 |
| 2001 | 33646 | 0 | 85901 | 908 | 152 | 1663 | 1706 | 1113 | 2299 | 844 | 177 | 1511 | 6 | 1 | 10 |
| 2002 | 19426 | 10648 | 28205 | 19157 | 11015 | 27300 | 1843 | 1276 | 2410 | 23354 | 12144 | 34564 | 130 | 20 | 241 |
| 2003 | 94902 | 41128 | 148676 | 17304 | 10225 | 24383 | 7910 | 3757 | 12063 | 28579 | 15504 | 41653 | 216 | 0 | 495 |
| 2004 | 16701 | 2541 | 30862 | 19157 | 13987 | 24328 | 19144 | 12649 | 25638 | 133350 | 94873 | 171826 | 849 | 0 | 1766 |
| 2005 | 41808 | 12316 | 71300 | 21532 | 14732 | 28331 | 33283 | 24377 | 42190 | 26332 | 1132 | 51532 | 12332 | 631 | 24034 |
| 2006 | 166400 | 102749 | 230050 | 7860 | 3658 | 12061 | 11421 | 7553 | 15289 | 66819 | 22759 | 110880 | 20864 | 10057 | 31671 |
| 2007 | 157913 | 87370 | 228456 | 9707 | 5887 | 13527 | 2826 | 1787 | 3866 | 22481 | 4556 | 40405 | 159159 | 44882 | 273436 |
| 2008 | 288799 | 178860 | 398738 | 52975 | 31839 | 74111 | 2742 | 830 | 4655 | 15915 | 4477 | 27353 | 9962 | 0 | 20828 |
| 2009 | 189767 | 113154 | 266379 | 54579 | 37311 | 71846 | 13040 | 7988 | 18093 | 18916 | 8249 | 29582 | 66671 | 29636 | 103706 |
| 2010 | 91730 | 57545 | 125914 | 40635 | 20307 | 60963 | 7267 | 4529 | 10005 | 20367 | 4099 | 36636 | 66392 | 3114 | 129669 |
| Mean | 78158 | | | 20550 | | | 4144 | | | 28314 | | | 64800 | | |

**Table 2.2.1 Continued**

| Year | Saithe | | | Gr halibut | | | Long rough dab | | | Polar cod (east) | | | Polar cod (west) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | |
| 1980 | 3 | 0 | 6 | 111 | 35 | 187 | 1273 | 883 | 1664 | 28958 | 9784 | 48132 | 9650 | 0 | 20622 |
| 1981 | 0 | 0 | 0 | 74 | 46 | 101 | 556 | 300 | 813 | 595 | 226 | 963 | 5150 | 1956 | 8345 |
| 1982 | 143 | 0 | 371 | 39 | 11 | 68 | 1013 | 698 | 1328 | 1435 | 144 | 2725 | 1187 | 0 | 3298 |
| 1983 | 239 | 83 | 394 | 41 | 22 | 59 | 420 | 264 | 577 | 1246 | 0 | 2501 | 9693 | 0 | 20851 |
| 1984 | 1339 | 407 | 2271 | 31 | 18 | 45 | 60 | 43 | 77 | 127 | 0 | 303 | 3182 | 737 | 5628 |
| 1985 | 12 | 1 | 23 | 48 | 29 | 67 | 265 | 110 | 420 | 19220 | 4989 | 33451 | 809 | 0 | 1628 |
| 1986 | 1 | 0 | 2 | 112 | 60 | 164 | 6846 | 4941 | 8752 | 12938 | 2355 | 23521 | 2130 | 180 | 4081 |
| 1987 | 1 | 0 | 1 | 35 | 23 | 47 | 804 | 411 | 1197 | 7694 | 0 | 17552 | 74 | 31 | 117 |
| 1988 | 17 | 4 | 30 | 8 | 3 | 13 | 205 | 113 | 297 | 383 | 9 | 757 | 4634 | 0 | 9889 |
| 1989 | 1 | 0 | 3 | 1 | 0 | 3 | 180 | 100 | 260 | 199 | 0 | 423 | 18056 | 2182 | 33931 |
| 1990 | 11 | 2 | 20 | 1 | 0 | 2 | 55 | 26 | 84 | 399 | 129 | 669 | 31939 | 0 | 70847 |
| 1991 | 4 | 2 | 6 | 1 | 0 | 2 | 90 | 49 | 131 | 88292 | 39856 | 136727 | 38709 | 0 | 110568 |
| 1992 | 159 | 86 | 233 | 9 | 0 | 17 | 121 | 25 | 218 | 7539 | 0 | 15873 | 9978 | 1591 | 18365 |
| 1993 | 366 | 0 | 913 | 4 | 2 | 7 | 56 | 25 | 87 | 41207 | 0 | 96068 | 8254 | 1359 | 15148 |
| 1994 | 2 | 0 | 5 | 39 | 0 | 93 | 1696 | 1083 | 2309 | 267997 | 151917 | 384078 | 5455 | 0 | 12032 |
| 1995 | 148 | 68 | 229 | 15 | 5 | 24 | 229 | 39 | 419 | 1 | 0 | 2 | 25 | 1 | 49 |
| 1996 | 131 | 57 | 204 | 6 | 3 | 9 | 41 | 2 | 79 | 70134 | 43196 | 97072 | 4902 | 0 | 12235 |
| 1997 | 78 | 37 | 120 | 5 | 3 | 7 | 97 | 44 | 150 | 33580 | 18788 | 48371 | 7593 | 623 | 14563 |
| 1998 | 86 | 39 | 133 | 8 | 3 | 12 | 27 | 13 | 42 | 11223 | 6849 | 15597 | 10311 | 0 | 23358 |
| 1999 | 136 | 68 | 204 | 14 | 8 | 21 | 105 | 1 | 210 | 129980 | 82936 | 177023 | 2848 | 407 | 5288 |
| 2000 | 206 | 111 | 301 | 43 | 17 | 69 | 233 | 120 | 346 | 116121 | 67589 | 164652 | 22740 | 14924 | 30556 |
| 2001 | 20 | 0 | 46 | 51 | 20 | 83 | 162 | 78 | 246 | 3697 | 658 | 6736 | 13490 | 0 | 28796 |
| 2002 | 553 | 108 | 998 | 51 | 0 | 112 | 731 | 342 | 1121 | 96954 | 57530 | 136378 | 27753 | 4184 | 51322 |
| 2003 | 65 | 0 | 146 | 13 | 0 | 34 | 78 | 45 | 110 | 11211 | 6100 | 16323 | 1627 | 0 | 3643 |
| 2004 | 1395 | 860 | 1930 | 70 | 28 | 113 | 36 | 20 | 52 | 37156 | 19040 | 55271 | 367 | 125 | 610 |
| 2005 | 55 | 36 | 73 | 9 | 4 | 14 | 200 | 109 | 292 | 6540 | 3196 | 9884 | 3216 | 1269 | 5162 |
| 2006 | 142 | 60 | 224 | 11 | 1 | 20 | 710 | 437 | 983 | 26016 | 9996 | 42036 | 2078 | 464 | 3693 |
| 2007 | 51 | 6 | 96 | 1 | 1 | 0 | 262 | 45 | 478 | 25883 | 8494 | 43273 | 2532 | 0 | 5134 |
| 2008 | 45 | 22 | 69 | 6 | 0 | 13 | 956 | 410 | 1502 | 6649 | 845 | 12453 | 91 | 0 | 183 |
| 2009 | 22 | 0 | 46 | 7 | 4 | 10 | 115 | 51 | 179 | 23570 | 9661 | 37479 | 21433 | 5642 | 37223 |
| 2010 | 402 | 126 | 678 | 14 | 8 | 21 | 130 | 19 | 241 | 31338 | 13644 | 49032 | 1500 | 0 | 4153 |
| Mean | 188 | | | 28 | | | 573 | | | 35751 | | | 8755 | | |

**Table 2.2.2 0-group abundance indices (in millions) with 95% confidence limits, corrected for capture efficiency**

| | Capelin | | | Cod | | | Haddock | | | Herring | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | |
| 1980 | 740289 | 495187 | 985391 | 276 | 131 | 421 | 265 | 169 | 361 | 77 | 12 | 142 |
| 1981 | 477260 | 273493 | 681026 | 289 | 201 | 377 | 75 | 34 | 117 | 37 | 0 | 86 |
| 1982 | 599596 | 145299 | 1053893 | 3480 | 2540 | 4421 | 2927 | 2200 | 3655 | 2519 | 0 | 5992 |
| 1983 | 340200 | 191122 | 489278 | 19299 | 9538 | 29061 | 6217 | 3978 | 8456 | 195446 | 69415 | 321477 |
| 1984 | 275233 | 161408 | 389057 | 24326 | 14489 | 34164 | 5512 | 3981 | 7043 | 27354 | 3425 | 51284 |
| 1985 | 63771 | 5893 | 121648 | 66630 | 32914 | 100346 | 2457 | 1520 | 3393 | 20081 | 3933 | 36228 |
| 1986 | 41814 | 642 | 82986 | 10509 | 7719 | 13299 | 2579 | 1621 | 3537 | 93 | 27 | 160 |
| 1987 | 4032 | 1458 | 6607 | 1035 | 504 | 1565 | 708 | 432 | 984 | 49 | 0 | 111 |
| 1988 | 65127 | 12101 | 118153 | 2570 | 1519 | 3622 | 1661 | 630 | 2693 | 60782 | 20877 | 100687 |
| 1989 | 862394 | 690983 | 1033806 | 2775 | 1624 | 3925 | 650 | 448 | 852 | 17956 | 8252 | 27661 |
| 1990 | 115636 | 77306 | 153966 | 23593 | 13426 | 33759 | 3122 | 2318 | 3926 | 15172 | 0 | 36389 |
| 1991 | 169455 | 74078 | 264832 | 40631 | 29843 | 51419 | 13713 | 10530 | 16897 | 267644 | 107990 | 427299 |
| 1992 | 2337 | 250 | 4423 | 166276 | 92113 | 240438 | 4739 | 3217 | 6262 | 83909 | 48399 | 119419 |
| 1993 | 952 | 289 | 1616 | 133046 | 58312 | 207779 | 3785 | 2335 | 5236 | 291468 | 1429 | 581506 |
| 1994 | 13898 | 70 | 27725 | 70761 | 39933 | 101589 | 4470 | 2354 | 6586 | 103891 | 0 | 212765 |
| 1995 | 2869 | 0 | 6032 | 233885 | 114258 | 353512 | 1203 | 686 | 1720 | 11018 | 4409 | 17627 |
| 1996 | 136674 | 69801 | 203546 | 280916 | 188630 | 373203 | 2632 | 1999 | 3265 | 549608 | 256160 | 843055 |
| 1997 | 189372 | 80734 | 298011 | 294607 | 218967 | 370247 | 1983 | 1391 | 2575 | 463243 | 176669 | 749817 |
| 1998 | 113390 | 70516 | 156263 | 24951 | 15827 | 34076 | 14116 | 9524 | 18707 | 476065 | 277542 | 674589 |
| 1999 | 287760 | 143243 | 432278 | 4150 | 944 | 7355 | 2740 | 1018 | 4463 | 35932 | 13017 | 58848 |
| 2000 | 140837 | 6551 | 275123 | 108093 | 58416 | 157770 | 10906 | 6837 | 14975 | 469626 | 22507 | 916746 |
| 2001 | 90181 | 0 | 217345 | 4150 | 798 | 7502 | 4649 | 3189 | 6109 | 10008 | 2021 | 17996 |
| 2002 | 67130 | 36971 | 97288 | 76146 | 42253 | 110040 | 4381 | 2998 | 5764 | 151514 | 58954 | 244073 |
| 2003 | 340877 | 146178 | 535575 | 81977 | 47715 | 116240 | 30792 | 15352 | 46232 | 177676 | 52699 | 302653 |
| 2004 | 53950 | 11999 | 95900 | 65969 | 47743 | 84195 | 39303 | 26359 | 52246 | 773891 | 544964 | 1002819 |
| 2005 | 148466 | 51669 | 245263 | 72137 | 50662 | 93611 | 91606 | 67869 | 115343 | 125927 | 20407 | 231447 |
| 2006 | 515770 | 325776 | 705764 | 25061 | 11469 | 38653 | 28505 | 18754 | 38256 | 294649 | 102788 | 486511 |
| 2007 | 480069 | 272313 | 687825 | 42628 | 26652 | 58605 | 8401 | 5587 | 11214 | 144002 | 25099 | 262905 |
| 2008 | 995101 | 627202 | 1362999 | 234144 | 131081 | 337208 | 9864 | 1144 | 18585 | 201046 | 68778 | 333313 |
| 2009 | 673027 | 423386 | 922668 | 185457 | 123375 | 247540 | 33339 | 19707 | 46970 | 104233 | 31009 | 177458 |
| 2010 | 318569 | 201973 | 435166 | 135355 | 68199 | 202511 | 23669 | 14503 | 32834 | 117087 | 32045 | 202129 |
| Mean | 268582 | | | 78552 | | | 11644 | | | 167484 | | |

## Table 2.2.2 Continued

| | Saithe | | | Polar cod (east) | | | Polar cod (west) | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Abundance index | Confidence limit | | Abundance index | Confidence limit | | Abundance index | Confidence limit | |
| 1980 | 21 | 0 | 47 | 203226 | 69898 | 336554 | 82871 | 0 | 176632 |
| 1981 | 0 | 0 | 0 | 4882 | 1842 | 7922 | 46155 | 17810 | 74500 |
| 1982 | 296 | 0 | 699 | 1443 | 154 | 2731 | 10565 | 0 | 29314 |
| 1983 | 562 | 211 | 912 | 1246 | 0 | 2501 | 87272 | 0 | 190005 |
| 1984 | 2577 | 725 | 4430 | 871 | 0 | 2118 | 26316 | 6097 | 46534 |
| 1985 | 30 | 7 | 53 | 143257 | 39633 | 246881 | 6670 | 0 | 13613 |
| 1986 | 4 | 0 | 9 | 102869 | 16336 | 189403 | 18644 | 125 | 37164 |
| 1987 | 4 | 0 | 10 | 64171 | 0 | 144389 | 631 | 265 | 996 |
| 1988 | 32 | 11 | 52 | 2588 | 59 | 5117 | 41133 | 0 | 89068 |
| 1989 | 10 | 0 | 23 | 1391 | 0 | 2934 | 164058 | 15439 | 312678 |
| 1990 | 29 | 4 | 55 | 2862 | 879 | 4846 | 246819 | 0 | 545410 |
| 1991 | 9 | 4 | 14 | 823828 | 366924 | 1280732 | 281434 | 0 | 799822 |
| 1992 | 326 | 156 | 495 | 49757 | 0 | 104634 | 80747 | 12984 | 148509 |
| 1993 | 1033 | 0 | 2512 | 297397 | 0 | 690030 | 70019 | 12321 | 127716 |
| 1994 | 7 | 1 | 12 | 2139223 | 1230225 | 3048220 | 49237 | 0 | 109432 |
| 1995 | 415 | 196 | 634 | 6 | 0 | 14 | 195 | 0 | 390 |
| 1996 | 430 | 180 | 679 | 588020 | 368361 | 807678 | 46671 | 0 | 116324 |
| 1997 | 341 | 162 | 521 | 297828 | 164107 | 431550 | 62084 | 6037 | 118131 |
| 1998 | 182 | 91 | 272 | 96874 | 59118 | 134630 | 95609 | 0 | 220926 |
| 1999 | 275 | 139 | 411 | 1154149 | 728616 | 1579682 | 24015 | 3768 | 44262 |
| 2000 | 851 | 446 | 1256 | 916625 | 530966 | 1302284 | 190661 | 133249 | 248072 |
| 2001 | 47 | 0 | 106 | 29087 | 5648 | 52526 | 119023 | 0 | 252146 |
| 2002 | 2112 | 134 | 4090 | 829216 | 496352 | 1162079 | 215572 | 36403 | 394741 |
| 2003 | 286 | 0 | 631 | 82315 | 42707 | 121923 | 12998 | 0 | 30565 |
| 2004 | 4779 | 2810 | 6749 | 290686 | 147492 | 433879 | 2892 | 989 | 4796 |
| 2005 | 176 | 115 | 237 | 44663 | 22890 | 66436 | 25970 | 9987 | 41953 |
| 2006 | 280 | 116 | 443 | 182713 | 73645 | 291781 | 15965 | 3414 | 28517 |
| 2007 | 286 | 3 | 568 | 191111 | 57403 | 324819 | 22803 | 0 | 46521 |
| 2008 | 142 | 68 | 216 | 42657 | 5936 | 79378 | 619 | 25 | 1212 |
| 2009 | 62 | 0 | 132 | 168990 | 70509 | 267471 | 154687 | 37022 | 272351 |
| 2010 | 1066 | 362 | 1769 | 267430 | 111697 | 423162 | 12045 | 0 | 33370 |
| Mean | 538 | | | 291012 | | | 71432 | | |

**Table 2.2.3 Length distribution (%) of 0-group fish in the Barents Sea and adjacent waters, August-September 2010**

| Length, mm | Cod | Haddock | Capelin | Herring | Saithe | Redfish | Polar cod | Gr. halibut | LRD | Sandeel |
|---|---|---|---|---|---|---|---|---|---|---|
| 10 - 14 mm | | | | | | | | | | |
| 15 - 19 mm | | | | | | 0.03 | | | 1.17 | |
| 20 - 24 mm | | | 0.15 | | | 0.11 | 0.28 | | 0.38 | |
| 25 - 29 mm | | | 1.60 | | | 0.36 | 5.93 | | 38.41 | 2.98 |
| 30 - 34 mm | | | 7.26 | | | 1.03 | 22.92 | 1.37 | 23.81 | 3.23 |
| 35 - 39 mm | | 0.00 | 15.07 | 0.01 | | 4.26 | 26.51 | | 29.27 | 16.48 |
| 40 - 44 mm | 0.01 | 0.14 | 23.68 | 0.07 | | 15.55 | 26.49 | 1.59 | 6.80 | 36.17 |
| 45 - 49 mm | 0.17 | 0.12 | 23.10 | 0.39 | | 24.79 | 14.19 | | 0.16 | 7.71 |
| 50 - 54 mm | 0.31 | 0.12 | 14.95 | 1.68 | 0.11 | 33.58 | 3.67 | 6.10 | | 7.77 |
| 55 - 59 mm | 0.92 | 0.65 | 9.99 | 6.94 | 1.68 | 17.82 | | 26.99 | | 1.04 |
| 60 - 64 mm | 2.56 | 2.04 | 4.09 | 9.48 | 0.37 | 2.46 | | 16.26 | | 3.75 |
| 65 - 69 mm | 4.63 | 4.15 | 0.09 | 19.24 | 0.45 | | | 28.85 | | 0.85 |
| 70 - 74 mm | 8.49 | 9.56 | 0.03 | 32.44 | 2.95 | | | 12.86 | | 0.58 |
| 75 - 79 mm | 10.78 | 10.18 | 0.00 | 20.67 | 2.67 | | | 2.23 | | 0.38 |
| 80 - 84 mm | 15.08 | 14.07 | | 7.37 | 4.54 | | | 3.74 | | 2.37 |
| 85 - 89 mm | 16.95 | 15.94 | | 1.68 | 9.63 | | | | | 6.12 |
| 90 - 94 mm | 15.01 | 14.35 | | 0.02 | 11.84 | | | | | 5.57 |
| 95 - 99 mm | 11.97 | 12.84 | | | 20.33 | | | | | 3.50 |
| 100 - 104 mm | 7.50 | 5.74 | | | 12.34 | | | | | 1.31 |
| 105 - 109 mm | 3.18 | 4.68 | | | 14.08 | | | | | 0.12 |
| 110 - 114 mm | 1.75 | 2.76 | | | 7.70 | | | | | 0.07 |
| 115 - 119 mm | 0.41 | 1.82 | | | 6.83 | | | | | |
| 120 - 124 mm | 0.25 | 0.39 | | | 1.55 | | | | | |
| 125 - 129 mm | 0.02 | 0.25 | | | 1.46 | | | | | |
| 130 - 134 mm | 0.00 | 0.17 | | | 1.46 | | | | | |
| 135 - 139 mm | 0.01 | 0.00 | | | | | | | | |
| 140 - 144 mm | | 0.00 | | | | | | | | |
| 145 - 149 mm | | 0.02 | | | | | | | | |
| 150 - 154 mm | | | | | | | | | | |
| 155 - 159 mm | | | | | | | | | | |
| Mean length, cm | 8.6 | 8.7 | 4.4 | 7.0 | 9.8 | 4.9 | 3.7 | 6.3 | 3.1 | 5.1 |
| Long term mean length, cm | 7.5 | 9.0 | 4.8 | 7.1 | 9.3 | 3.8 | 4.0 | 6.2 | 3.4 | 5.6 |

**Table 2.3.1. Barents Sea capelin. Acoustic estimate in August-September 2010**

| Length (cm) | Age groups / year class | | | | | Sum | Biomass | Mean |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5+ | | | |
| | 2009 | 2008 | 2007 | 2006 | 2005- | ($10^9$ ) | ($10^3$ t) | weight (g) |
| 5.0 - 5.5 | | | | | | | | |
| 5.5 - 6.0 | 2.805 | 0.000 | 0.000 | 0.000 | 0.000 | 2.805 | 2.8 | 1.0 |
| 6.0 - 6.5 | 7.761 | 0.000 | 0.000 | 0.000 | 0.000 | 7.761 | 7.8 | 1.0 |
| 6.5 - 7.0 | 10.184 | 0.000 | 0.000 | 0.000 | 0.000 | 10.184 | 10.2 | 1.0 |
| 7.0 - 7.5 | 9.517 | 0.000 | 0.000 | 0.000 | 0.000 | 9.517 | 9.5 | 1.0 |
| 7.5 - 8.0 | 13.194 | 0.000 | 0.000 | 0.000 | 0.000 | 13.194 | 18.5 | 1.4 |
| 8.0 - 8.5 | 16.785 | 0.000 | 0.000 | 0.000 | 0.000 | 16.785 | 31.9 | 1.9 |
| 8.5 - 9.0 | 28.983 | 0.000 | 0.000 | 0.000 | 0.000 | 28.983 | 60.9 | 2.1 |
| 9.0 - 9.5 | 34.387 | 0.054 | 0.000 | 0.000 | 0.000 | 34.441 | 89.5 | 2.6 |
| 9.5 - 10.0 | 30.392 | 0.000 | 0.000 | 0.000 | 0.000 | 30.392 | 91.2 | 3.0 |
| 10.0 - 10.5 | 40.408 | 0.066 | 0.000 | 0.000 | 0.000 | 40.474 | 145.7 | 3.6 |
| 10.5 - 11.0 | 20.679 | 0.948 | 0.000 | 0.000 | 0.000 | 21.627 | 95.2 | 4.4 |
| 11.0 - 11.5 | 19.719 | 2.290 | 0.000 | 0.000 | 0.000 | 22.009 | 110.0 | 5.0 |
| 11.5 - 12.0 | 8.885 | 8.089 | 0.000 | 0.000 | 0.000 | 16.974 | 101.8 | 6.0 |
| 12.0 - 12.5 | 2.000 | 13.431 | 0.000 | 0.000 | 0.000 | 15.431 | 104.9 | 6.8 |
| 12.5 - 13.0 | 1.838 | 20.823 | 0.111 | 0.000 | 0.000 | 22.772 | 175.3 | 7.7 |
| 13.0 - 13.5 | 0.066 | 23.318 | 0.860 | 0.000 | 0.000 | 24.244 | 215.8 | 8.9 |
| 13.5 - 14.0 | 0.069 | 16.326 | 0.763 | 0.000 | 0.000 | 17.158 | 175.0 | 10.2 |
| 14.0 - 14.5 | 0.024 | 20.600 | 2.538 | 0.000 | 0.000 | 23.162 | 268.7 | 11.6 |
| 14.5 - 15.0 | 0.000 | 8.477 | 2.679 | 0.000 | 0.000 | 11.156 | 151.7 | 13.6 |
| 15.0 - 15.5 | 0.000 | 5.476 | 7.070 | 0.004 | 0.000 | 12.550 | 197.0 | 15.7 |
| 15.5 - 16.0 | 0.000 | 3.257 | 6.503 | 0.041 | 0.000 | 9.801 | 175.4 | 17.9 |
| 16.0 - 16.5 | 0.000 | 1.334 | 8.745 | 0.242 | 0.000 | 10.321 | 217.8 | 21.1 |
| 16.5 - 17.0 | 0.000 | 2.349 | 8.252 | 0.069 | 0.000 | 10.670 | 250.7 | 23.5 |
| 17.0 - 17.5 | 0.000 | 0.470 | 8.378 | 0.185 | 0.000 | 9.033 | 246.6 | 27.3 |
| 17.5 - 18.0 | 0.000 | 0.073 | 6.403 | 0.303 | 0.000 | 6.779 | 204.0 | 30.1 |
| 18.0 - 18.5 | 0.000 | 0.208 | 4.437 | 0.057 | 0.007 | 4.709 | 157.8 | 33.5 |
| 18.5 - 19.0 | 0.000 | 0.077 | 2.841 | 0.013 | 0.000 | 2.931 | 109.6 | 37.4 |
| 19.0 - 19.5 | 0.000 | 0.096 | 1.335 | 0.023 | 0.000 | 1.454 | 59.6 | 41.0 |
| 19.5 - 20.0 | 0.000 | | 0.264 | | 0.000 | 0.264 | 11.8 | 44.6 |
| 20.0 - 20.5 | 0.000 | | 0.025 | | 0.000 | 0.025 | 1.2 | 47.0 |
| 20.5 - 21.0 | 0.000 | | | | 0.000 | 0.000 | 0.0 | 52.0 |
| TSN ($10^9$) | 247.696 | 127.762 | 61.204 | 0.937 | 0.007 | 437.606 | | |
| TSB ($10^3$ t) | 739.8 | 1300.9 | 1432.0 | 25.0 | 0.2 | | 3498.0 | |
| Mean length (cm) | 9.38 | 13.51 | 16.56 | 17.17 | 18.25 | 11.61 | | |
| Mean weight (g) | 3.0 | 10.2 | 23.4 | 26.7 | 33.5 | | | 8.0 |
| SSN ($10^9$ ) | 0.02 | 42.417 | 59.470 | 0.937 | 0.007 | 102.855 | | |
| SSB ($10^3$ t) | 0.28 | 610.7 | 1415.7 | 25.0 | 0.2 | | 2052.0 | |

**Table 2.3.2. Barents Sea capelin. Acoustic estimates of the stock by age in autumn. Biomass (B) in $10^6$ tonnes, average weight (AW) in grams. All estimates based on TS = 19.1Log L -74.0 dB**

| Age | 1 | | 2 | | 3 | | 4 | | 5 | | Sum 1-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | B | AW | B | AW | B | AW | B | AW | B | AW | B |
| 1973 | 1.69 | 3.2 | 2.32 | 6.2 | 0.73 | 18.3 | 0.41 | 23.8 | 0.01 | 30.1 | 5.16 |
| 1974 | 1.06 | 3.5 | 3.06 | 5.6 | 1.53 | 8.9 | 0.07 | 20.8 | + | 25 | 5.72 |
| 1975 | 0.65 | 3.4 | 2.39 | 6.9 | 3.27 | 11.1 | 1.48 | 17.1 | 0.01 | 31 | 7.80 |
| 1976 | 0.78 | 3.7 | 1.92 | 8.3 | 2.09 | 12.8 | 1.35 | 17.6 | 0.27 | 21.7 | 6.41 |
| 1977 | 0.72 | 2 | 1.41 | 8.1 | 1.66 | 16.8 | 0.84 | 20.9 | 0.17 | 22.9 | 4.80 |
| 1978 | 0.24 | 2.8 | 2.62 | 6.7 | 1.20 | 15.8 | 0.17 | 19.7 | 0.02 | 25 | 4.25 |
| 1979 | 0.05 | 4.5 | 2.47 | 7.4 | 1.53 | 13.5 | 0.10 | 21 | + | 27 | 4.15 |
| 1980 | 1.21 | 4.5 | 1.85 | 9.4 | 2.83 | 18.2 | 0.82 | 24.8 | 0.01 | 19.7 | 6.72 |
| 1981 | 0.92 | 2.3 | 1.83 | 9.3 | 0.82 | 17 | 0.32 | 23.3 | 0.01 | 28.7 | 3.90 |
| 1982[1] | 1.22 | 2.3 | 1.33 | 9 | 1.18 | 20.9 | 0.05 | 24.9 | | | 3.78 |
| 1983 | 1.61 | 3.1 | 1.90 | 9.5 | 0.72 | 18.9 | 0.01 | 19.4 | | | 4.24 |
| 1984 | 0.57 | 3.7 | 1.43 | 7.7 | 0.88 | 18.2 | 0.08 | 26.8 | | | 2.96 |
| 1985 | 0.17 | 4.5 | 0.40 | 8.4 | 0.27 | 13 | 0.01 | 15.7 | | | 0.85 |
| 1986 | 0.02 | 3.9 | 0.05 | 10.1 | 0.05 | 13.5 | + | 16.4 | | | 0.12 |
| 1987[2] | 0.08 | 2.1 | 0.02 | 12.2 | + | 14.6 | + | 34 | | | 0.10 |
| 1988 | 0.07 | 3.4 | 0.35 | 12.2 | + | 17.1 | | | | | 0.42 |
| 1989 | 0.61 | 3.2 | 0.20 | 11.5 | 0.05 | 18.1 | + | 21 | | | 0.86 |
| 1990 | 2.66 | 3.8 | 2.72 | 15.3 | 0.44 | 27.2 | + | 20 | | | 5.82 |
| 1991 | 1.52 | 3.8 | 5.10 | 8.8 | 0.64 | 19.4 | 0.04 | 30.2 | | | 7.30 |
| 1992 | 1.25 | 3.6 | 1.69 | 8.6 | 2.17 | 16.9 | 0.04 | 29.5 | | | 5.15 |
| 1993 | 0.01 | 3.4 | 0.48 | 9 | 0.26 | 15.1 | 0.05 | 18.8 | | | 0.80 |
| 1994 | 0.09 | 4.4 | 0.04 | 11.2 | 0.07 | 16.5 | + | 18.4 | | | 0.20 |
| 1995 | 0.05 | 6.7 | 0.11 | 13.8 | 0.03 | 16.8 | 0.01 | 22.6 | | | 0.20 |
| 1996 | 0.24 | 2.9 | 0.22 | 18.6 | 0.05 | 23.9 | + | 25.5 | | | 0.51 |
| 1997 | 0.42 | 4.2 | 0.45 | 11.5 | 0.04 | 22.9 | + | 26.2 | | | 0.91 |
| 1998 | 0.81 | 4.5 | 0.98 | 13.4 | 0.25 | 24.2 | 0.02 | 27.1 | + | 29.4 | 2.06 |
| 1999 | 0.16 | 4.2 | 1.01 | 13.6 | 0.27 | 26.9 | 0.09 | 29.3 | | | 1.53 |
| 2000 | 1.70 | 3.8 | 1.59 | 14.4 | 0.95 | 27.9 | 0.08 | 37.7 | | | 4.32 |
| 2001 | 0.37 | 3.3 | 2.40 | 11 | 0.81 | 26.7 | 0.04 | 35.5 | + | 41.4 | 3.62 |
| 2002 | 0.23 | 3.9 | 0.92 | 10.1 | 1.04 | 20.7 | 0.02 | 35 | | | 2.21 |
| 2003 | 0.20 | 2.4 | 0.10 | 10.2 | 0.20 | 18.4 | 0.03 | 23.5 | | | 0.53 |
| 2004 | 0.20 | 3.8 | 0.29 | 11.9 | 0.12 | 21.5 | 0.02 | 23.5 | + | 26.3 | 0.63 |
| 2005 | 0.10 | 3.7 | 0.19 | 14.3 | 0.04 | 20.8 | + | 25.8 | | | 0.33 |
| 2006 | 0.29 | 4.8 | 0.35 | 16.1 | 0.14 | 24.8 | 0.01 | 30.6 | + | 36.5 | 0.79 |
| 2007 | 0.93 | 4.2 | 0.85 | 15.5 | 0.10 | 27.5 | + | 28.1 | | | 1.88 |
| 2008 | 0.97 | 3.1 | 2.80 | 12.1 | 0.61 | 24.6 | 0.05 | 30.0 | | | 4.43 |
| 2009 | 0.42 | 3.4 | 1.82 | 10.9 | 1.51 | 24.6 | 0.01 | 28.4 | | | 3.76 |
| 2010 | 0.74 | 3.0 | 1.30 | 10.2 | 1.43 | 23.4 | 0.03 | 26.7 | + | 26.7 | 3.50 |
| Average | 0.67 | 3.60 | 1.35 | 10.76 | 0.85 | 19.41 | 0.22 | 24.85 | 0.07 | 28.05 | 3.00 |

[1] Computed values based on the estimates in 1981 and 1983
[2] Combined estimates from multispecies survey and succeeding survey with "Eldjarn"

**Table 2.3.3. Barents Sea capelin. Survey mortalities from age 1 to age 2**

| Year | Year class | Age 1 ($10^9$) | Age 2 ($10^9$) | Total mort. % | Total mort. Z |
|---|---|---|---|---|---|
| 1984-1985 | 1983 | 154.8 | 48.3 | 69 | 1.16 |
| 1985-1986 | 1984 | 38.7 | 4.7 | 88 | 2.11 |
| 1986-1987 | 1985 | 6.0 | 1.7 | 72 | 1.26 |
| 1987-1988 | 1986 | 37.6 | 28.7 | 24 | 0.27 |
| 1988-1989 | 1987 | 21.0 | 17.7 | 16 | 0.17 |
| 1989-1990 | 1988 | 189.2 | 177.6 | 6 | 0.06 |
| 1990-1991 | 1989 | 700.4 | 580.2 | 17 | 0.19 |
| 1991-1992 | 1990 | 402.1 | 196.3 | 51 | 0.72 |
| 1992-1993 | 1991 | 351.3 | 53.4 | 85 | 1.88 |
| 1993-1994 | 1992 | 2.2 | 3.4 | - | - |
| 1994-1995 | 1993 | 19.8 | 8.1 | 59 | 0.89 |
| 1995-1996 | 1994 | 7.1 | 11.5 | - | - |
| 1996-1997 | 1995 | 81.9 | 39.1 | 52 | 0.74 |
| 1997-1998 | 1996 | 98.9 | 72.6 | 27 | 0.31 |
| 1998-1999 | 1997 | 179.0 | 101.5 | 43 | 0.57 |
| 1999-2000 | 1998 | 155.9 | 110.6 | 29 | 0.34 |
| 2000-2001 | 1999 | 449.2 | 218.7 | 51 | 0.72 |
| 2001-2002 | 2000 | 113.6 | 90.8 | 20 | 0.22 |
| 2002-2003 | 2001 | 59.7 | 9.6 | 84 | 1.83 |
| 2003-2004 | 2002 | 82.4 | 24.8 | 70 | 1.20 |
| 2004-2005 | 2003 | 51.2 | 13.0 | 75 | 1.39 |
| 2005-2006 | 2004 | 26.9 | 21.7 | 19 | 0.21 |
| 2006-2007 | 2005 | 60.1 | 54.8 | 9 | 0.09 |
| 2007-2008 | 2006 | 221.7 | 231.4 | - | - |
| 2008-2009 | 2007 | 313.0 | 166.4 | 47 | 0.63 |
| 2009-2010 | 2008 | 124.0 | 127.8 | - | - |

**Table 2.3.4. Barents Sea polar cod. Acoustic estimate in August-September 2010**

| Length (cm) | Age/Yearclass | | | | | Sum | Biomass | Mean weigt(g) |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | | | | |
| | 2009 | 2008 | 2007 | 2006 | | $(10^6)$ | $(10^3$ t ) | |
| 6.5 - 7.0 | 2 | | | | | 2 | 0 | 2.3 |
| 7.0 - 7.5 | 137 | | | | | 137 | 0.4 | 2.8 |
| 7.5 - 8.0 | 464 | | | | | 464 | 0.9 | 2 |
| 8.0 - 8.5 | 873 | | | | | 873 | 3.3 | 3.8 |
| 8.5 - 9.0 | 1613 | | | | | 1613 | 6.8 | 4.2 |
| 9.0 - 9.5 | 3853 | | | | | 3853 | 20.5 | 5.3 |
| 9.5 - 10.0 | 3902 | | | | | 3902 | 24.3 | 6.2 |
| 10.0 - 10.5 | 3863 | | | | | 3863 | 26.7 | 6.9 |
| 10.5 - 11.0 | 4328 | 2 | | | | 4330 | 36.9 | 8.5 |
| 11.0 - 11.5 | 2118 | 403 | | | | 2521 | 26.7 | 10.6 |
| 11.5 - 12.0 | 1837 | 371 | | | | 2208 | 28.4 | 12.9 |
| 12.0 - 12.5 | 1864 | 36 | 3 | | | 1902 | 26.9 | 14.2 |
| 12.5 - 13.0 | 1297 | 22 | 1 | | | 1319 | 21.6 | 16.4 |
| 13.0 - 13.5 | 790 | 161 | | | | 951 | 16.3 | 17.1 |
| 13.5 - 14.0 | 337 | 463 | 1 | | | 801 | 16.7 | 20.9 |
| 14.0 - 14.5 | 3 | 805 | | | | 808 | 16.6 | 20.6 |
| 14.5 - 15.0 | | 1302 | 154 | | | 1456 | 32.2 | 22.1 |
| 15.0 - 15.5 | 2 | 1955 | 178 | | | 2135 | 54.1 | 25.3 |
| 15.5 - 16.0 | | 2370 | 88 | | | 2457 | 68.3 | 27.8 |
| 16.0 - 16.5 | 2 | 3762 | 285 | | | 4049 | 118.2 | 29.2 |
| 16.5 - 17.0 | | 3485 | 407 | | | 3892 | 133.1 | 34.2 |
| 17.0 - 17.5 | | 1050 | 2167 | 546 | | 3763 | 144.7 | 38.4 |
| 17.5 - 18.0 | | 1059 | 2621 | | | 3679 | 155 | 42.1 |
| 18.0 - 18.5 | | 712 | 1532 | 255 | | 2499 | 110.4 | 44.2 |
| 18.5 - 19.0 | | 297 | 2282 | | | 2580 | 125.3 | 48.6 |
| 19.0 - 19.5 | | 1 | 1342 | 1 | | 1345 | 73.5 | 54.7 |
| 19.5 - 20.0 | | 1 | 405 | 375 | | 781 | 42.1 | 54 |
| 20.0 - 20.5 | | | 549 | | | 549 | 32.3 | 58.9 |
| 20.5 - 21.0 | | | 360 | 1 | | 361 | 20.2 | 56 |
| 21.0 - 21.5 | | | 316 | | | 316 | 19.6 | 62 |
| 21.5 - 22.0 | | 1 | 263 | | | 264 | 20.3 | 76.9 |
| 22.0 - 22.5 | | | 15 | | | 15 | 1 | 71.5 |
| 22.5 - 23.0 | | | 4 | | | 4 | 0.4 | 88.1 |
| 23.0 - 23.5 | | | | 76 | | 76 | 6 | 80 |
| 23.5 - 24.0 | | | 5 | | | 5 | 0.2 | 52 |
| 24.0 - 24.5 | | | 5 | | | 5 | 0.4 | 78 |
| 24.5 - 25.0 | | | | | | 0 | 0 | . |
| 25.0 - 25.5 | | | 1 | | | 1 | 0 | 78 |
| TSN$(10^6)$ | 27285 | 18257 | 12982 | 1253 | | 59777 | | |
| TSB$(10^3$ t) | 234.2 | 543.1 | 594.6 | 58.6 | | | 1430.5 | |
| Mean length (cm) | 10.5 | 15.9 | 18.3 | 18.6 | | | 14.0 | |
| Mean weight (g) | 8.6 | 29.7 | 45.8 | 46.8 | | | | 23.9 |

Based on TS value: 21.8 log L - 72.7, corresponding to $\sigma = 6.7\ 10^{-7}$ ·

**Table 2.3.5. Barents Sea polar cod. Acoustic estimates by age in August-September. TSN and TSB is total stock numbers ($10^6$ ) and total stock biomass ($10^3$ tonnes) respectively. Numbers based on TS = 21.8 Log L - 72.7 dB**

| Year | Age 1 | | Age 2 | | Age 3 | | Age 4+ | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | TSN | TSB | TSN | TSB | TSN | TSB | TSN | TSB | TSN | TSB |
| 1986 | 24038 | 169.6 | 6263 | 104.3 | 1058 | 31.5 | 82 | 3.4 | 31441 | 308.8 |
| 1987 | 15041 | 125.1 | 10142 | 184.2 | 3111 | 72.2 | 39 | 1.2 | 28333 | 382.8 |
| 1988 | 4314 | 37.1 | 1469 | 27.1 | 727 | 20.1 | 52 | 1.7 | 6562 | 86.0 |
| 1989 | 13540 | 154.9 | 1777 | 41.7 | 236 | 8.6 | 60 | 2.6 | 15613 | 207.8 |
| 1990 | 3834 | 39.3 | 2221 | 56.8 | 650 | 25.3 | 94 | 6.9 | 6799 | 127.3 |
| 1991 | 23670 | 214.2 | 4159 | 93.8 | 1922 | 67.0 | 152 | 6.4 | 29903 | 381.5 |
| 1992 | 22902 | 194.4 | 13992 | 376.5 | 832 | 20.9 | 64 | 2.9 | 37790 | 594.9 |
| 1993 | 16269 | 131.6 | 18919 | 367.1 | 2965 | 103.3 | 147 | 7.7 | 38300 | 609.7 |
| 1994 | 27466 | 189.7 | 9297 | 161.0 | 5044 | 154.0 | 790 | 35.8 | 42597 | 540.5 |
| 1995 | 30697 | 249.6 | 6493 | 127.8 | 1610 | 41.0 | 175 | 7.9 | 38975 | 426.2 |
| 1996 | 19438 | 144.9 | 10056 | 230.6 | 3287 | 103.1 | 212 | 8.0 | 33012 | 487.4 |
| 1997 | 15848 | 136.7 | 7755 | 124.5 | 3139 | 86.4 | 992 | 39.3 | 28012 | 400.7 |
| 1998 | 89947 | 505.5 | 7634 | 174.5 | 3965 | 119.3 | 598 | 23.0 | 102435 | 839.5 |
| 1999 | 59434 | 399.6 | 22760 | 426.0 | 8803 | 286.8 | 435 | 25.9 | 91463 | 1141.9 |
| 2000 | 33825 | 269.4 | 19999 | 432.4 | 14598 | 597.6 | 840 | 48.4 | 69262 | 1347.8 |
| 2001 | 77144 | 709.0 | 15694 | 434.5 | 12499 | 589.3 | 2271 | 132.1 | 107713 | 1869.6 |
| 2002 | 8431 | 56.8 | 34824 | 875.9 | 6350 | 282.2 | 2322 | 143.2 | 52218 | 1377.2 |
| 2003 | 15434 | 114.1 | 2057 | 37.9 | 2038 | 63.9 | 1545 | 64.4 | 21074 | 280.2 |
| 2004 | 99404 | 627.1 | 22777 | 404.9 | 2627 | 82.2 | 510 | 32.7 | 125319 | 1143.8 |
| 2005 | 71675 | 626.6 | 57053 | 1028.2 | 3703 | 120.2 | 407 | 28.3 | 132859 | 1803.3 |
| 2006 | 16190 | 180.8 | 45063 | 1277.4 | 12083 | 445.9 | 698 | 37.2 | 74033 | 1941.2 |
| 2007 | 29483 | 321.2 | 25778 | 743.4 | 3230 | 145.8 | 315 | 19.8 | 58807 | 1230.1 |
| 2008 | 41693 | 421.8 | 18114 | 522.0 | 5905 | 247.8 | 415 | 27.8 | 66127 | 1219.4 |
| 2009 | 13276 | 100.2 | 22213 | 492.5 | 8265 | 280.0 | 336 | 16.6 | 44090 | 889.3 |
| 2010 | 27285 | 234.2 | 18257 | 543.1 | 12982 | 594.6 | 1253 | 58.6 | 59777 | 1430.5 |
| Average | 32011 | 254.1 | 16191 | 371.5 | 4865 | 183.6 | 592 | 31.3 | 53701 | 842.7 |

**Table 2.3.6. Barents Sea polar cod. Survey mortalities from age 1 to age 2, and from age 2 to age 3**

| Year | Year class | Age 1 ($10^9$) | Age 2 ($10^9$) | Total mort. % | Total mort Z |
|---|---|---|---|---|---|
| 1986-1987 | 1985 | 24.0 | 10.1 | 58 | 0.86 |
| 1987-1988 | 1986 | 15.0 | 1.5 | 90 | 2.30 |
| 1988-1989 | 1987 | 4.3 | 1.8 | 58 | 0.87 |
| 1989-1990 | 1988 | 13.5 | 2.2 | 84 | 1.81 |
| 1990-1991 | 1989 | 3.8 | 4.2 | - | - |
| 1991-1992 | 1990 | 23.7 | 14.0 | 41 | 0.53 |
| 1992-1993 | 1991 | 22.9 | 18.9 | 17 | 0.19 |
| 1993-1994 | 1992 | 16.3 | 9.3 | 43 | 0.56 |
| 1994-1995 | 1993 | 27.5 | 6.5 | 76 | 1.44 |
| 1995-1996 | 1994 | 30.7 | 10.1 | 67 | 1.11 |
| 1996-1997 | 1995 | 19.4 | 7.8 | 59 | 0.91 |
| 1997-1998 | 1996 | 15.8 | 7.6 | 52 | 0.73 |
| 1998-1999 | 1997 | 89.9 | 22.8 | 75 | 1.37 |
| 1999-2000 | 1998 | 59.4 | 20.0 | 66 | 1.09 |
| 2000-2001 | 1999 | 33.8 | 15.7 | 54 | 0.77 |
| 2001-2002 | 2000 | 77.1 | 34.8 | 55 | 0.80 |
| 2002-2003 | 2001 | 8.4 | 2.1 | 75 | 1.38 |
| 2003-2004 | 2002 | 15.4 | 22.7 | - | - |
| 2004-2005 | 2003 | 99.4 | 57.1 | 43 | 0.56 |
| 2005-2006 | 2004 | 71.7 | 45.1 | 37 | 0.48 |
| 2006-2007 | 2005 | 16.2 | 25.8 | - | - |
| 2007-2008 | 2006 | 29.5 | 18.1 | 39 | 0.50 |
| 2008-2009 | 2007 | 41.7 | 22.2 | 47 | 0.63 |
| 2009-2010 | 2008 | 13.2 | 18.3 | - | - |

| Year | Year class | Age 2 ($10^9$) | Age 3 ($10^9$) | Total mort. % | Total mort Z |
|---|---|---|---|---|---|
| 1986-1987 | 1984 | 6.3 | 3.1 | 51 | 0.71 |
| 1987-1988 | 1985 | 10.1 | 0.7 | 93 | 2.67 |
| 1988-1989 | 1986 | 1.5 | 0.2 | 87 | 2.01 |
| 1989-1990 | 1987 | 1.8 | 0.7 | 61 | 2.57 |
| 1990-1991 | 1988 | 2.2 | 1.9 | 14 | 0.15 |
| 1991-1992 | 1989 | 4.2 | 0.8 | 81 | 1.66 |
| 1992-1993 | 1990 | 14.0 | 3.0 | 78 | 1.54 |
| 1993-1994 | 1991 | 18.9 | 5.0 | 74 | 1.33 |
| 1994-1995 | 1992 | 9.3 | 1.6 | 83 | 1.76 |
| 1995-1996 | 1993 | 6.5 | 3.3 | 51 | 0.68 |
| 1996-1997 | 1994 | 10.1 | 3.1 | 69 | 1.18 |
| 1997-1998 | 1995 | 7.8 | 4.0 | 49 | 0.67 |
| 1998-1999 | 1996 | 7.6 | 8.8 | - | - |
| 1999-2000 | 1997 | 22.8 | 14.6 | 36 | 0.44 |
| 2000-2001 | 1998 | 20.0 | 12.5 | 38 | 0.47 |
| 2001-2002 | 1999 | 15.7 | 6.4 | 59 | 0.90 |
| 2002-2003 | 2000 | 34.8 | 2.0 | 94 | 2.86 |
| 2003-2004 | 2001 | 2.1 | 2.6 | - | - |
| 2004-2005 | 2002 | 22.8 | 3.7 | 84 | 1.83 |
| 2005-2006 | 2003 | 51.7 | 12.1 | 77 | 1.50 |
| 2006-2007 | 2004 | 45.1 | 3.2 | 93 | 2.64 |
| 2007-2008 | 2005 | 25.8 | 5.9 | 77 | 1.50 |
| 2008-2009 | 2006 | 18.1 | 8.3 | 54 | 0.78 |
| 2009-2010 | 2007 | 22.2 | 13.0 | 41 | 0.52 |

**Table 2.3.7. Norwegian spring spawning herring. Acoustic estimate in the Barents Sea in August-September 2010**

| Length (cm) | Age / Year class | | | | | | | Sum ($10^6$) | Biomass ($10^3$ t ) | Mean weight (g) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7+ | | | |
| | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003- | | | |
| 12.5 - 13.0 | 31 | | | | | | | 31 | 0.5 | 15.6 |
| 13.0 - 13.4 | 143 | | | | | | | 143 | 2.5 | 17.6 |
| 13.5 - 13.9 | 70 | | | | | | | 70 | 1.4 | 19.9 |
| 14.0 - 14.4 | 148 | | | | | | | 148 | 3.3 | 22.1 |
| 14.5 - 14.9 | 62 | | | | | | | 62 | 1.6 | 25.1 |
| 15.0 - 15.4 | 96 | | | | | | | 96 | 2.6 | 27.3 |
| 15.5 - 15.9 | 72 | | | | | | | 72 | 2.0 | 27.8 |
| 16.0 - 16.4 | 79 | | | | | | | 79 | 2.6 | 32.2 |
| 16.5 - 16.9 | 75 | | | | | | | 75 | 2.6 | 34.6 |
| 17.0 - 17.4 | 24 | | | | | | | 24 | 1.0 | 41.5 |
| 17.5 - 17.9 | 15 | | | | | | | 15 | 0.7 | 43.7 |
| 18.0 - 18.4 | 24 | | | | | | | 24 | 1.2 | 48.0 |
| 18.5 - 18.9 | 31 | | | | | | | 31 | 1.7 | 53.6 |
| 19.0 - 19.4 | 85 | | | | | | | 85 | 4.9 | 57.5 |
| 19.5 - 19.9 | 31 | | | | | | | 31 | 1.8 | 60.0 |
| 20.0 - 20.4 | 17 | | | | | | | 17 | 1.1 | 65.0 |
| 20.5 - 20.9 | 17 | 17 | | | | | | 34 | 2.4 | 69.0 |
| 21.0 - 21.4 | 25 | 25 | | | | | | 50 | 3.8 | 76.2 |
| 21.5 - 21.9 | | 38 | | | | | | 38 | 3.1 | 82.1 |
| 22.0 - 22.4 | | 27 | | | | | | 27 | 2.3 | 85.5 |
| 22.5 - 22.9 | | 38 | | | | | | 38 | 3.7 | 96.8 |
| 23.0 - 23.4 | | 41 | | | | | | 41 | 4.3 | 103.0 |
| 23.5 - 23.9 | | 19 | | | | | | 19 | 2.0 | 105.0 |
| 24.0 - 24.4 | | | 5 | | | | | 5 | 0.7 | 125.0 |
| 24.5 - 24.9 | | 26 | 16 | | | | | 42 | 5.2 | 125.0 |
| 25.0 - 25.4 | | 14 | 18 | | | | | 32 | 4.2 | 132.9 |
| 25.5 - 25.9 | | 22 | 26 | | | | | 48 | 6.6 | 137.2 |
| 26.0 - 26.4 | | 33 | 33 | 1 | | | | 67 | 9.7 | 145.2 |
| 26.5 - 26.9 | | 15 | 81 | 1 | | | | 97 | 15.4 | 157.7 |
| 27.0 - 27.4 | | | 8 | 27 | | | | 35 | 5.5 | 158.0 |
| 27.5 - 27.9 | | | 27 | 50 | | | | 76 | 13.1 | 171.0 |
| 28.0 - 28.4 | | | 1 | 50 | 10 | | | 61 | 11.3 | 186.4 |
| 28.5 - 28.9 | | | 0 | 40 | | | | 40 | 7.7 | 192.3 |
| 29.0 - 29.4 | | | 0 | 34 | | | | 34 | 6.9 | 202.8 |
| 29.5 - 29.9 | | | 1 | 23 | 10 | | | 34 | 7.5 | 218.7 |
| 30.0 - 30.4 | | | 13 | | | | | 13 | 3.0 | 227.8 |
| 30.5 - 30.9 | | | | 13 | | | | 13 | 2.9 | 216.9 |
| 31.0 - 31.4 | | | | 12 | 4 | | | 16 | 4.1 | 257.3 |
| 31.5 - 31.9 | | | | | | 17 | | 17 | 4.8 | 275.7 |
| 32.0 - 32.4 | | | | | | 23 | | 23 | 6.7 | 289.4 |
| 32.5 - 32.9 | | | | | 5 | 14 | 9 | 33 | 10.3 | 309.2 |
| 33.0 - 33.4 | | | | | | 19 | 6 | 32 | 10.1 | 319.6 |
| 33.5 - 33.9 | | | | | | 11 | 6 | 20 | 6.7 | 340.2 |
| 34.0 - 34.4 | | | | | | 7 | 13 | 20 | 6.9 | 350.2 |
| 34.5 - 34.9 | | | | | | 2 | 6 | 8 | 2.7 | 355.6 |
| 35.0 - 35.4 | | | | | | | 2 | 2 | 0.6 | 370.0 |
| 35.5 - 35.9 | | | | | | | | | | |
| 36.0 - 36.4 | | | | | | | 3 | 3 | 1.2 | 413.7 |
| 36.5 - 36.9 | | | | | | | | 2 | 0.7 | 468.0 |
| TSN (106) | 1047 | 315 | 234 | 251 | 29 | 93 | 56 | 2025 | | |
| TSB(103 t) | 34.5 | 33.7 | 37.0 | 48.1 | 6.5 | 28.7 | 18.9 | | 207.3 | |
| Mean length (cm) | 15.9 | 23.5 | 26.7 | 28.7 | 29.9 | 32.8 | 33.7 | 21.4 | | |
| Mean weight (g) | 32.9 | 106.9 | 157.7 | 191.1 | 228.0 | 307.7 | 334.8 | | | 102.3 |
| TS=20.0* log(L) - 71.9 | | | | | | | | | | |

**Table 2.3.8. Norwegian spring spawning herring. Acoustic estimates by age in autumn1999-2010. TSN and TSB are total stock numbers ($10^6$) and total stock biomass ($10^3$ t)**

| Age | 1 | | 2 | | 3 | | 4+ | | Sum | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | TSN | TSB | TSN | TSB | TSN | TSB | TSN | TSB | TSN | TSB |
| 1999 | 48758.6 | 715.9 | 985.9 | 31.0 | 50.7 | 2.0 | | | 49795.2 | 748.9 |
| 2000 | 14731.0 | 382.6 | 11499.0 | 560.3 | | | | | 26230.0 | 942.9 |
| 2001 | 524.5 | 12.0 | 10544.1 | 604.3 | 1714.4 | 160.0 | | | 12783.0 | 776.3 |
| 2002 | | Herring | area | was not | covered | | | | | |
| 2003 | 99785.7 | 3090.3 | 4335.7 | 220.1 | 2475.6 | 325.5 | | | 106596.9 | 3636.4 |
| 2004 | 14265.0 | 406.4 | 36495.0 | 2725.3 | 901.0 | 106.6 | | | 51717.0* | 3251.9* |
| 2005 | 46380.0 | 983.7 | 16167.0 | 1054.5 | 6973.0 | 795.2 | | | 69520.0 | 2833.4 |
| 2006 | 1618.0 | 34.2 | 5535.0 | 398.4 | 1620.0 | 210.5 | | | 8773.0 | 643.0 |
| 2007 | 3941.0 | 147.5 | 2595.0 | 217.5 | 6378.0 | 810.1 | 250.0 | 45.7 | 13164.0 | 1220.9 |
| 2008 | 29.6 | 0.6 | 1626.4 | 76.9 | 3987.0** | 287.3** | 3222.6** | 373.1** | 8865.6 | 737.9 |
| 2009 | 1538 | 48.4 | 433.0 | 51.8 | 1807 | 287.3 | 1686.0 | 393.0 | 5577.0 | 814.8 |
| 2010 | 1047.0 | 34.5 | 315.0 | 33.7 | 234.0 | 37.0 | 428.0 | 104.2 | 2025.0 | 207.3 |
| Average 1999-2010 | 21147.1 | 532.4 | 8230.1 | 543.1 | 2614.1 | 302.2 | 1042.4 | 137.3 | 32277.0 | 1437.6 |

* - including older age groups not shown in the table
** - including Kanin herring

**Table 2.3.9. Blue whiting. Acoustic estimate in the Barents Sea in August-September**

| Length (cm) | Age/Yearclass | | | | | | | | | Sum ($10^6$) | Biomass ($10^3$ t ) | Mean weigt(g) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9+ | | | |
| | 2009 | 2008 | 2007 | 2006 | 2005 | 2004 | 2003 | 2002 | 2001 | | | |
| 23.0 - 23.5 | | | | | | | | | | 0 | 0 | 95.4 |
| 23.5 - 24.0 | | | | | | | | | | 0 | 0 | |
| 24.0 - 24.5 | | | | | | | | | | 0 | 0 | |
| 24.5 - 25.0 | | | | | | | | | | 0 | 0 | |
| 25.0 - 25.5 | | | | | | | | | | 0 | 0 | |
| 25.5 - 26.0 | | | | | | | | | | 0 | 0 | 99.0 |
| 26.0 - 26.5 | | | | | | | | | | 0 | 0.1 | 120.0 |
| 26.5 - 27.0 | | | | 1 | | 4 | | | | 5 | 0.5 | 108.5 |
| 27.0 - 27.5 | | | | | 2 | 2 | | | | 4 | 0.6 | 142.5 |
| 27.5 - 28.0 | | | | | 2 | 2 | | | | 5 | 0.6 | 137.3 |
| 28.0 - 28.5 | | | | | 1 | 1 | 1 | 1 | | 5 | 0.7 | 149.8 |
| 28.5 - 29.0 | | | | | | | 4 | 5 | | 9 | 1.4 | 155.4 |
| 29.0 - 29.5 | | | | | 3 | 6 | 2 | 29 | | 40 | 6.8 | 169.4 |
| 29.5 - 30.0 | | | | | 21 | 10 | 2 | 21 | | 55 | 9.1 | 166.2 |
| 30.0 - 30.5 | | | | | | 77 | 5 | | | 82 | 14.6 | 178.6 |
| 30.5 - 31.0 | | | | 2 | | 14 | | 61 | | 77 | 14.2 | 183.8 |
| 31.0 - 31.5 | | | | | 75 | | 33 | | | 108 | 20.6 | 190.8 |
| 31.5 - 32.0 | | | 9 | 18 | 4 | 63 | | | | 94 | 20.1 | 214.7 |
| 32.0 - 32.5 | | | | | | 8 | 7 | 27 | 66 | 109 | 22.1 | 203.2 |
| 32.5 - 33.0 | | | 2 | | 52 | 15 | | | 25 | 95 | 21.0 | 221.0 |
| 33.0 - 33.5 | | | 2 | | 30 | 4 | | | 57 | 93 | 21.1 | 227.6 |
| 33.5 - 34.0 | | | | 3 | | 14 | 12 | | 16 | 44 | 10.1 | 229.3 |
| 34.0 - 34.5 | | | | 2 | 1 | 13 | 2 | 3 | 3 | 25 | 6.0 | 240.8 |
| 34.5 - 35.0 | | | | | | 17 | 8 | | | 25 | 6.5 | 261.2 |
| 35.0 - 35.5 | | | | 2 | | 2 | | | | 5 | 1.2 | 256.9 |
| 35.5 - 36.0 | | | | | | | 4 | 1 | 1 | 6 | 1.6 | 267.4 |
| 36.0 - 36.5 | | | | | | | | | | 0 | 0.1 | 323.0 |
| 36.5 - 37.0 | | | | | | | 1 | 5 | 2 | 8 | 2.2 | 268.3 |
| 37.0 - 37.5 | | | | | | | | | 1 | 1 | 0.3 | 274.0 |
| 37.5 - 38.0 | | | | | | | | | | 0 | 0.2 | 445.0 |
| 38.0 - 38.5 | | | | | | | | | | 0 | 0 | |
| 38.5 - 39.0 | | | | | | | | | | 0 | 0 | |
| 39.0 - 39.5 | | | | | | | | | 1 | 1 | 0.2 | 347.0 |
| 39.5 - 40.0 | | | | | | | | | | 0 | 0 | |
| 40.0 - 40.5 | | | | | | | | | 2 | 2 | 0.5 | 298.0 |
| 40.5 - 41.0 | | | | | | | | | | 0 | 0 | |
| 41.0 - 41.5 | | | | | | | | | | 0 | 0 | |
| 41.5 - 42.0 | | | | | | | | | | 0 | 0 | |
| 42.0 - 42.5 | | | | | | | | | | 0 | 0.1 | 413.0 |
| TSN($10^6$) | | | 13 | 28 | 192 | 253 | 81 | 157 | 173 | 897 | | |
| TSB($10^3$ t) | | | 2.8 | 6.1 | 38.5 | 50.9 | 16.7 | 29.2 | 38.2 | | 182.6 | |
| Mean length (cm) | | | 32.1 | 32.2 | 31.7 | 31.5 | 32.1 | 30.9 | 32.8 | 31.8 | | |
| Mean weight (g) | | | 216.3 | 216.7 | 201.1 | 201.3 | 205.5 | 186.6 | 217.1 | | | 203.5 |

TS=21.8* lg(L) - 72.7

**Table 2.3.10. Blue whiting. Acoustic estimates by age in autumn 2004-2010. TSN and TSB are total stock numbers ($10^6$) and total stock biomass ($10^3$)**

| Age | 1 | | 2 | | 3 | | 4+ | | Sum | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | TSN | TSB | TSN | TSB | TSN | TSB | TSN | TSB | TSN | TSB |
| 2004 | 5787 | 219.1 | 3801 | 285.5 | 2878 | 264.8 | 4780 | 606.5 | 17268 | 1376.8 |
| 2005 | 4871 | 132.0 | 2770 | 180.0 | 4205 | 363.0 | 3213 | 409.8 | 15058 | 1084.1 |
| 2006 | 371 | 21.2 | 2227 | 158.8 | 2665 | 238.1 | 2491 | 330.6 | 7754 | 748.8 |
| 2007 | 3 | 0.1 | 245 | 23.2 | 2934 | 292.2 | 2221 | 315.1 | 5666 | 657.6 |
| 2008 | 3 | 0.1 | 2 | 0.1 | 11 | 1.1 | 604 | 95.4 | 620 | 96.9 |
| 2009 | 2 | 0.1 | 2 | 0.2 | 2 | 0.2 | 1513 | 260.8 | 1519 | 261.4 |
| 2010 | 0 | 0.0 | 0 | 0.0 | 13 | 2.8 | 884 | 179.3 | 897 | 182.6 |
| Average 2004-2010 | 1576.7 | 53.2 | 1292.4 | 92.5 | 1815.4 | 166.0 | 2243.7 | 313.9 | 6968.9 | 629.7 |

**Table 2.7.1. Number of marine mammal individuals observed from the research vessels J. Hjort, Jan Mayen, G.O. Sars, Vilnuys and F. Nansen during the ecosystem survey 2010.**

| Order / suborder | Name of species (english) | Johan Hjort | Jan Mayen | G.O.Sars | Vilnus | F. Nansen | Total | % |
|---|---|---|---|---|---|---|---|---|
| **Cetacea/ Baleen whales** | Blue whale | - | 4 | - | - | - | 4 | 0.12 |
| | Fin whale | 57 | 106 | 15 | 2 | 3 | 183 | 5.38 |
| | Humpback whale | 181 | 352 | 1 | 110 | - | 644 | 18.94 |
| | Minke whale | 31 | 107 | 10 | 25 | 5 | 178 | 5.24 |
| | Unidentified whale | 39 | 7 | - | 1 | - | 47 | 1.38 |
| **Cetacea/ Toothed whales** | Sperm whale | 20 | 5 | 1 | - | - | 26 | 0.76 |
| | Killer whale | 25 | - | - | 6 | - | 31 | 0.91 |
| | Harbour porpoise | 4 | - | - | 11 | - | 15 | 0.44 |
| | White-beaked dolphin | 55 | 218 | 872 | 39 | 37 | 1221 | 35.91 |
| | Lagenorhynchus spp. | 77 | 57 | 37 | - | - | 171 | 5.03 |
| | White whale | - | - | - | 3 | - | 3 | 0.09 |
| **Pinnipedia** | Harp seal | - | 241 | - | 609 | - | 850 | 25.00 |
| | Ringed seal | - | 2 | - | 1 | - | 3 | 0.09 |
| | Walrus | 4 | 15 | - | 1 | - | 20 | 0.59 |
| | Hooded seal | - | 1 | - | - | - | 1 | 0.03 |
| **Other** | Polar bear | - | 1 | - | 2 | - | 3 | 0.09 |
| **Total sum** | | **493** | **1116** | **936** | **810** | **45** | **3400** | **100** |

**Table 2.7.2. Number of seabirds observed by species during the Joint Norwegain/Russian Ecosystem Survey 2010**

| Species | Latin name | No. of ind. |
|---|---|---|
| **Little auk** | Alle alle | 871 |
| **Razorbill** | Alca torda | 8 |
| **Brünnich guillemot** | Uria lomvia | 5540 |
| **Common guillemot** | Uria aalge | 13 |
| **Black guillemot** | Cepphus grylle | 58 |
| **Puffin** | Fratercula arctica | 198 |
| **Uria spp.** | Uria spp. | 33 |
| **Fulmar** | Fulmarus glacialis | 35041 |
| **Sooty Shearwater** | Puffinus griseus | 4 |
| **Glaucous gull** | Larus hyperboreus | 1795 |
| **Great Black-backed gull** | Larus marinus | 463 |
| **Herring gull** | Larus argentatus | 896 |
| **Kittiwake** | Rissa tridactyla | 6059 |
| **Ivory gull** | Pagophila eburnea | 7 |
| **Great skua** | Stercorarius skua | 26 |
| **Long-tailed skua** | Stercorarius longicaudus | 11 |
| **Arctic skua** | Stercorarius parasiticus | 82 |
| **Pomarine skua** | Stercorarius pomarinus | 199 |
| **Unid. skua** | Stercorarius sp. | 7 |
| **Arctic tern** | Sterna paradisaea | 67 |
| **Gannet** | Morus bassanus | 3 |
| **Purple sandpiper** | Calidris maritima | 11 |
| **Black-throated loon** | Gavia arctica | 3 |
| **Bean goose** | Anser fabalis | 5 |

# 5 FIGURES

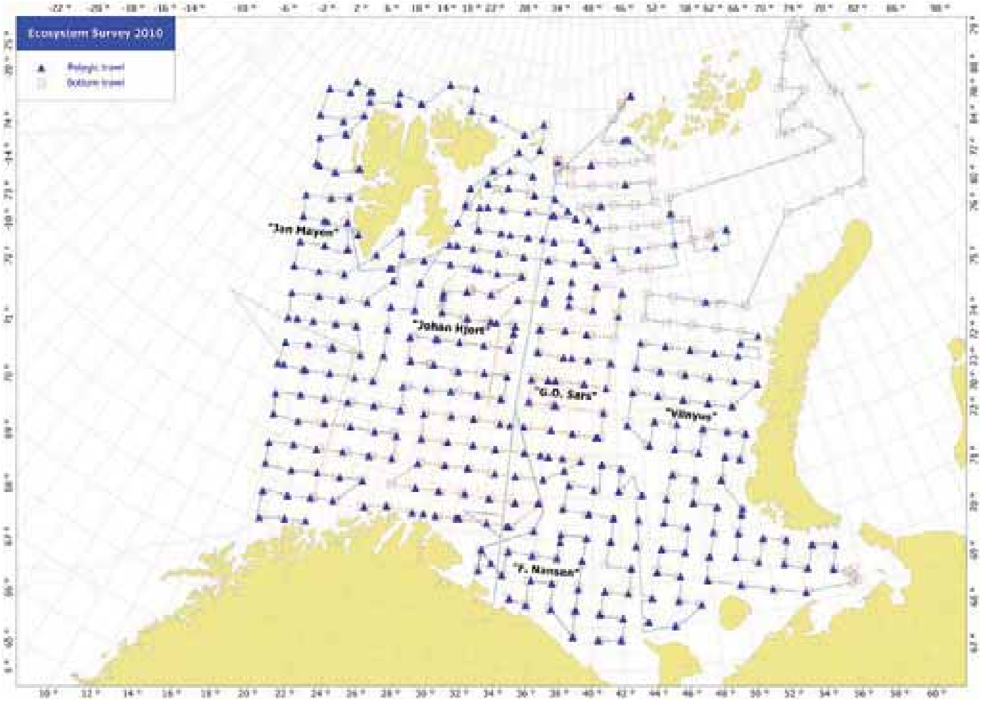
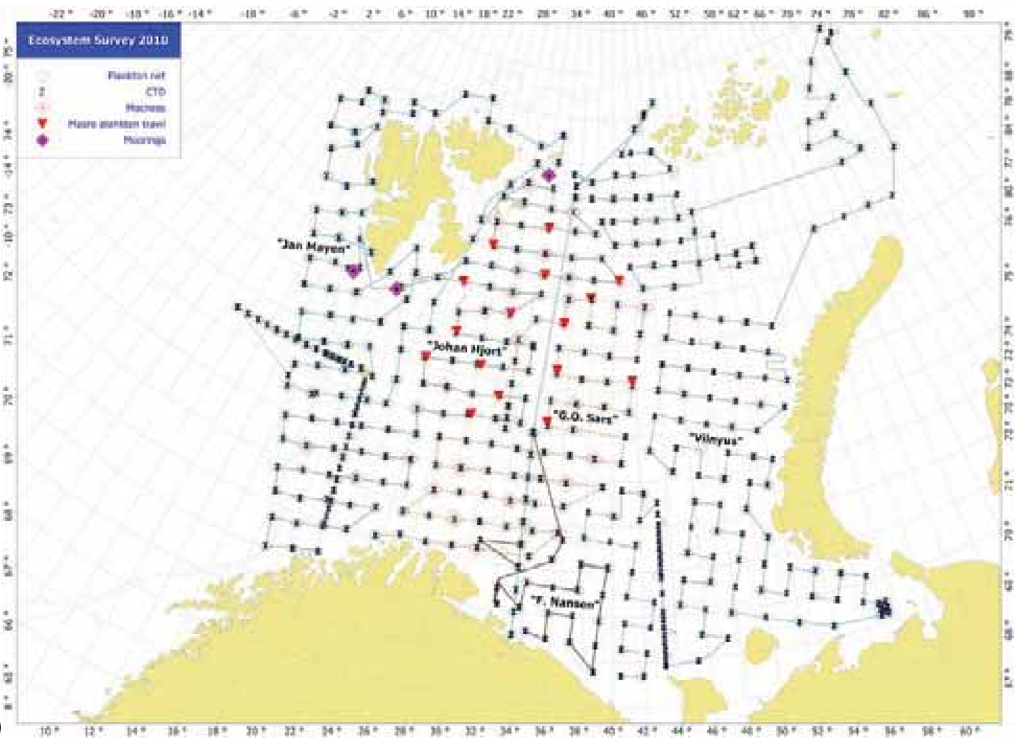



**Figure 2.1** **Trawl stations for "G.O. Sars" "Johan Hjort", "Jan Mayen", "F. Nansen"and"Vilnyus", August – September.**




**2010**

**Figure 2.2** **Hydrograhy and plankton stations for "G.O. Sars" "Johan Hjort", "Jan Mayen", "F. Nansen" and "Vilnyus", August - September 2010**

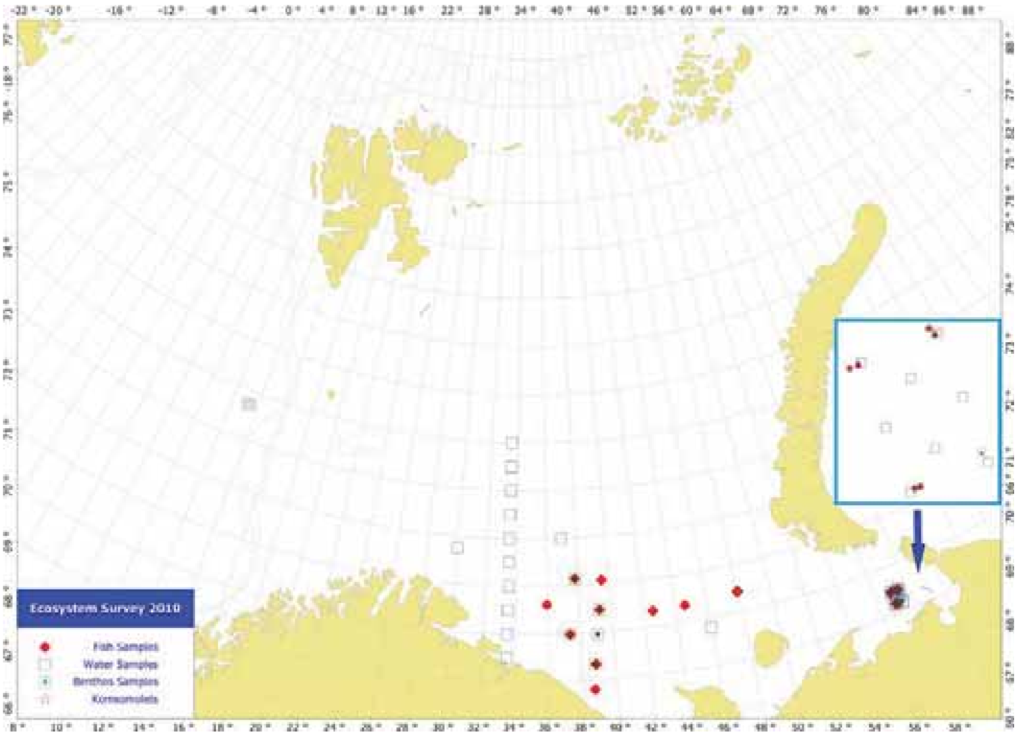



**Figure 2.3 Environmental stations for "Johan Hjort", and "Vilnyus", August - September 2010.**

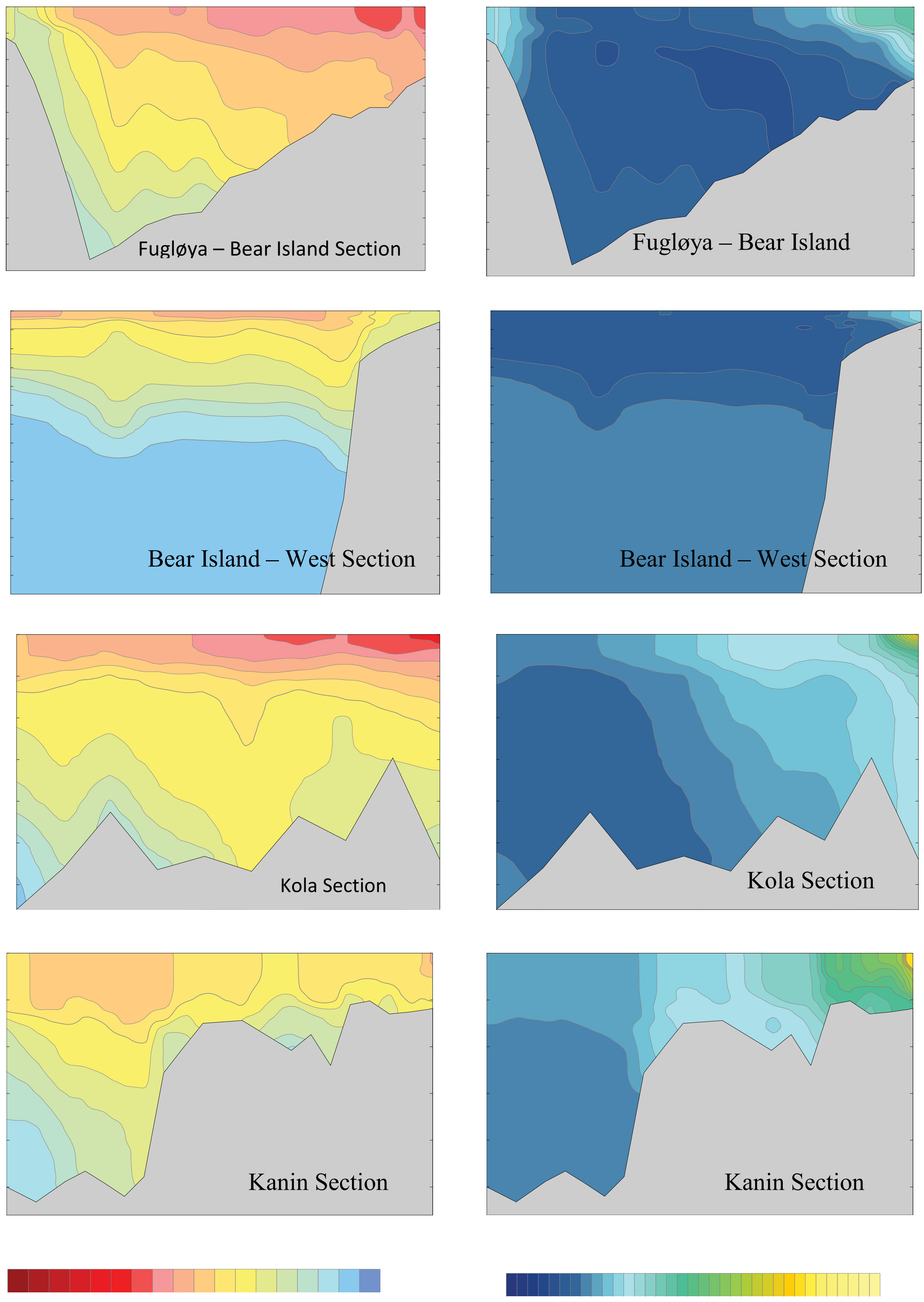



**Figure 2.1.1. Temperature (°C, left panels) and salinity (right panels) along standard oceanographic sections in August 2010.**

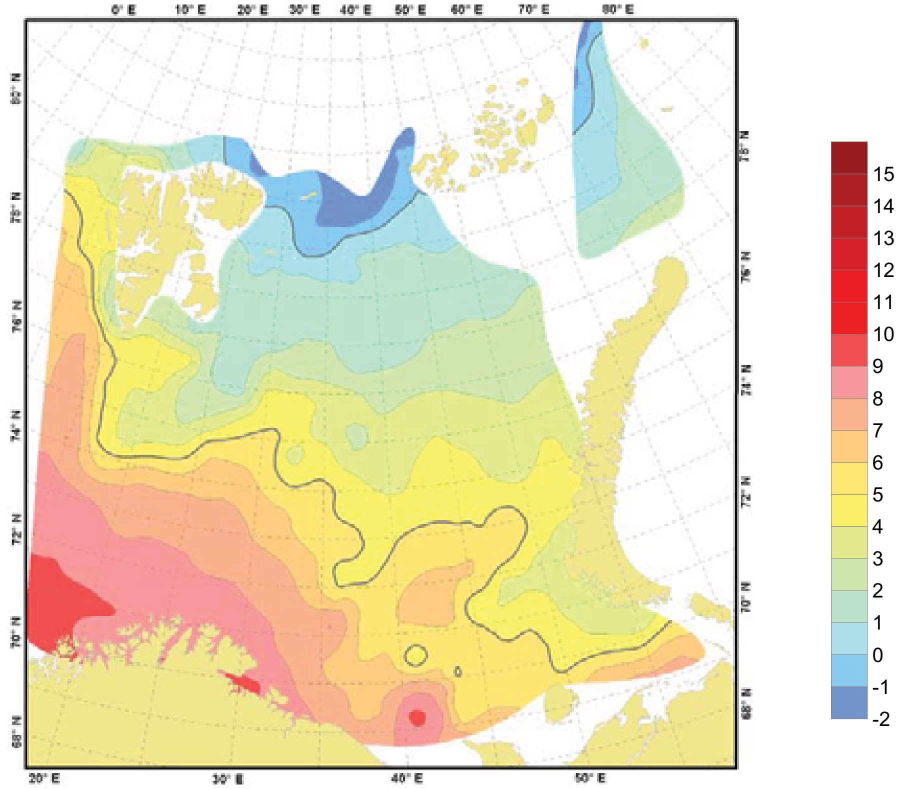



**Figure 2.1.2. Distribution of surface temperature (°C), August-September 2010.**

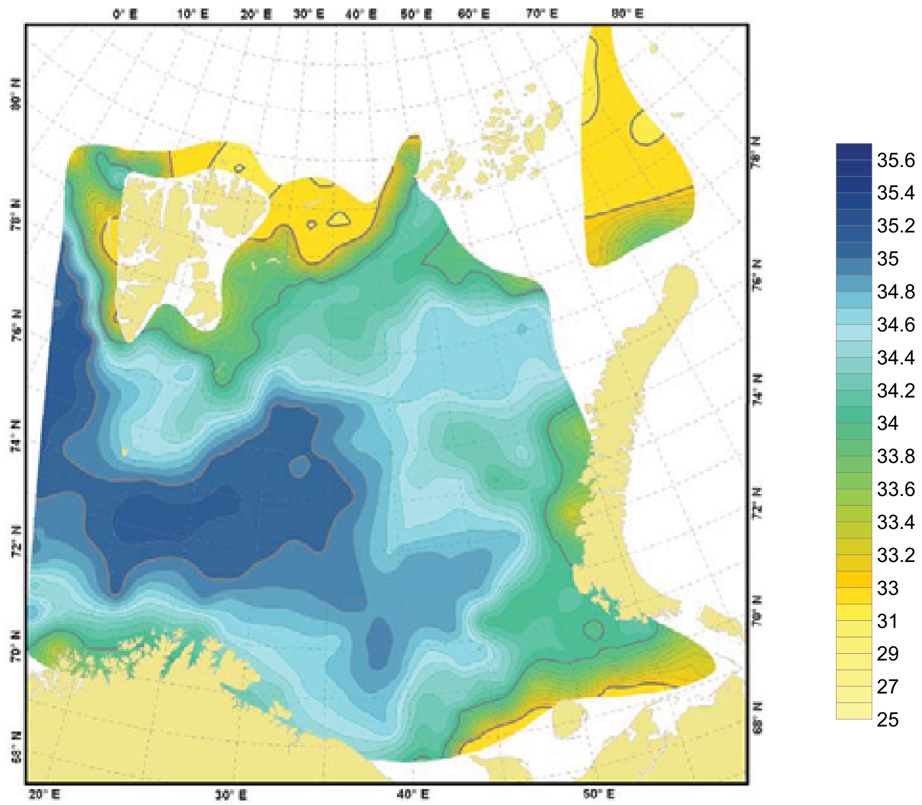



**Figure 2.1.3. Distribution of surface salinity, August-September 2010.**

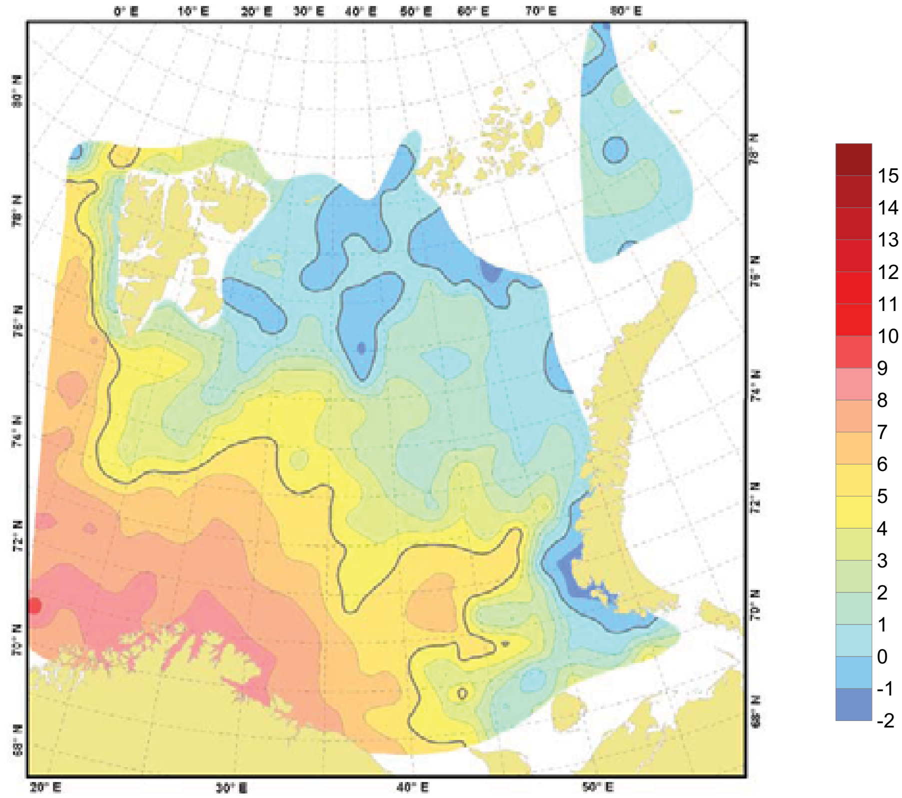



**Figure 2.1.4. Distribution of temperature (°C) at the 50 m depth, August-September 2010.**

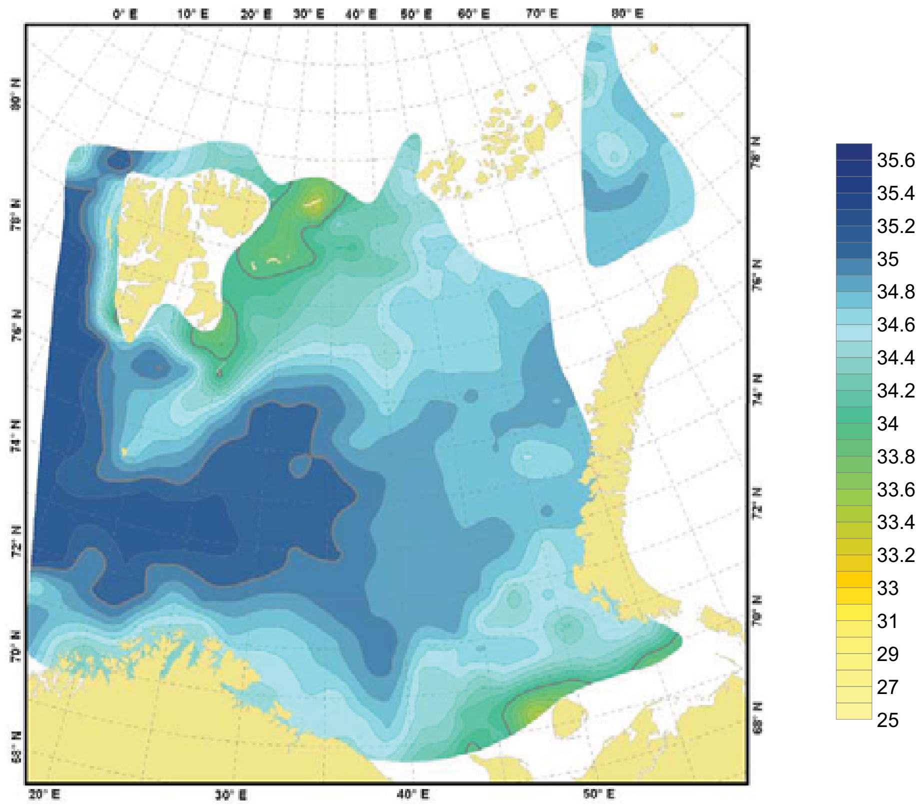



**Figure 2.1.5. Distribution of salinity at the 50 m depth, August-September 2010.**

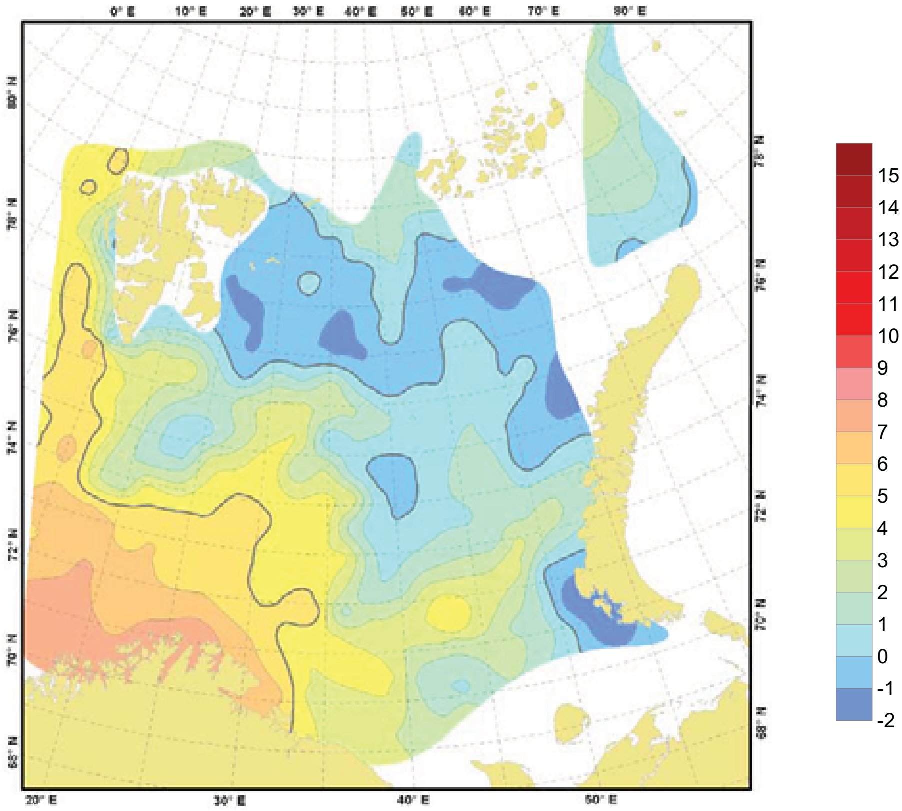



**Figure 2.1.6. Distribution of temperature (°C) at the 100 m depth, August-September 2010.**

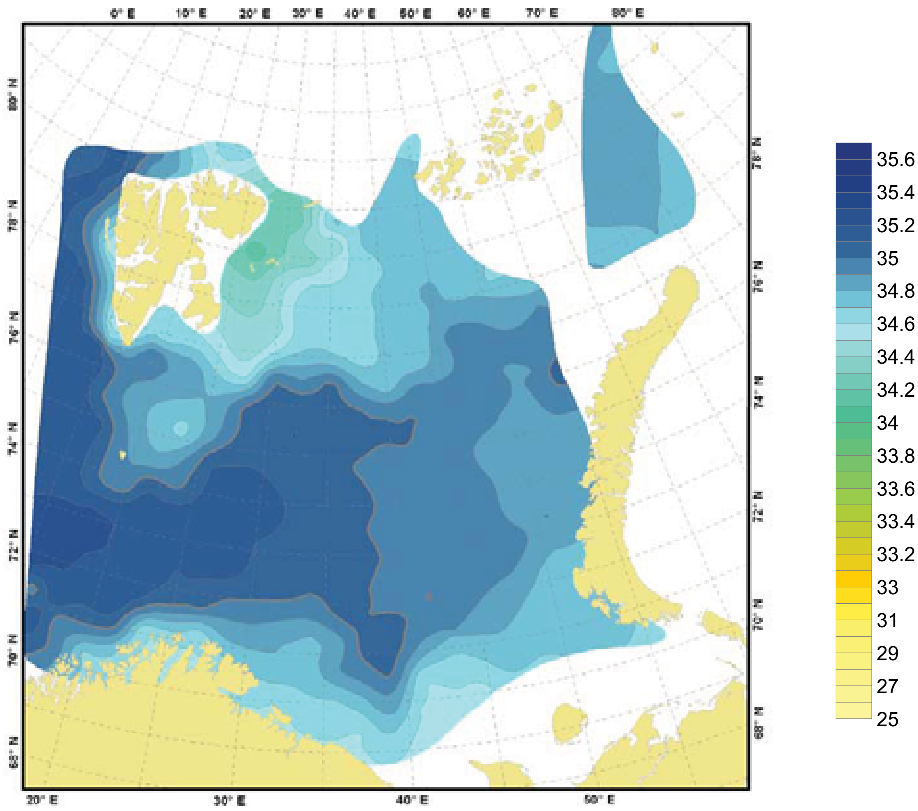



**Figure 2.1.7. Distribution of salinity at the 100 m depth, August-September 2010.**

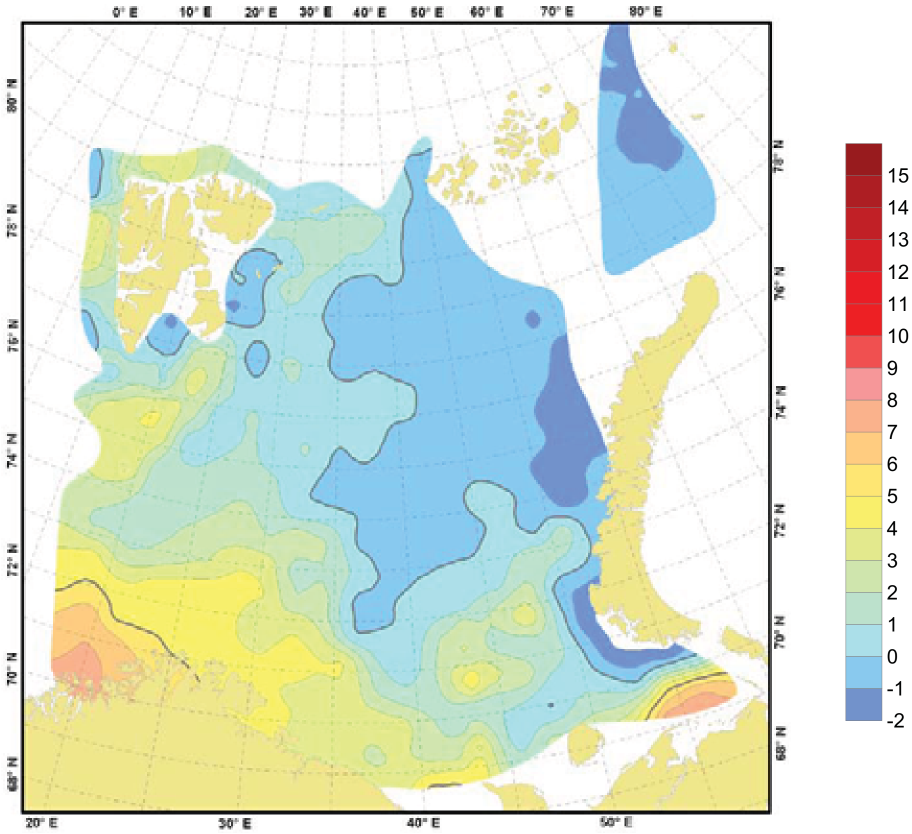



**Figure 2.1.8. Distribution of temperature (°C) at the bottom, August-September 2010.**

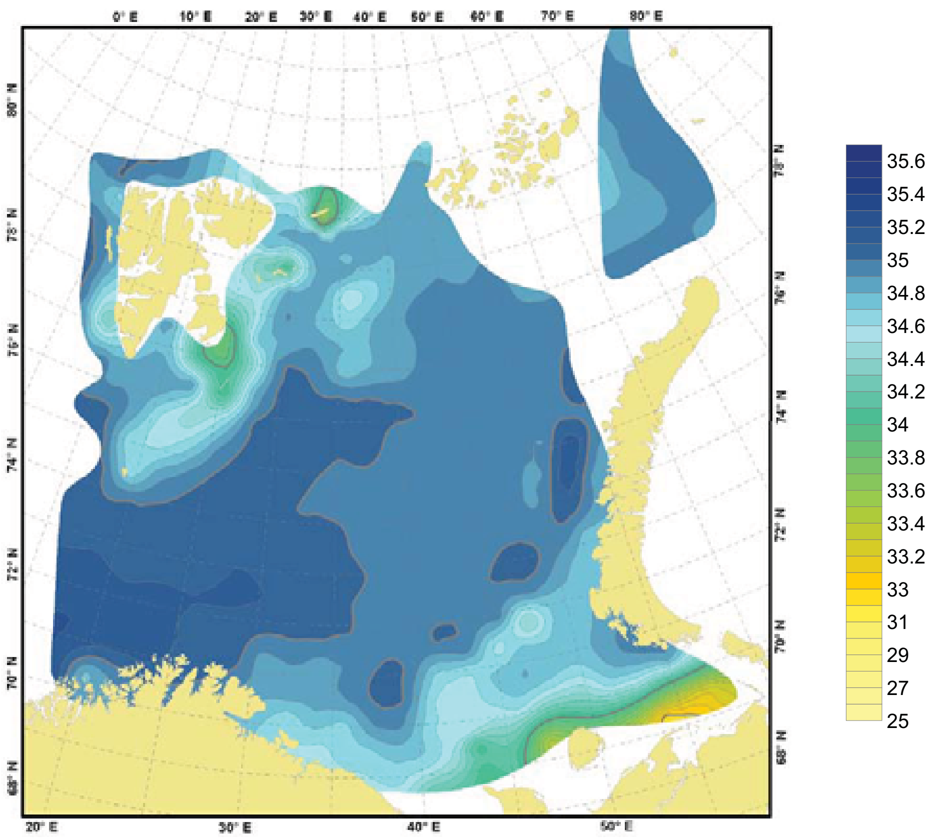



**Figure 2.1.9. Distribution of salinity at the bottom, August-September 2010.**

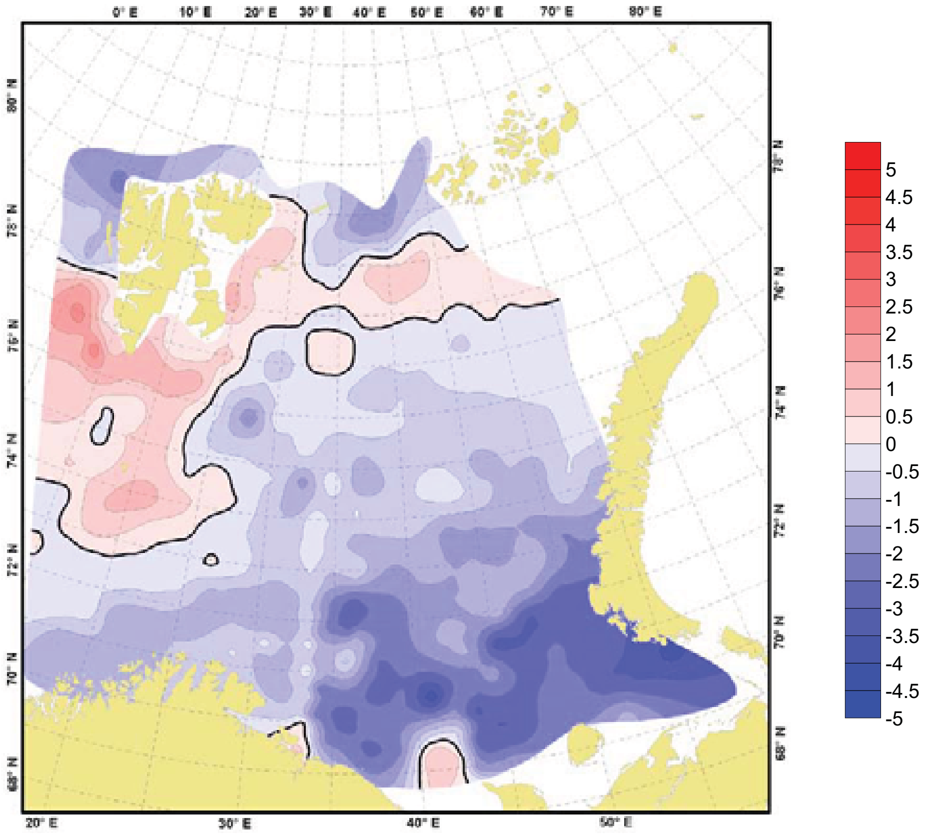



**Figure 2.1.10. Surface temperature anomalies (°C), August-September 2010.**

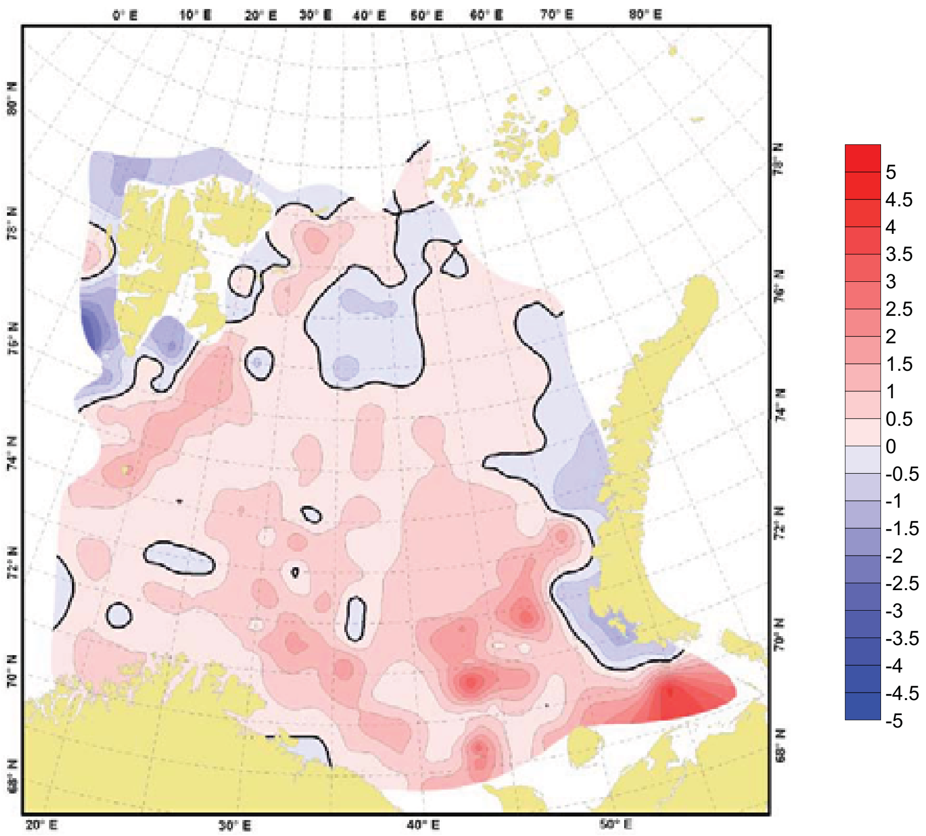



**Figure 2.1.11. Temperature anomalies (°C) at the bottom, August-September 2010.**

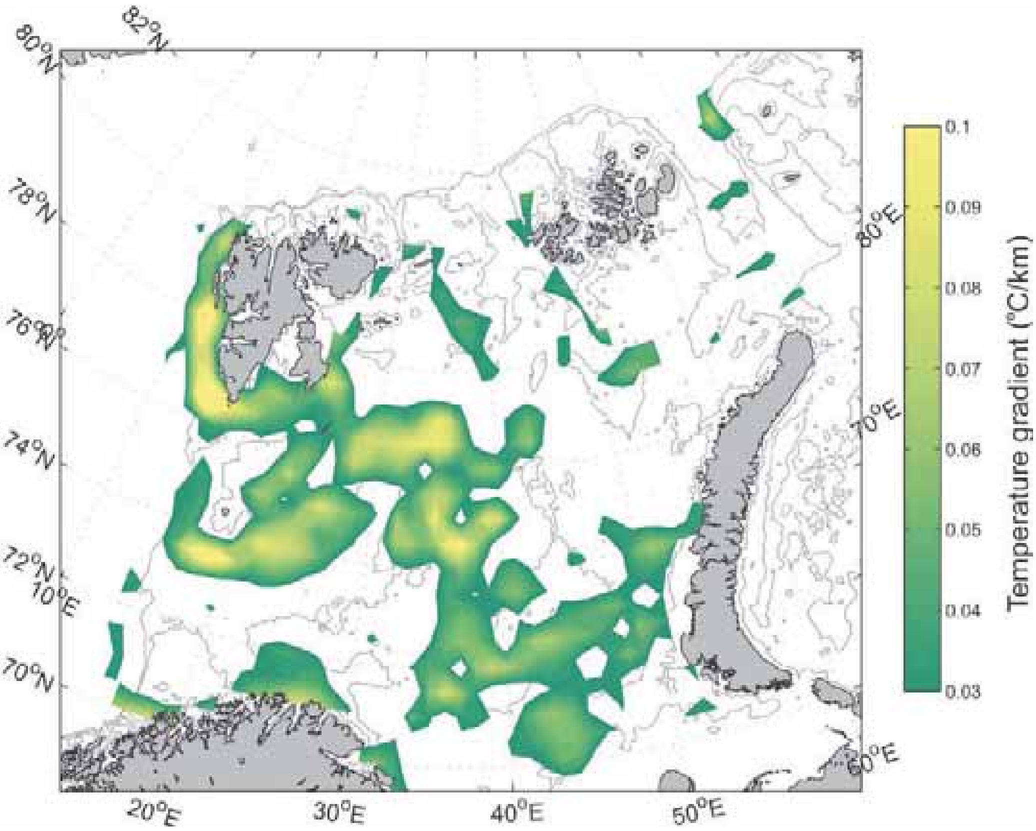



**Figure 2.1.12. Frontal structures as calculated by temperature gradients in 100 m depth in August-September 2010. High values indicate stronger frontal structures. Only values above 0.03°C/km are plotted.**

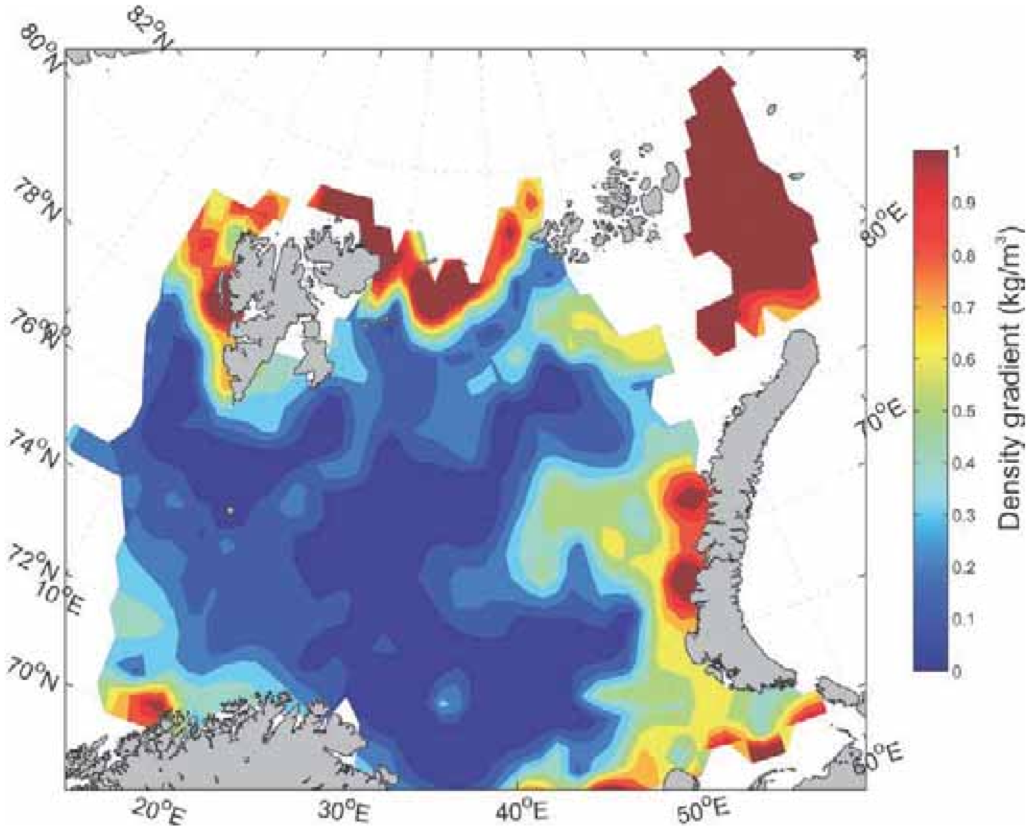



**Figure 2.1.13. Stratification in the upper layer calculated as density difference 0-50 m in August-September 2010.**

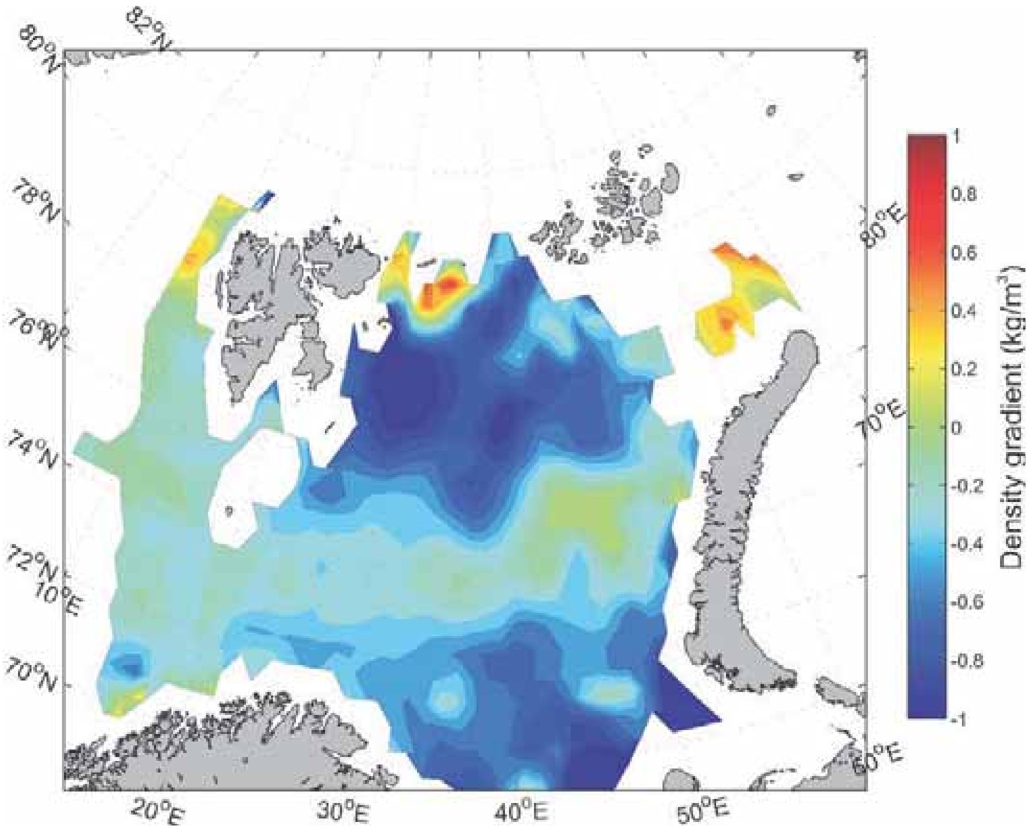



**Figure 2.1.14. Stratification anomalies in August-September 2010 (compared to the long-term mean for the period 1970-2009).**

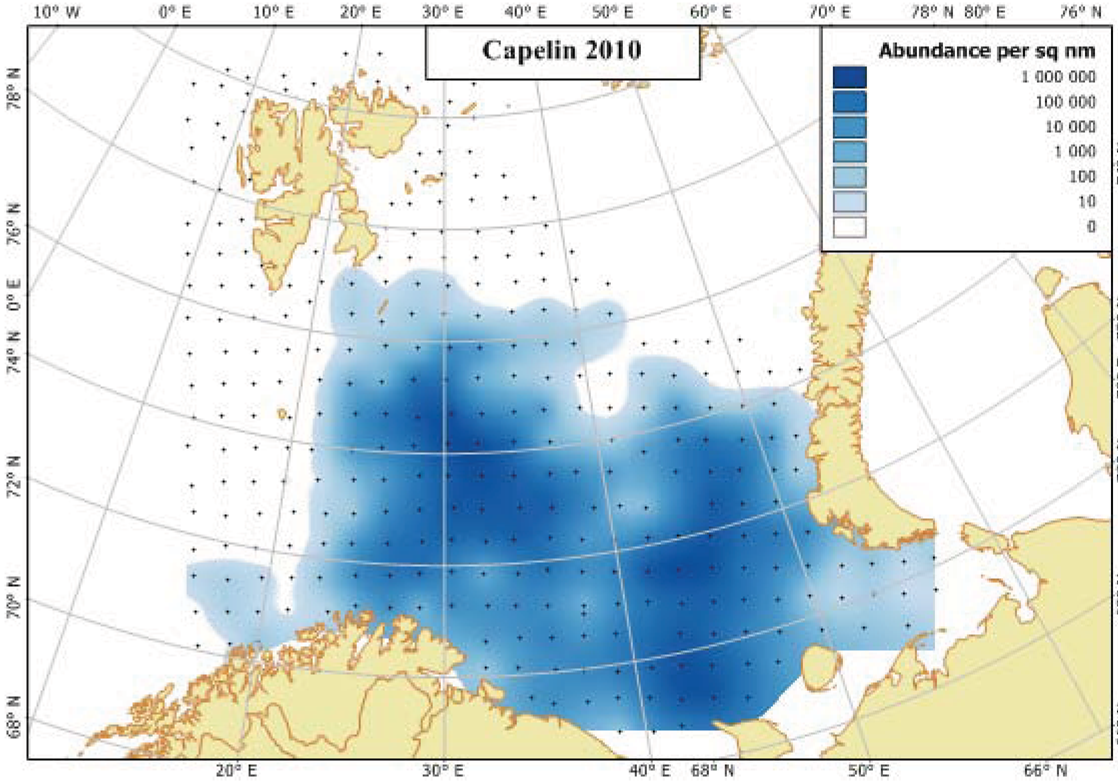



**Figure 2.2.1 Distribution of 0-group capelin, August-September 2010**

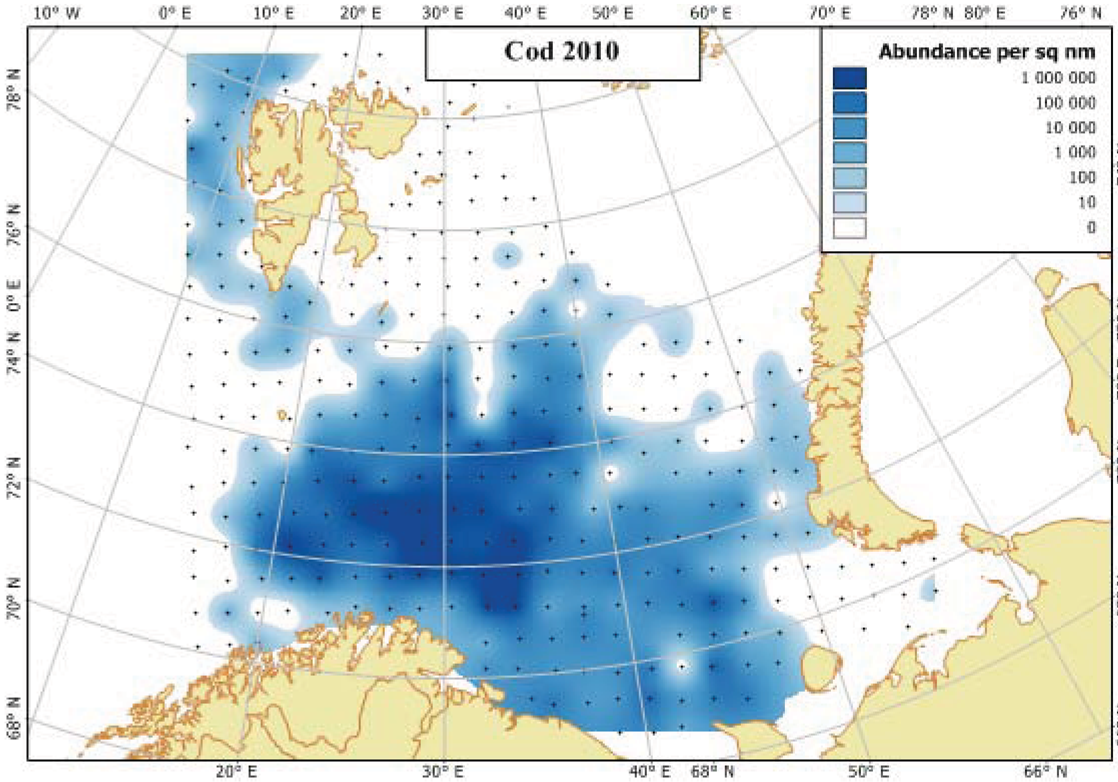



**Figure 2.2.2 Distribution of 0-group cod, August-September 2010**

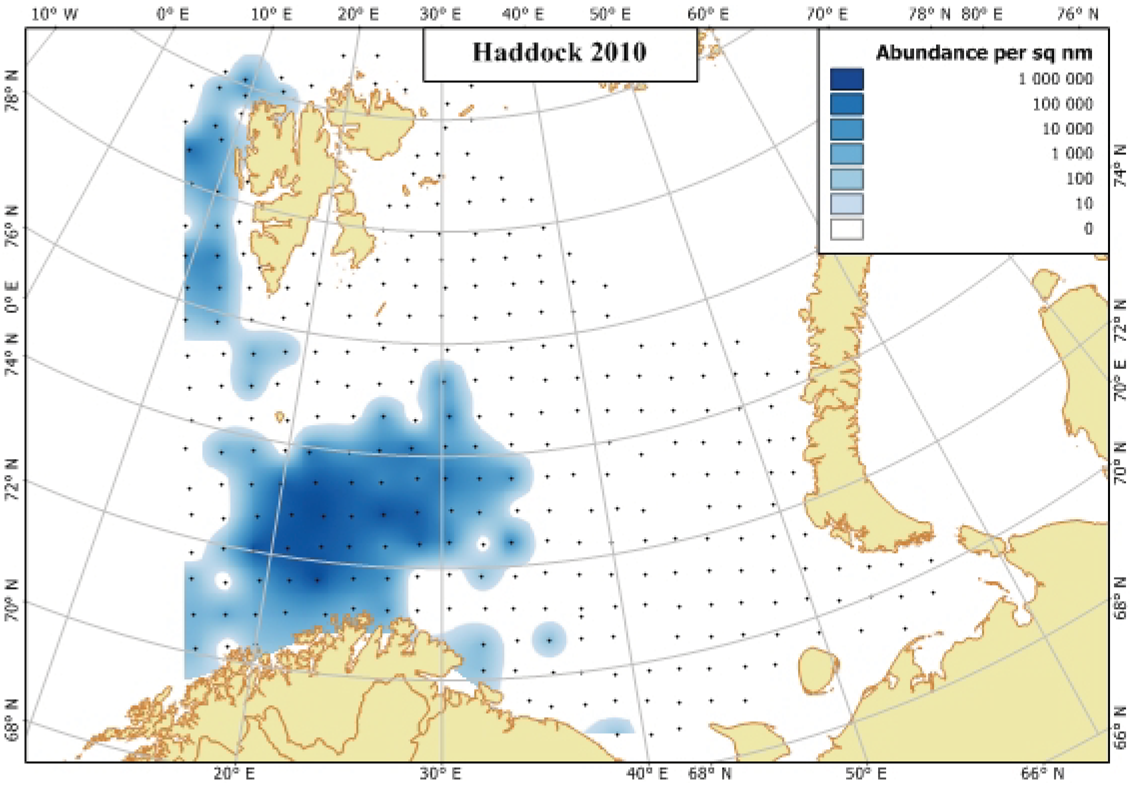



Figure 2.2.3 Distribution of 0-group haddock, August-September 2010

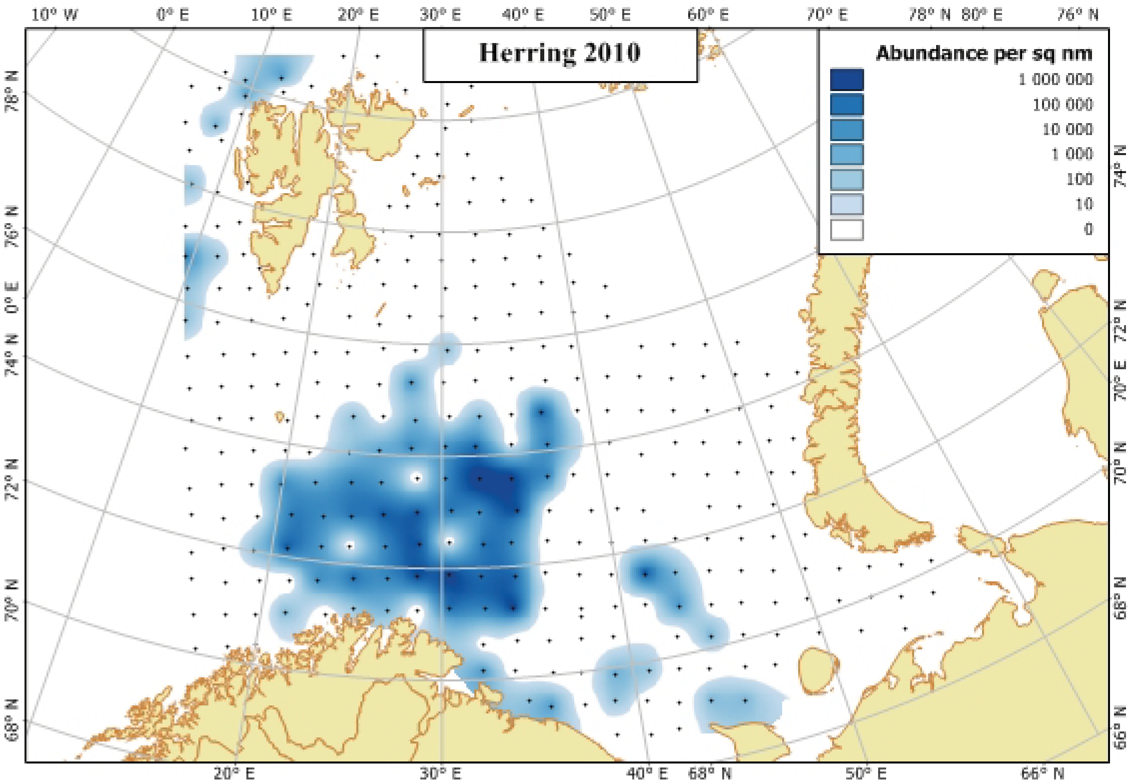



Figure 2.2.4 Distribution of 0-group herring, August-September 2010

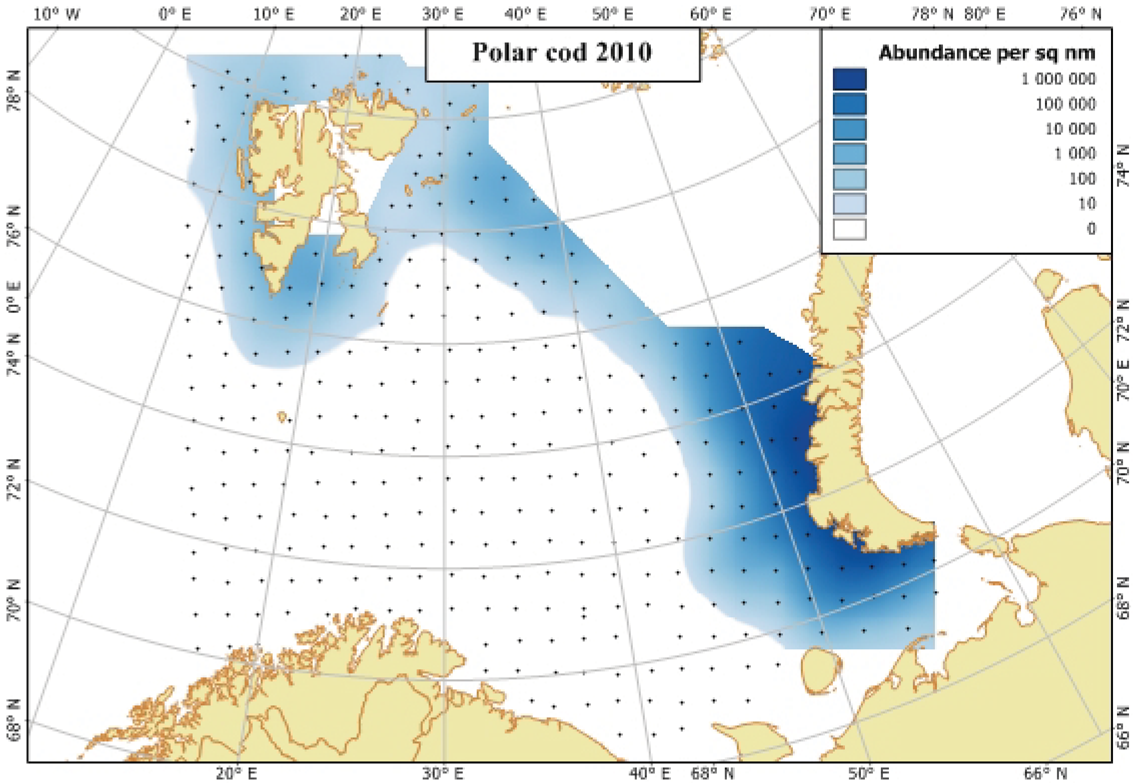



**Figure 2.2.5 Distribution of 0-group polar cod, August-September 2010**

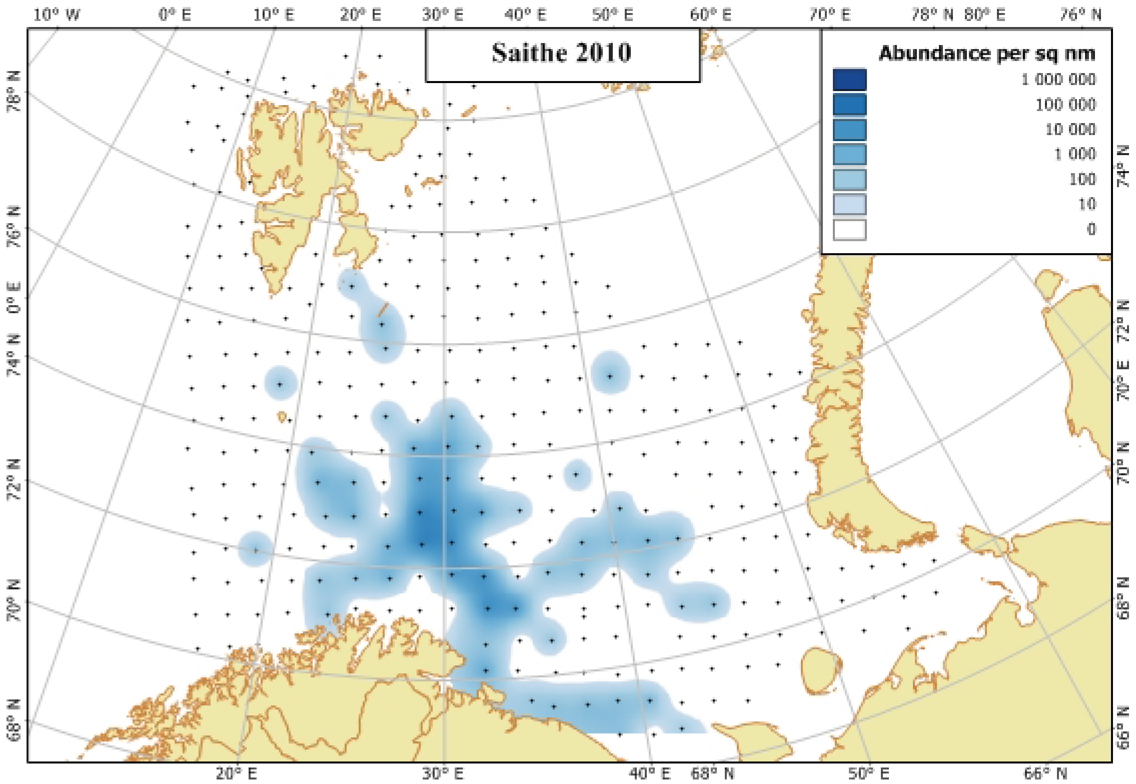



**Figure 2.2.6 Distribution of 0-group saithe, August-September 2010**

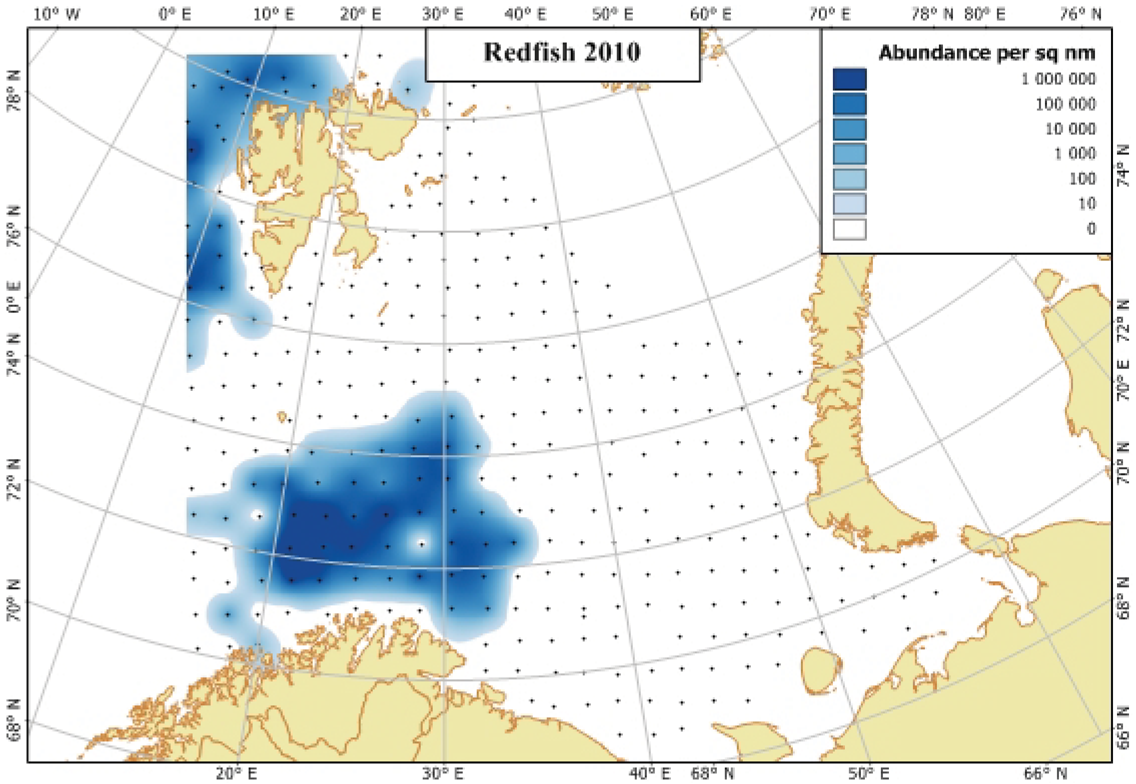



Figure 2.2.7 Distribution of 0-group redfish, August-September 2010

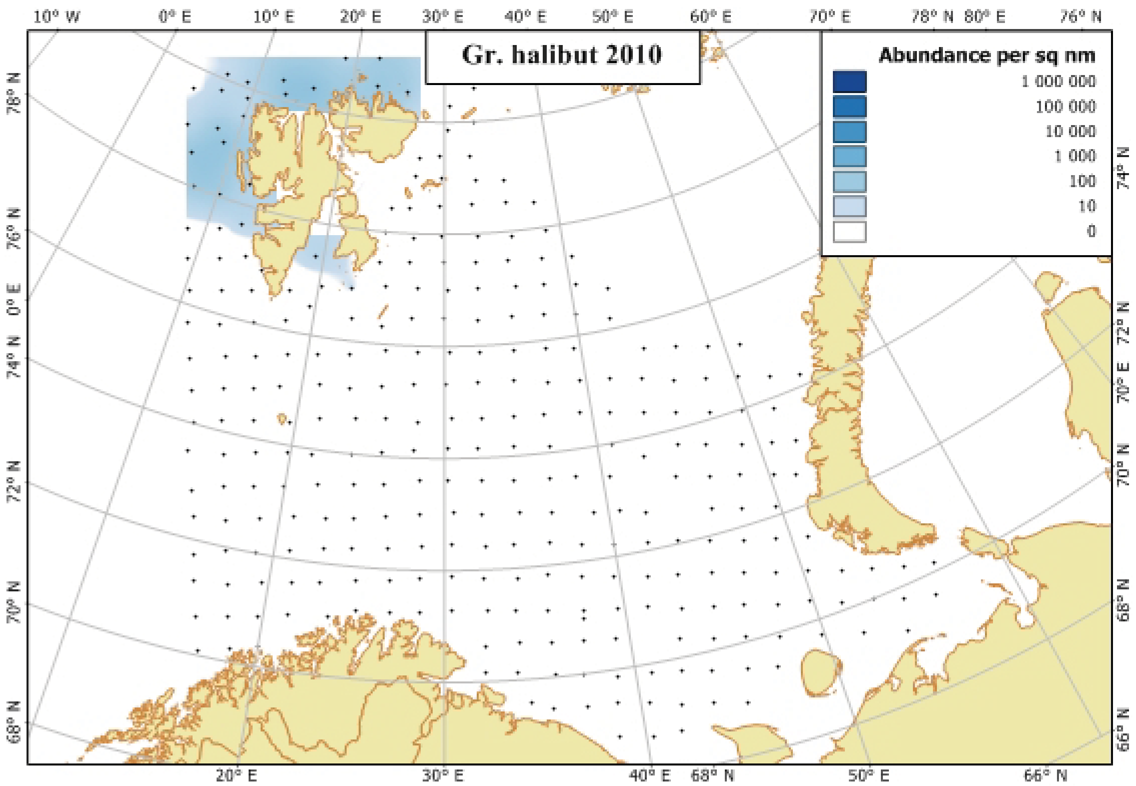



Figure 2.2.8 Distribution of 0-group Greenland halibut, August-September 2010

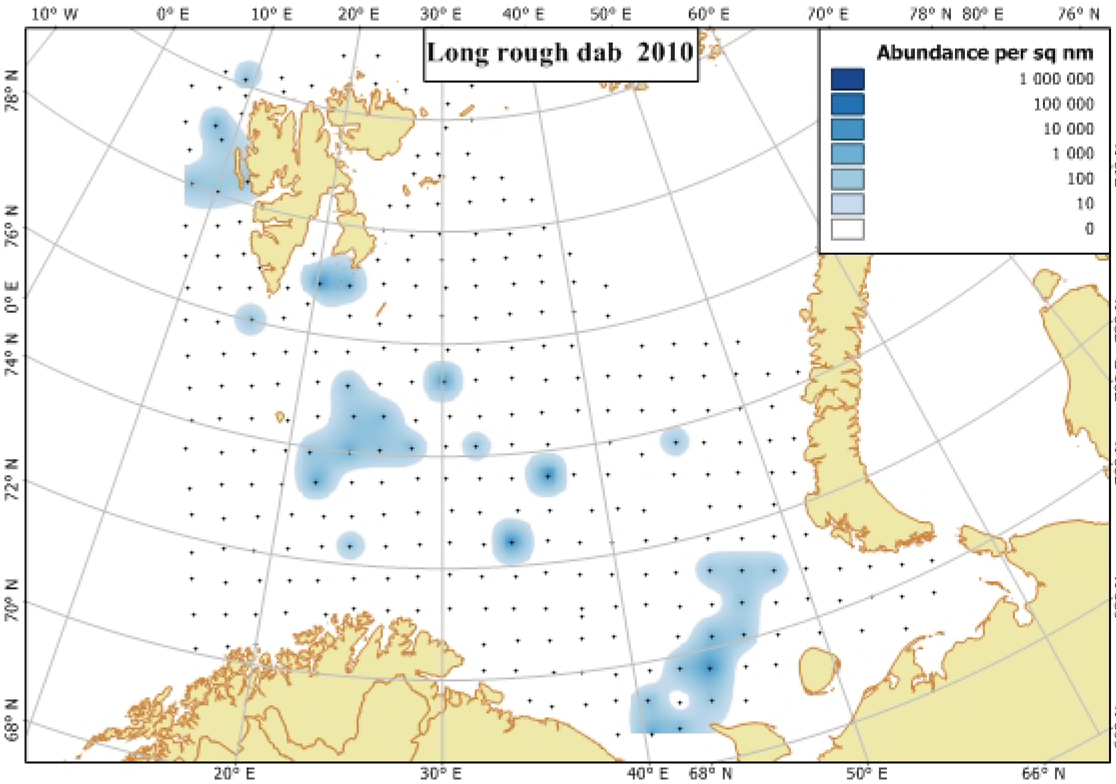



**Figure 2.2.9 Distribution of 0-group long rough dab, August-September 2010**

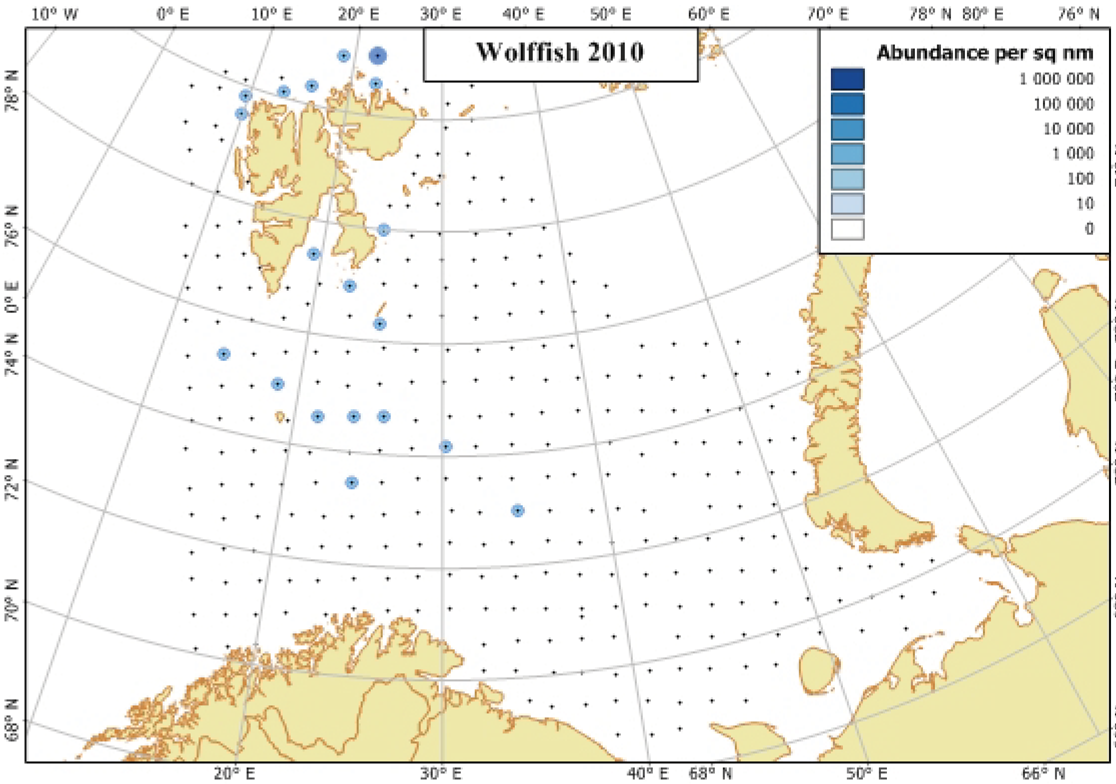



**Figure 2.2.10 Distribution of 0-group wolffish, August-September 2010**

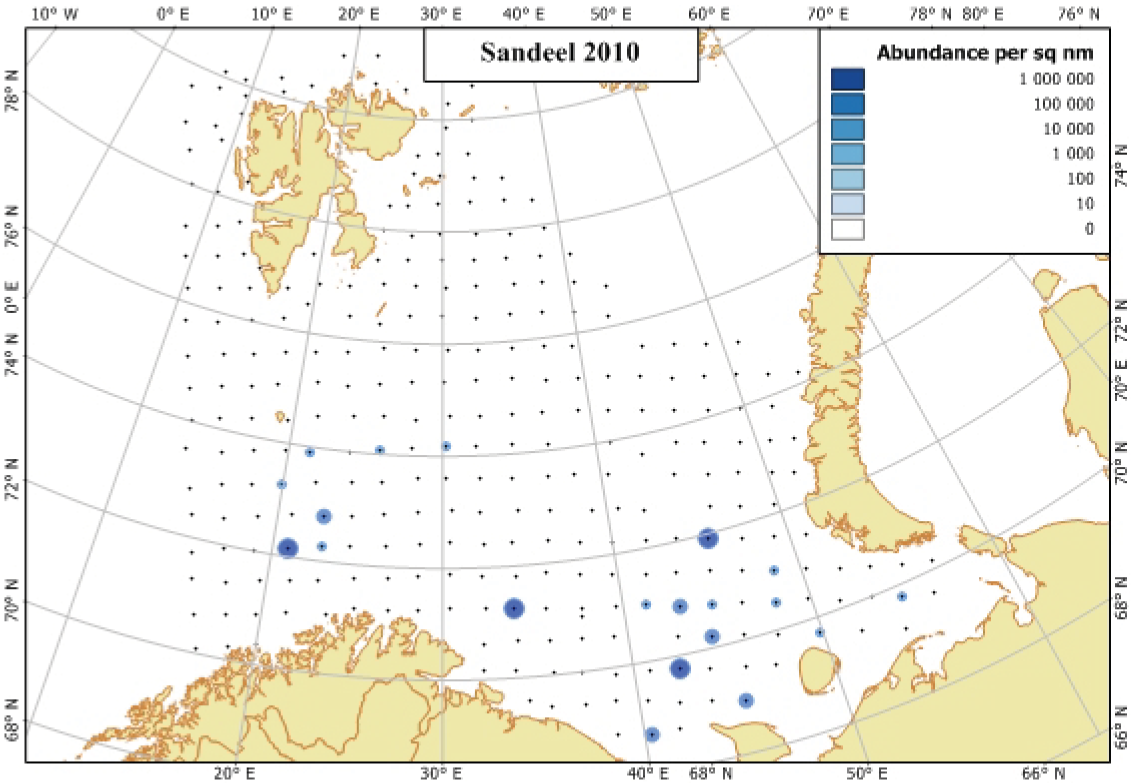



**Figure 2.2.11 Distribution of 0-group sandeel, August-September 2010**

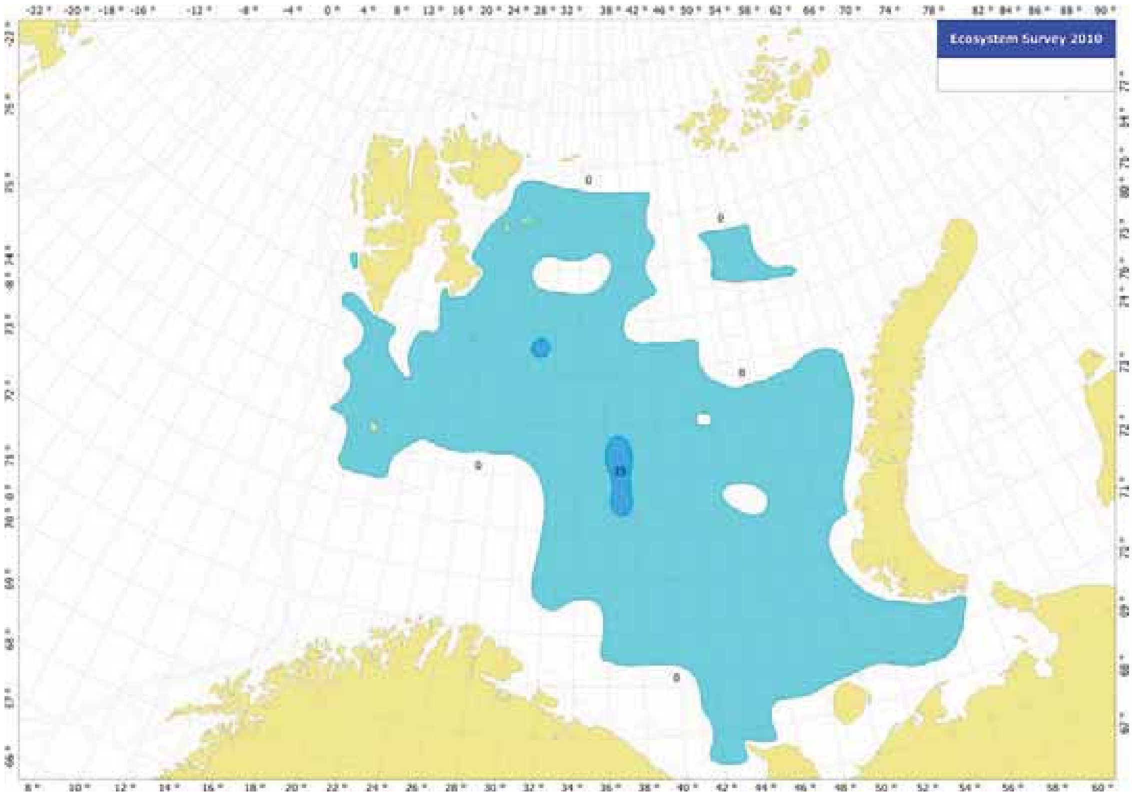



**Figure 2.3.1 Estimated density distribution of one-year-old capelin (t/nautical mile$^2$), August- September 2010**

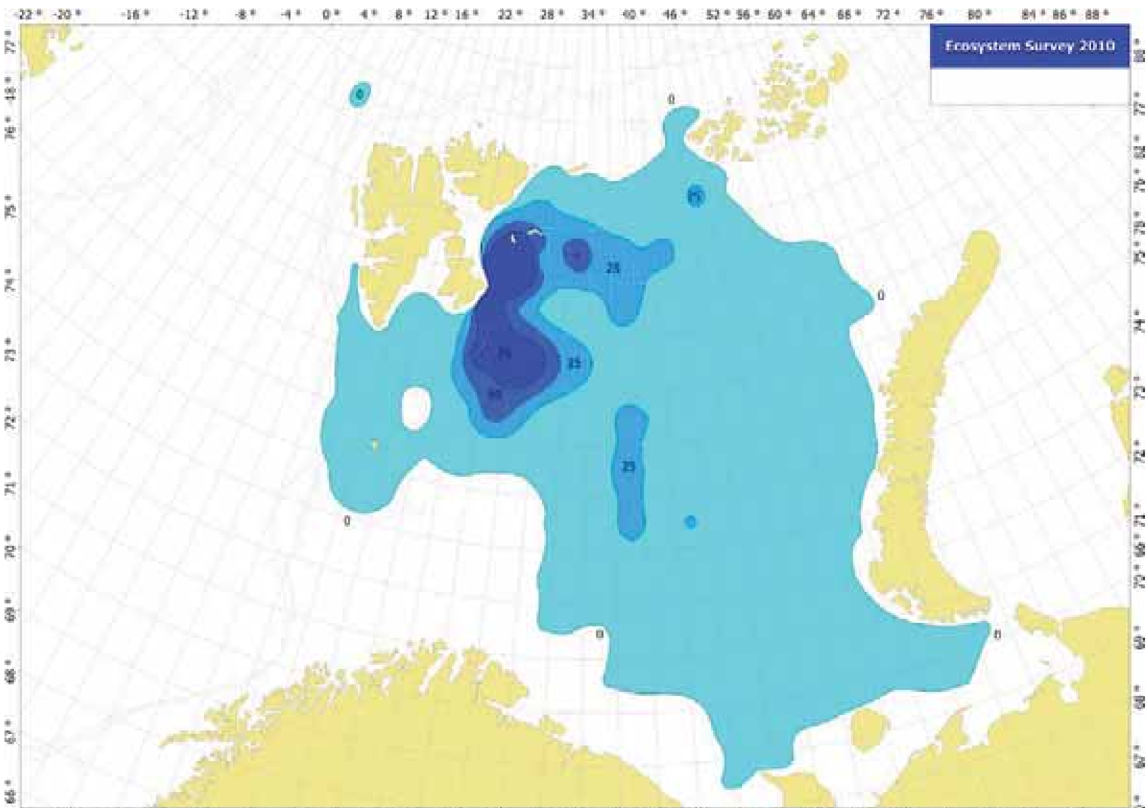



**Figure 2.3.2 Estimated total density distribution of capelin (t/nautical mile$^2$), August-September 2010**

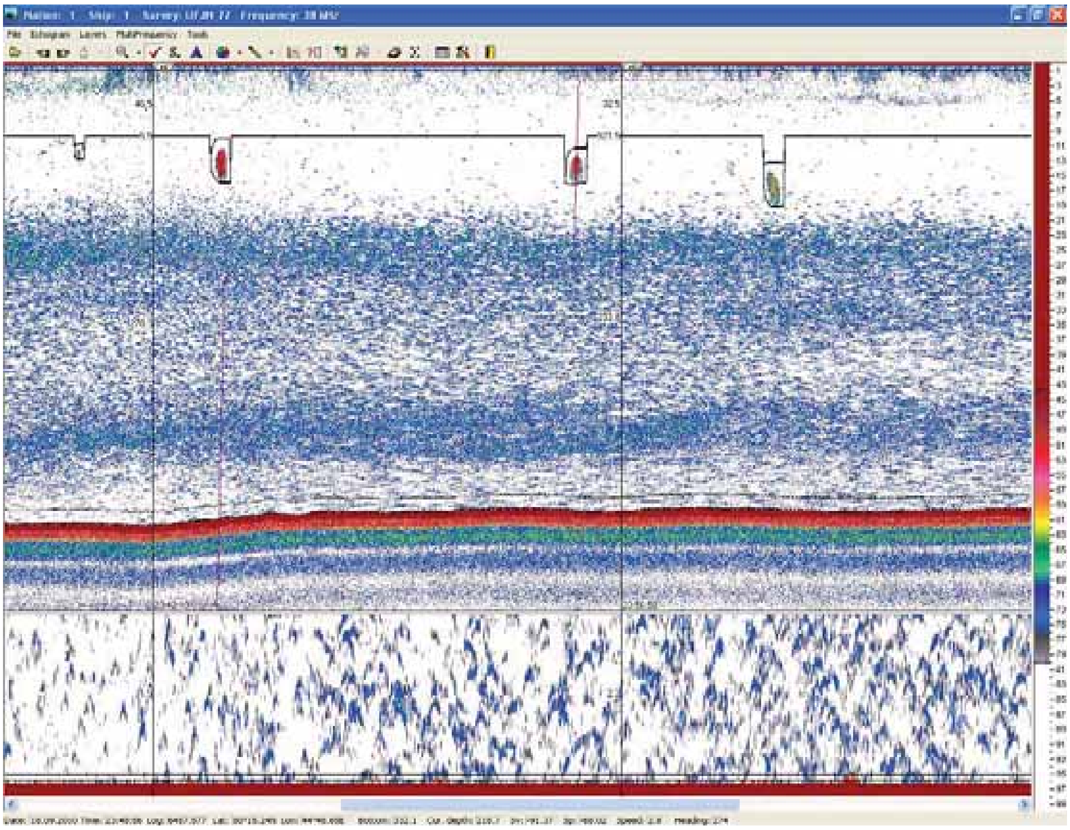


**Figure 2.3.3 Echo-records of capelin (schools) in the far northern area, 18.09.2010 (80º15′ N, 44º48′ E)**

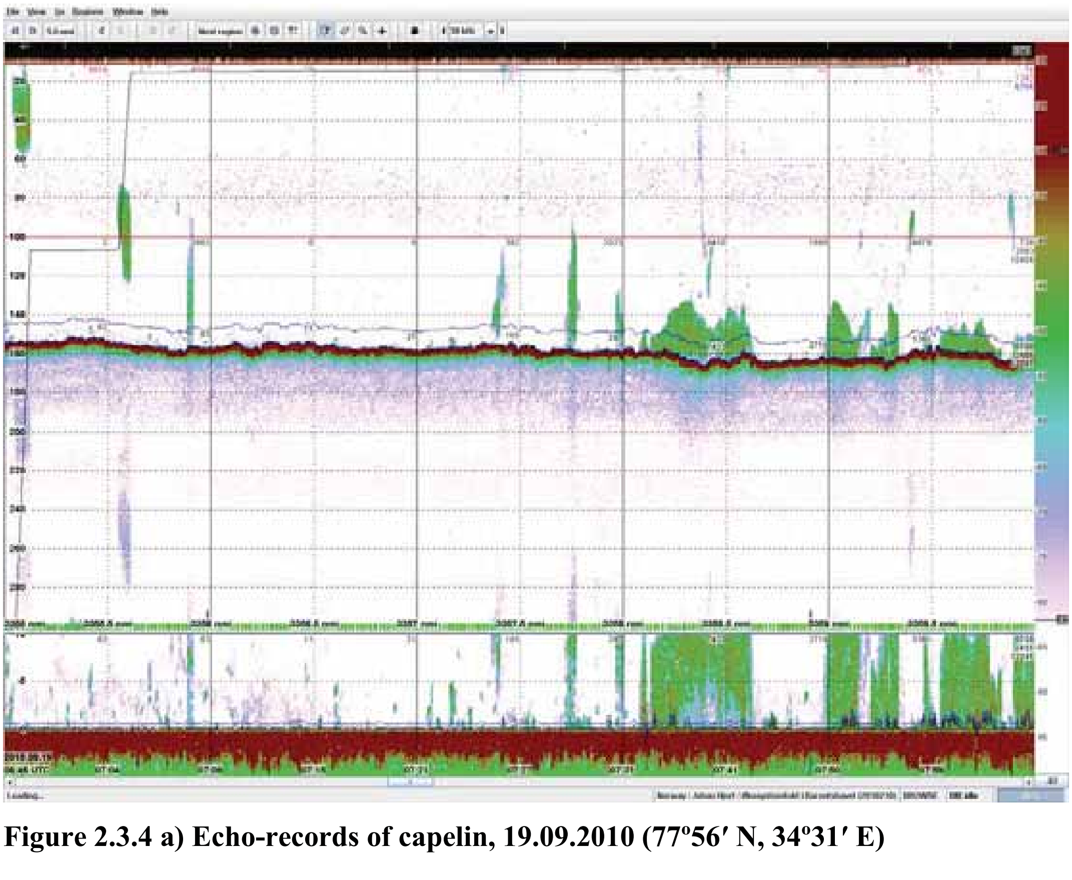


**Figure 2.3.4 a) Echo-records of capelin, 19.09.2010 (77º56′ N, 34º31′ E)**

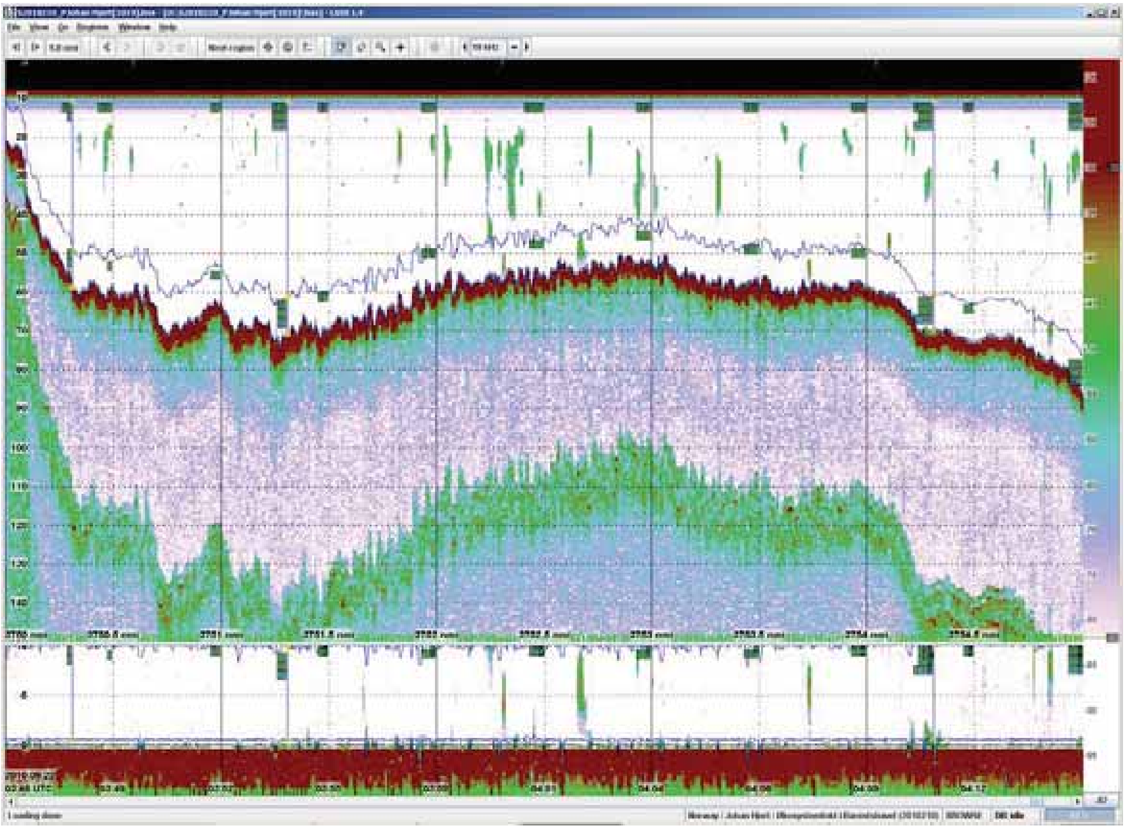


**Figure 2.3.4 b) Echo-records of capelin, 22.09.2010 (79º01′ N, 29º47′ E)**

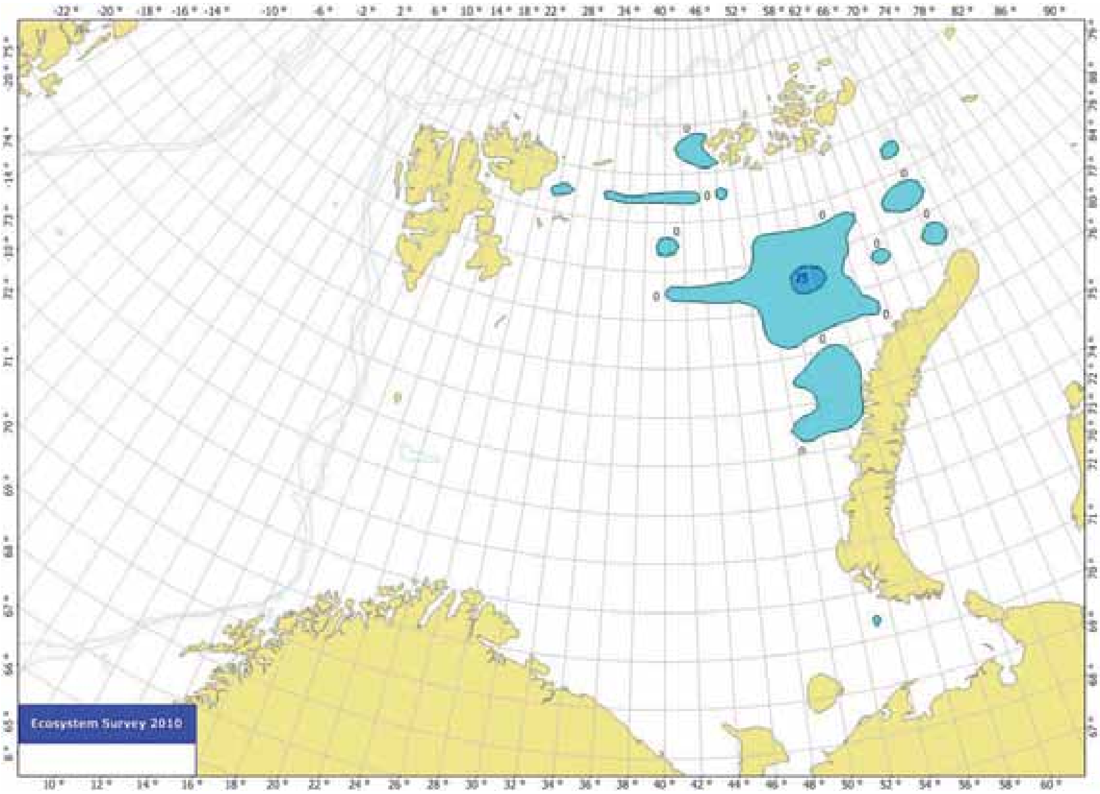



**Figure 2.3.5 Estimated density distribution of one year old polar cod (t/nautical mile²), August-September 2010**

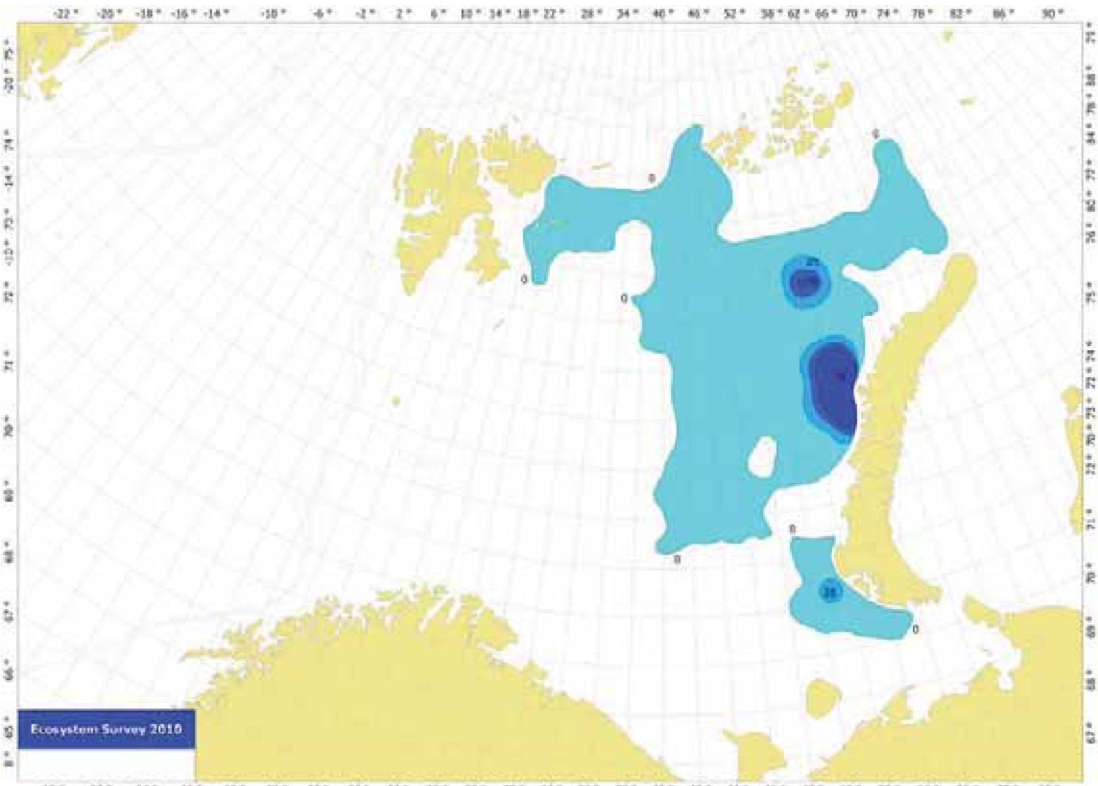



**Figure 2.3.6 Estimated total density distribution of polar cod (t/nautical mile²), August-September 2010**

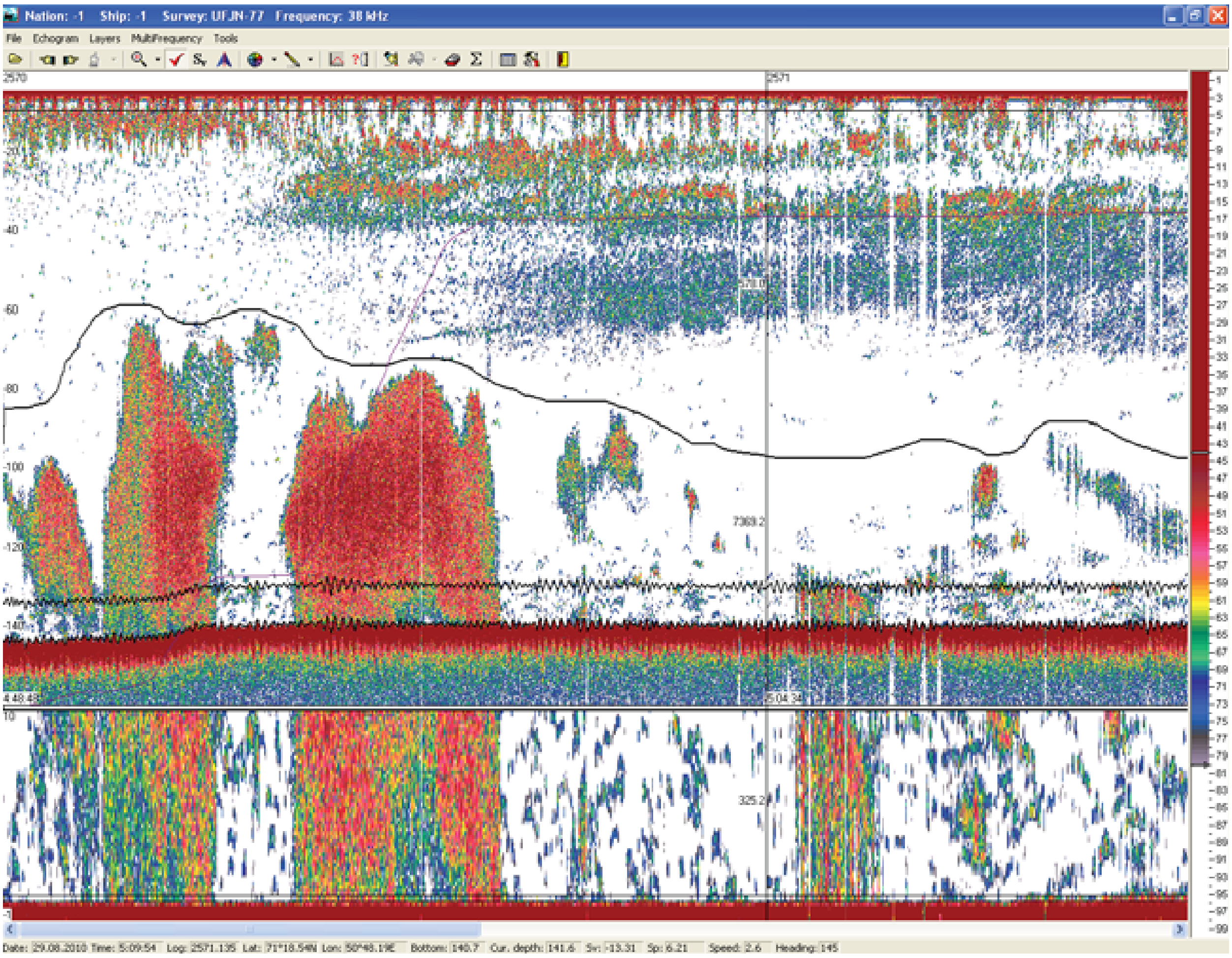


**Figure 2.3.7 Echo-records of large size polar cod in south-eastern Barents Sea, 29.08.2010 (71º18´ N, 50º48´ E)**

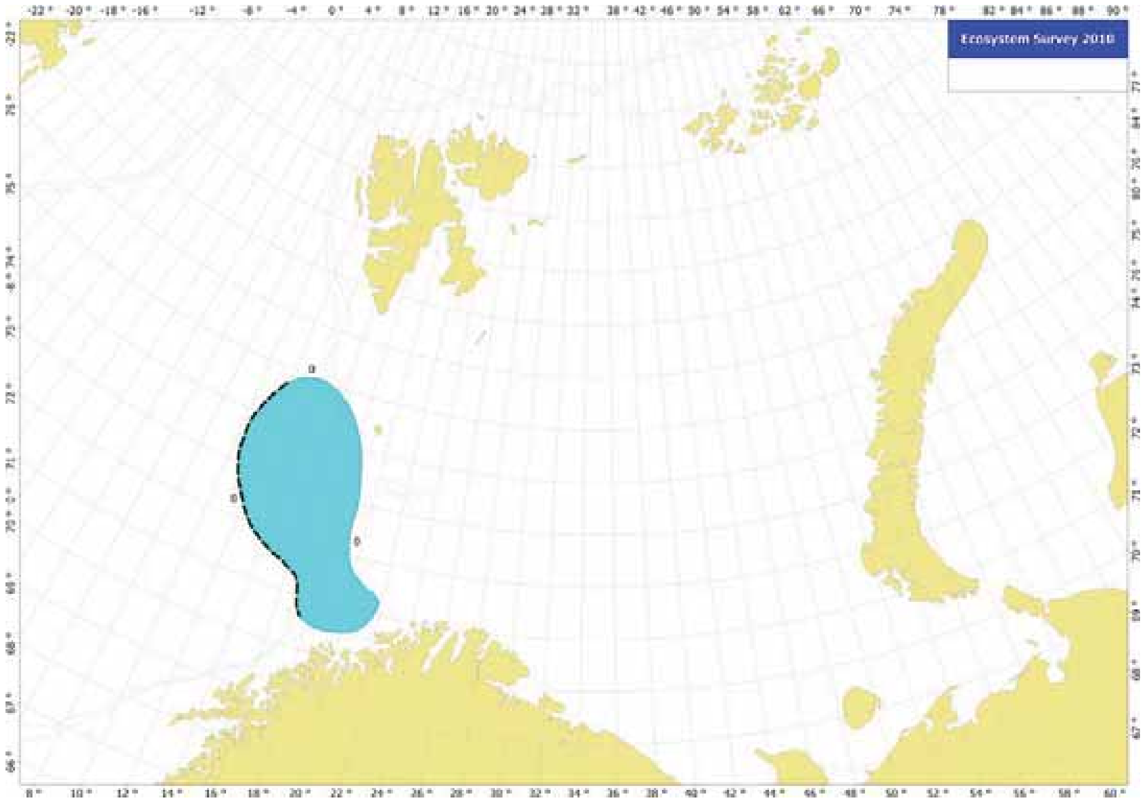



**Figure 2.3.8 Estimated total density distribution of herring (t/nautical mile$^2$), August-September 2010**

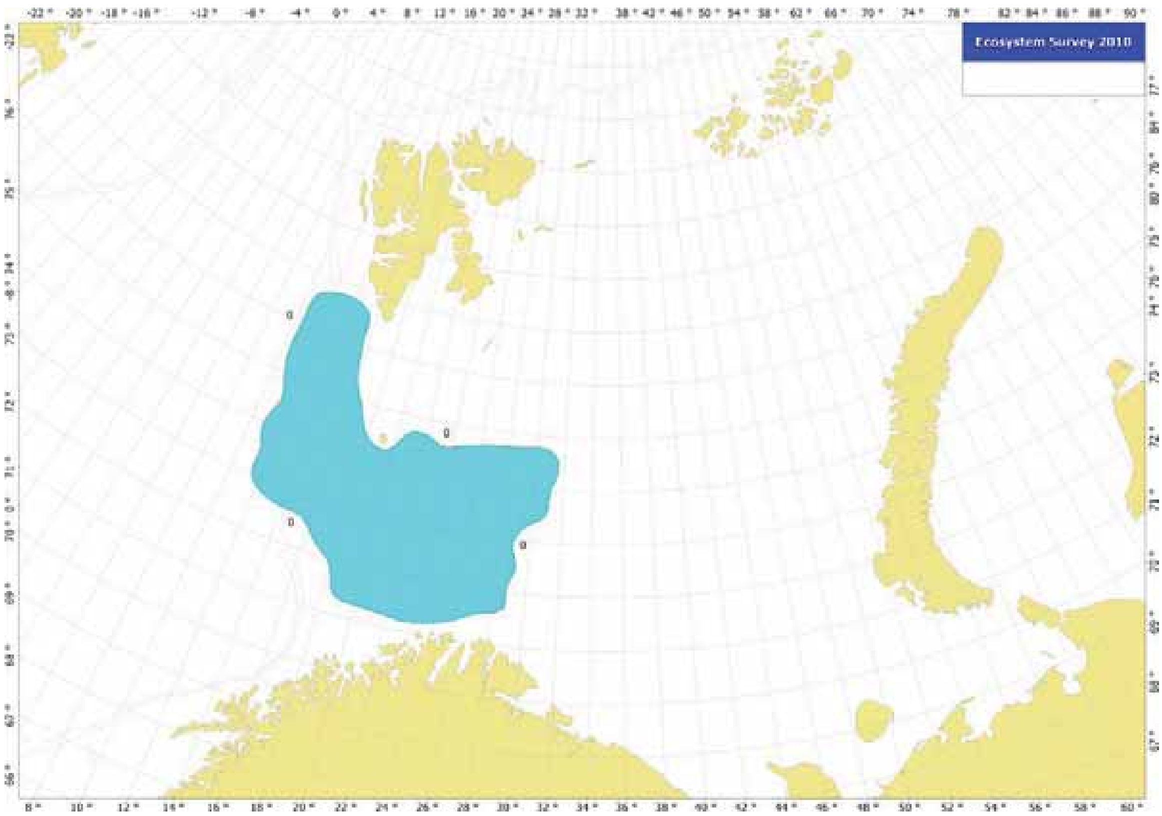



**Figure 2.3.9 Estimated total density distribution of blue whiting (t/nautical mile$^2$), August-September 2010**

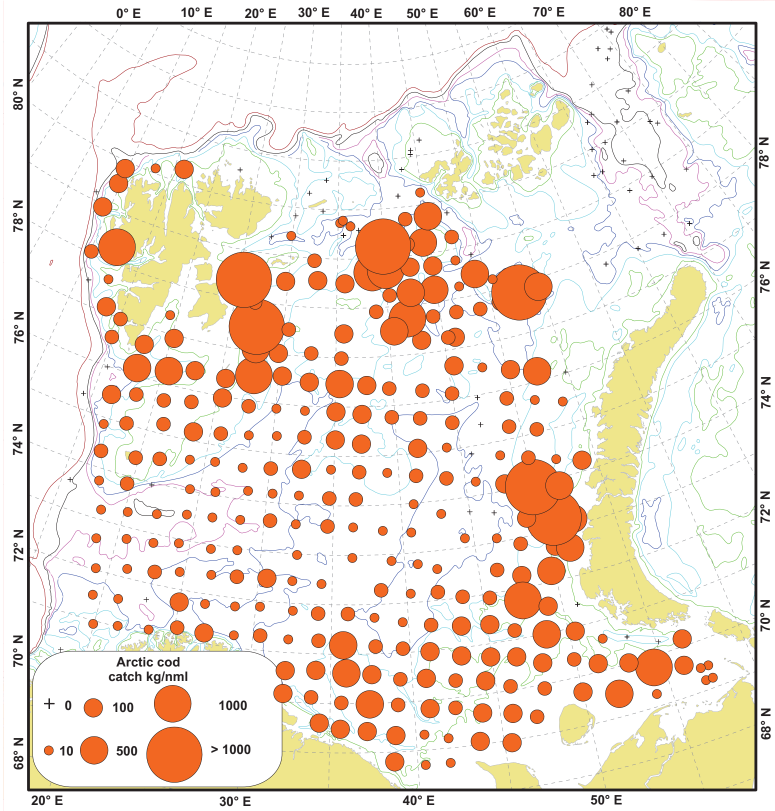



**Figure 2.4.1 Distribution of cod *(Gadus morhua morhua)*, August-September 2010**

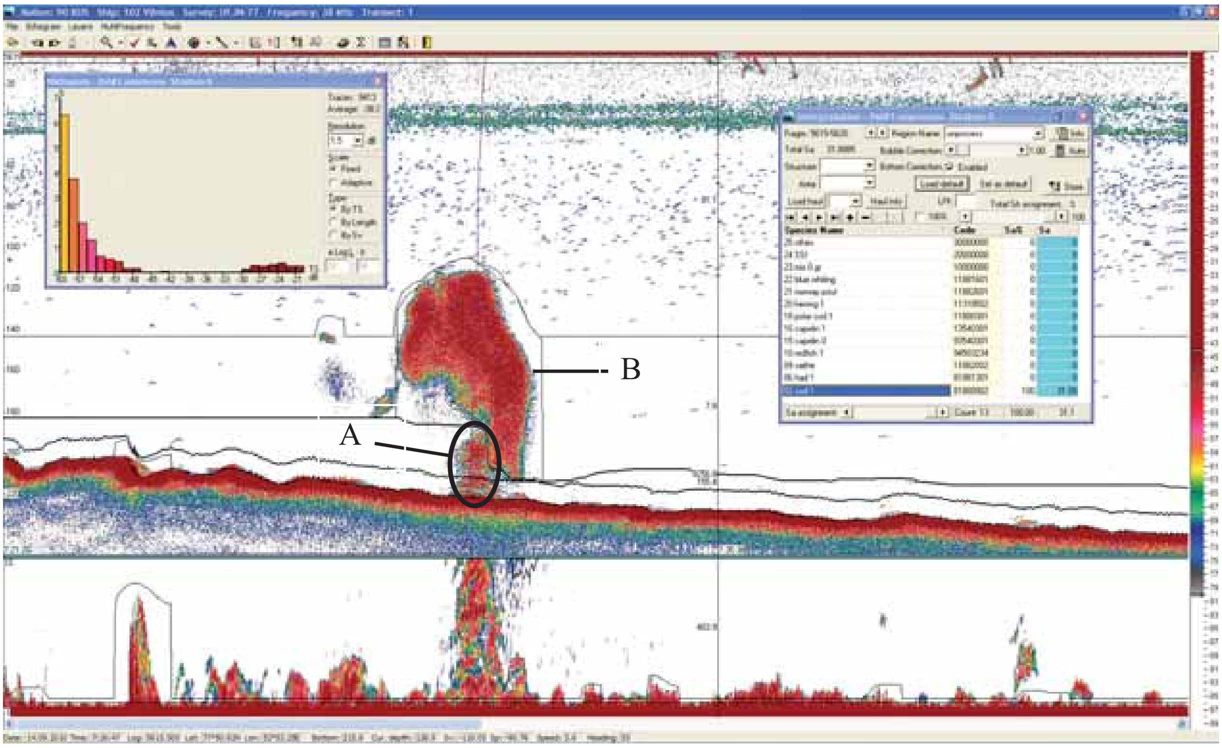



**Figure 2.4.2 Echo-records of cod (A, 3 tonnes) and polar cod (B, 600 tonnes) in north-eastern Barents Sea, 14.09.2010 (77º50´ N, 52º53´ E)**

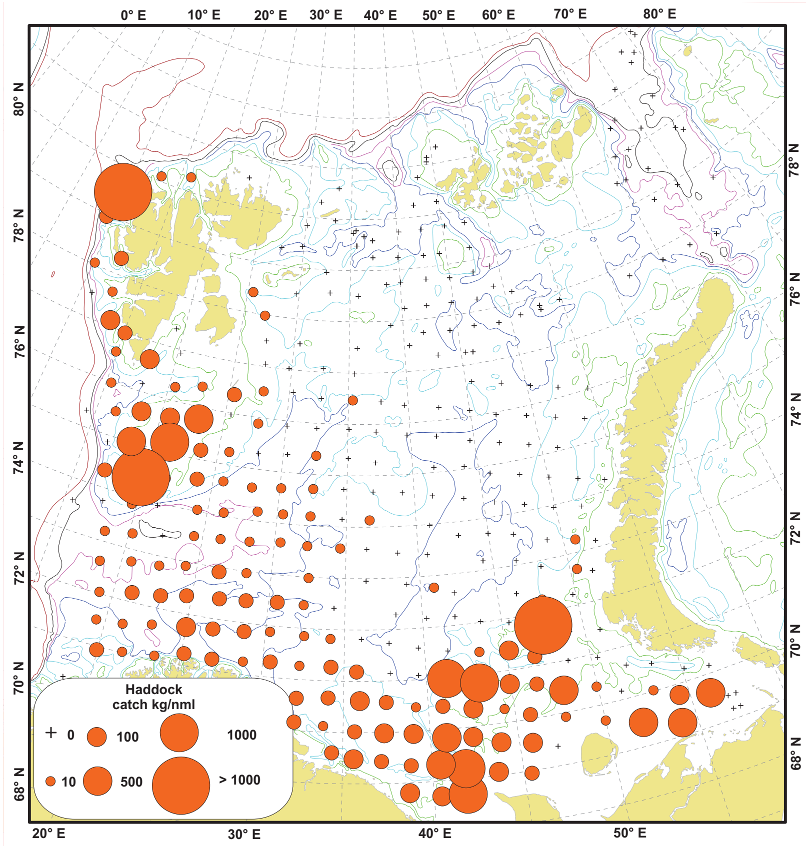



**Figure 2.4.3 Distribution of haddock *(Melanogrammus aeglefinus)*, August-September 2010**

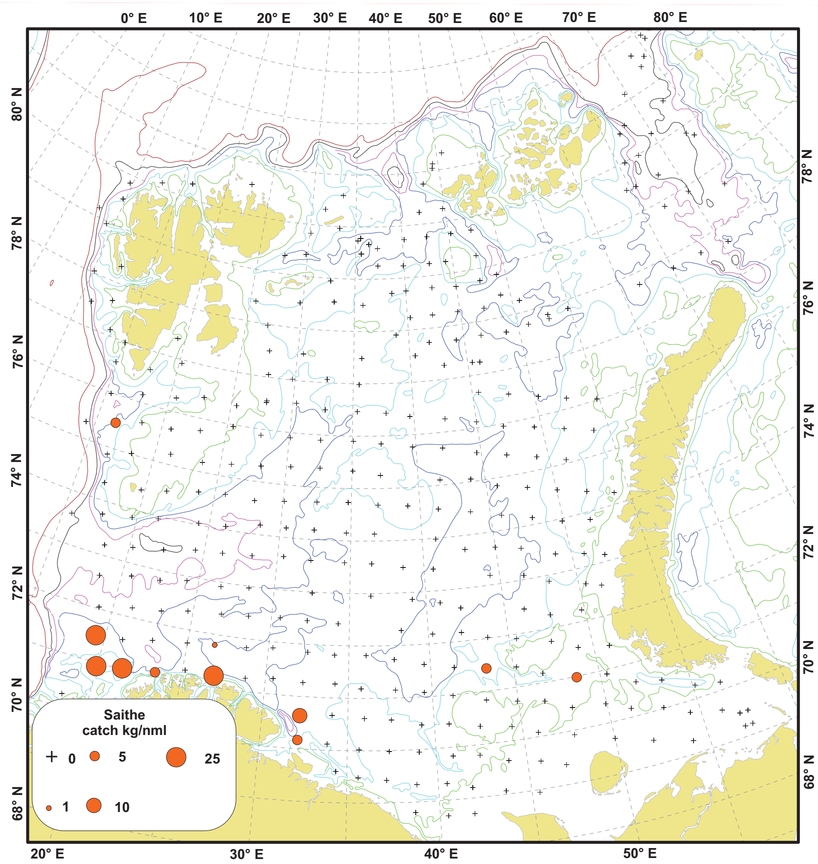



**Figure 2.4.4 Distribution of saithe *(Pollachius virens)*, August-September 2010**

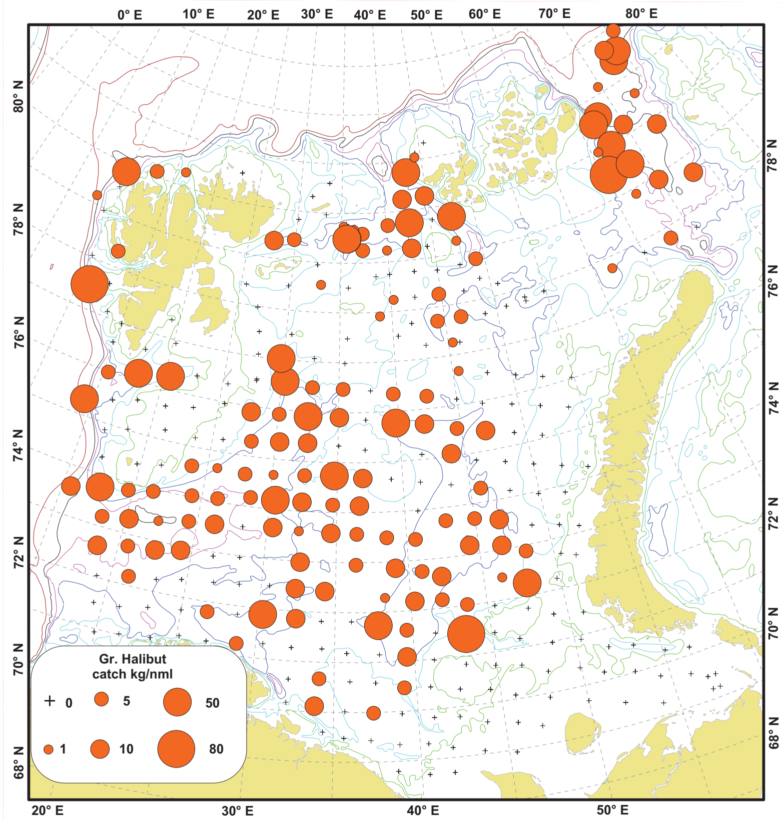



**Figure 2.4.5 Distribution of Greenland halibut *(Reinhardtius hippoglossoides)* (WCPUE, based on weight of fish), August- September 2010**

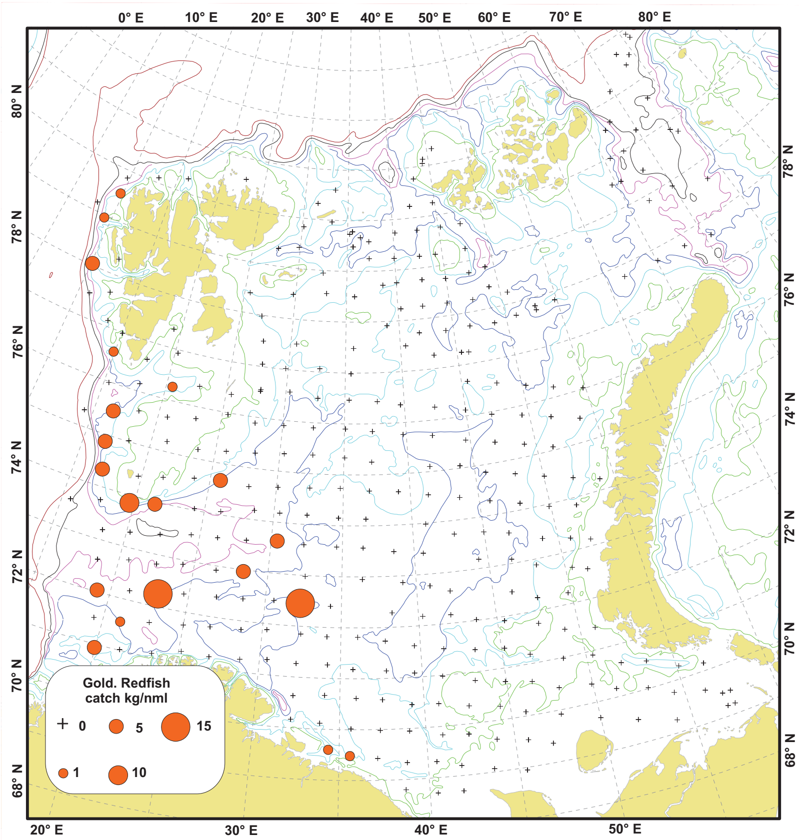



**Figure 2.4.6 Distribution of golden redfish (*Sebastes marinus*), August-September 2010**

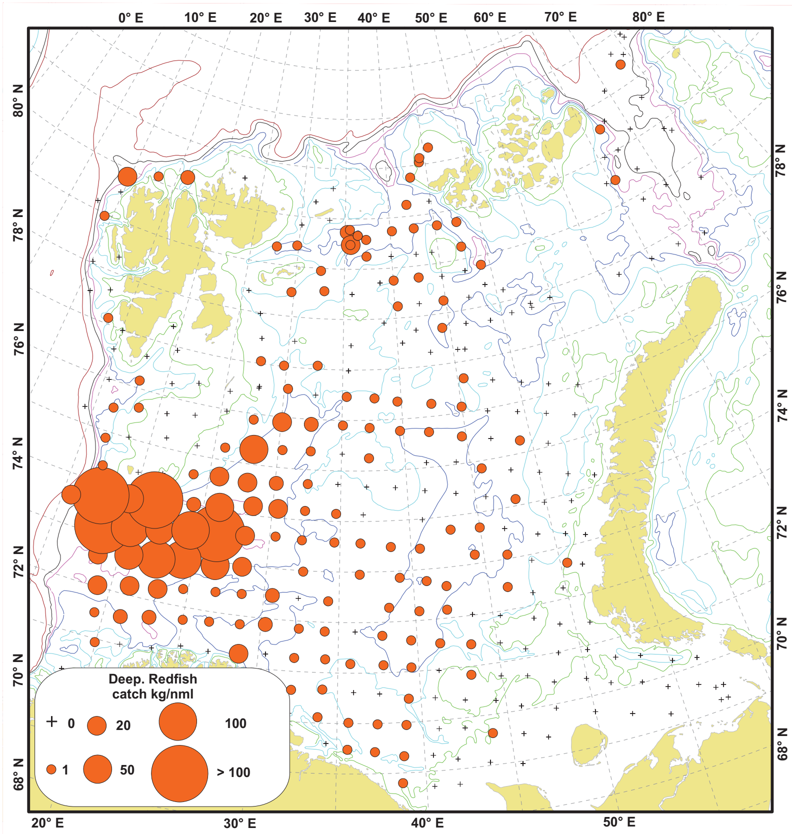



**Figure 2.4.7 Distribution of deep-water redfish *(Sebastes mentella)*, August-September 2010**

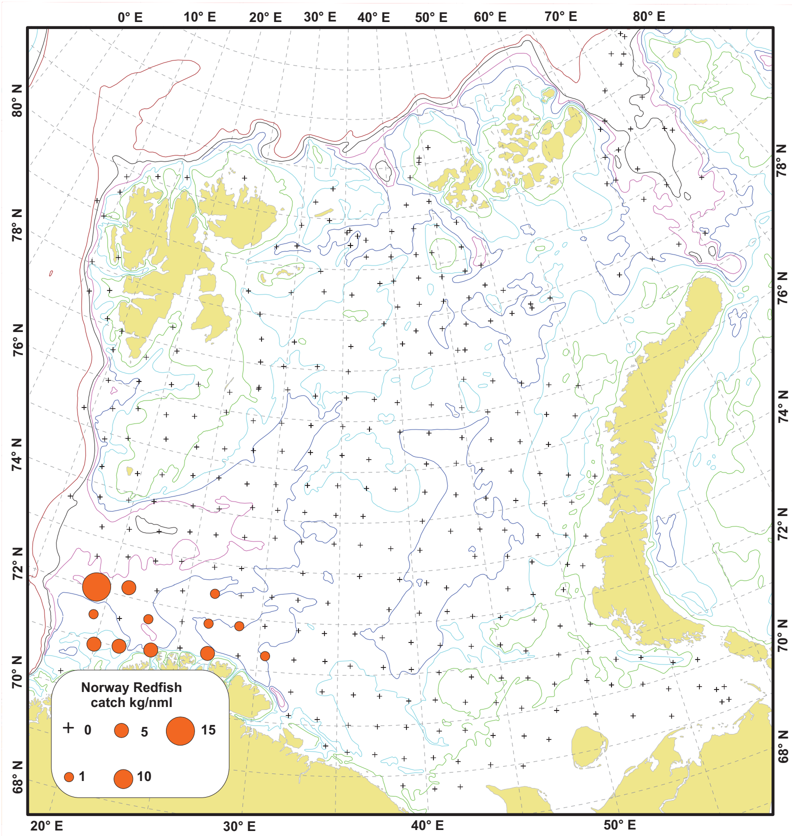



**Figure 2.4.8 Distribution of Norway redfish *(Sebastes viviparus)*, August-September 2010**

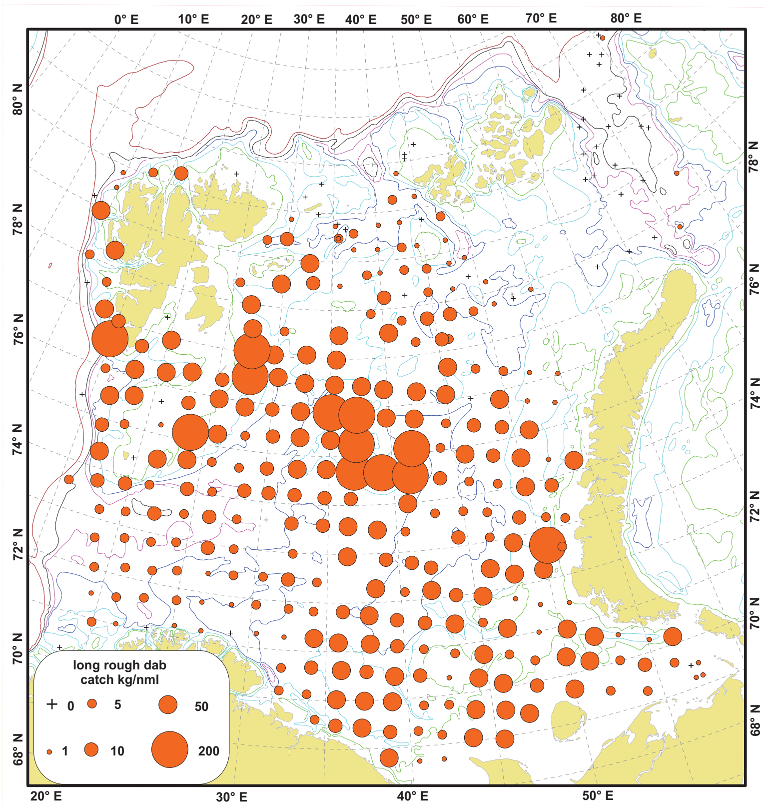



Figure 2.4.9 Distribution of long rough dab *(Hippoglossoides platessoides)*, August-September 2010

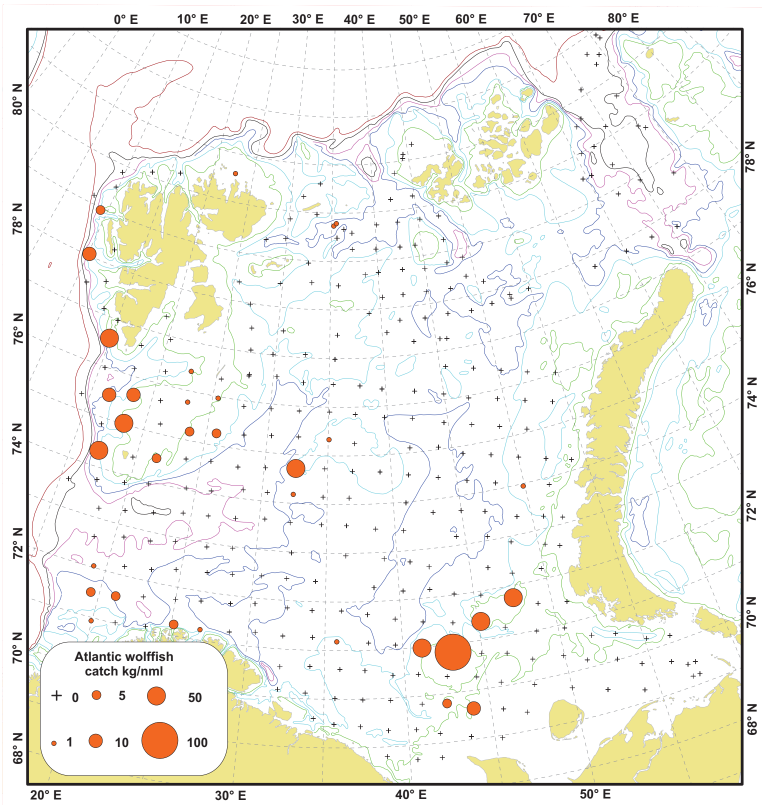



Figure 2.4.10 Distribution of Atlantic wolffish (*Anarhichas lupus*), August-September 2010

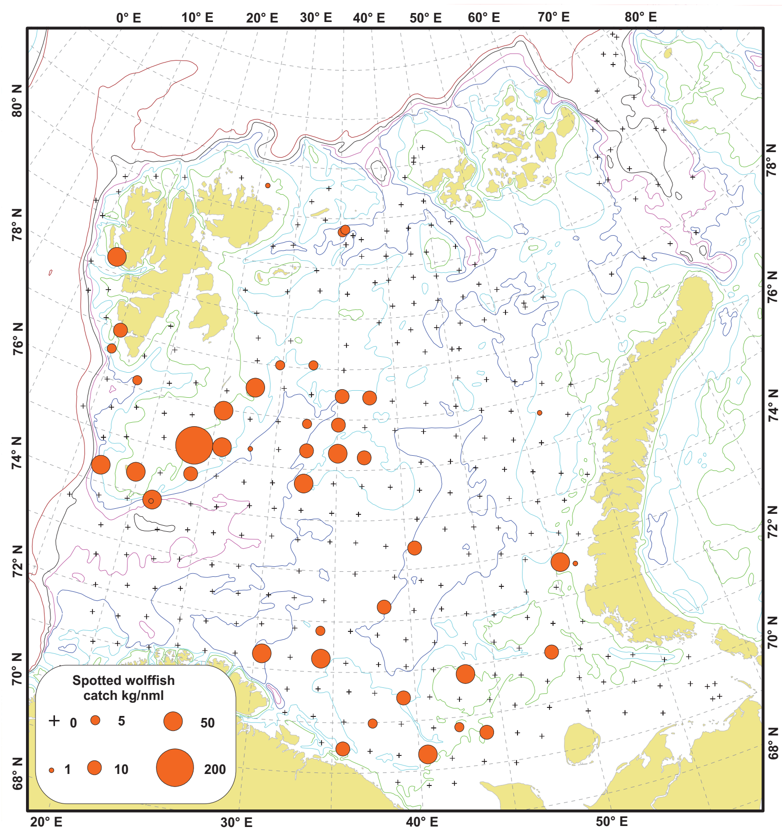



**Figure 2.4.11 Distribution of spotted wolffish (*Anarhichas minor*), August-September 2010**

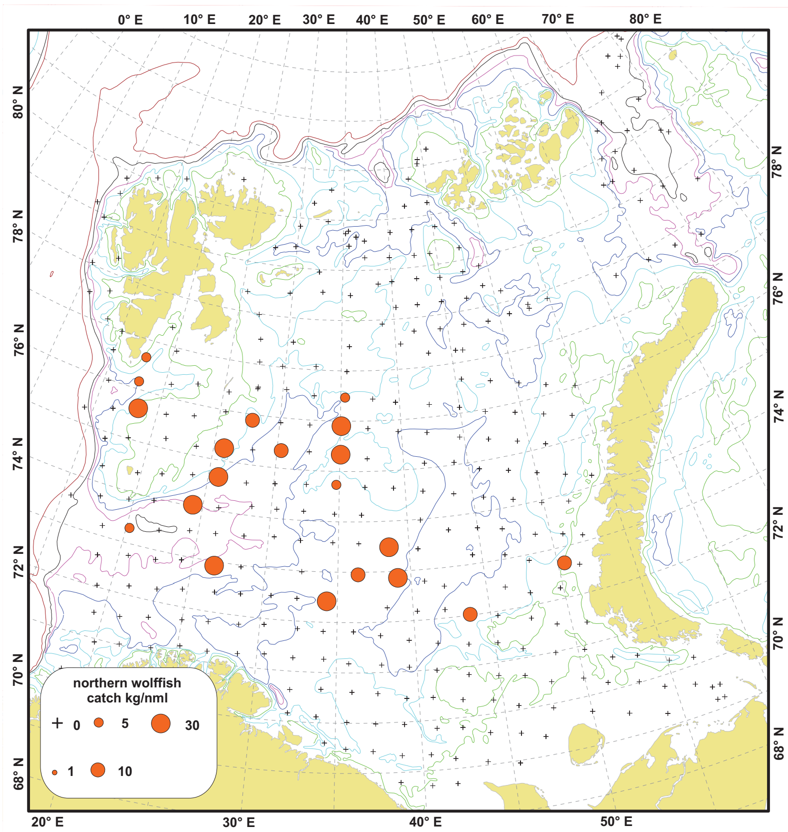



**Figure 2.4.12 Distribution of northern wolffish (*Anarhichas denticulatus*), August-September 2010**

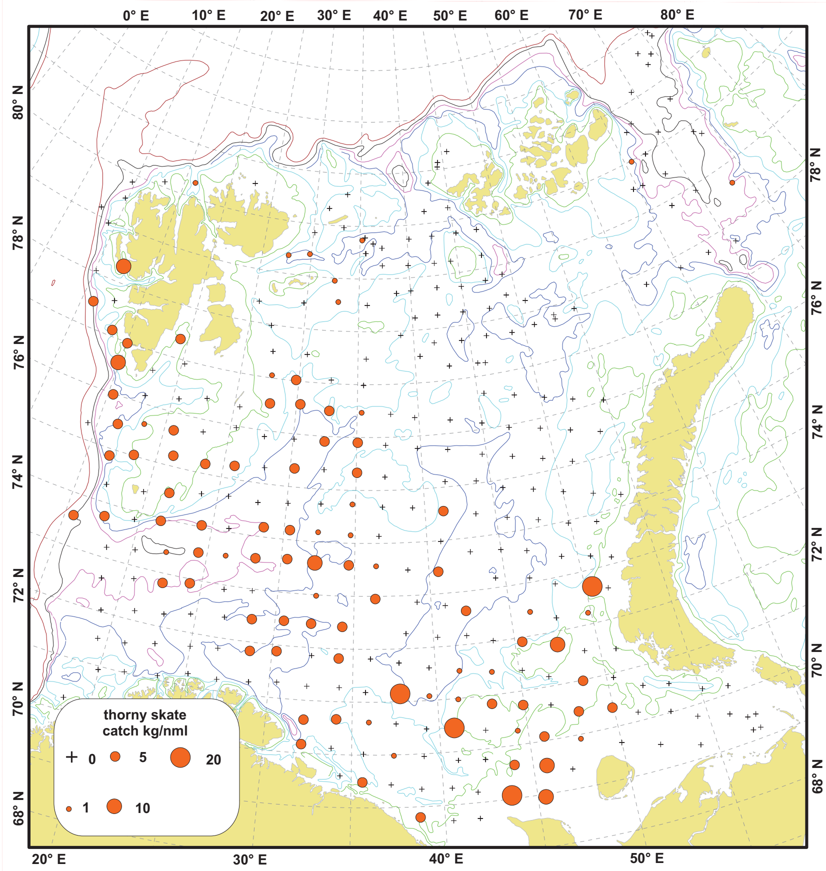



**Figure 2.4.13 Distribution of thorny skate (*Amblyraja radiata*), August-September 2010**

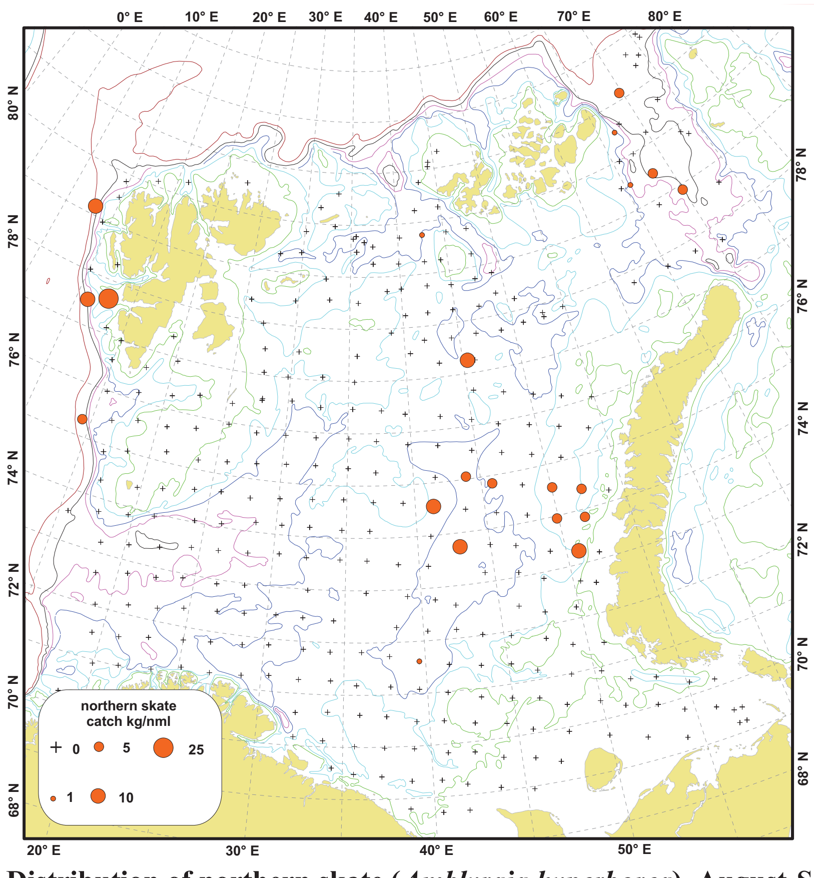



**Figure 2.4.14 Distribution of northern skate (*Amblyraja hyperborea*), August-September 2010**

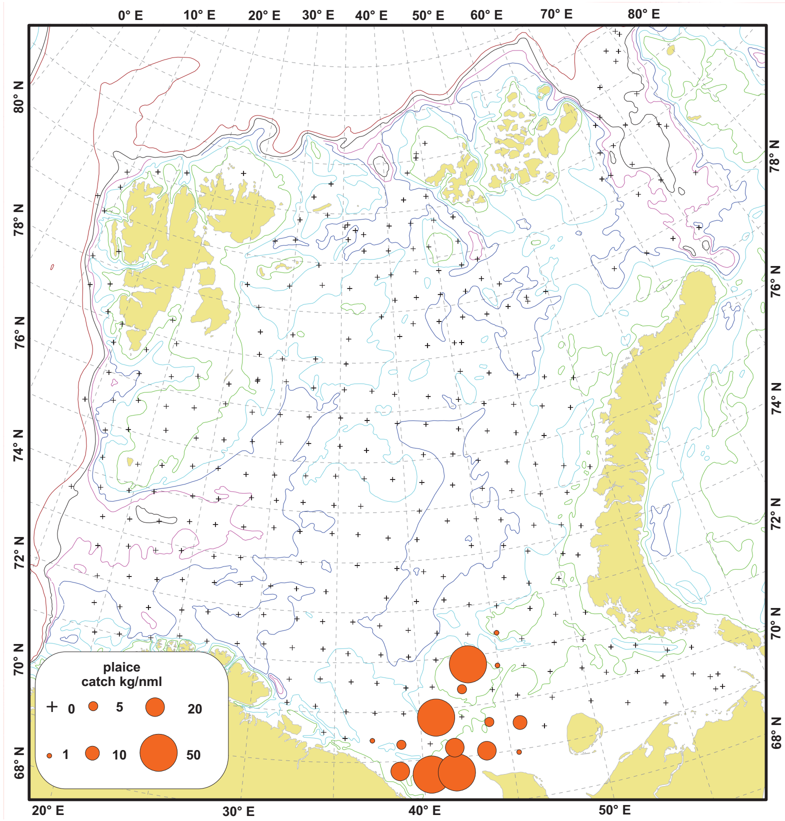
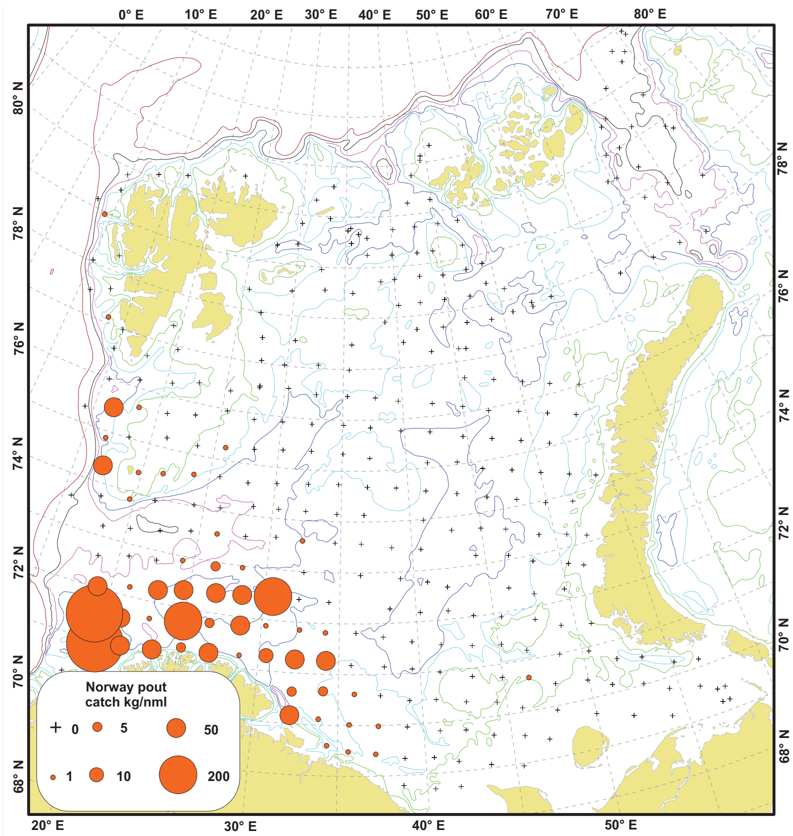



**Figure 2.4.15 Distribution of plaice (*Pleuronectes platessa*), August-September 2010**




**2.4.16 Distribution of Norway pout *(Trisopterus Esmarkii)*, August-September 2010**

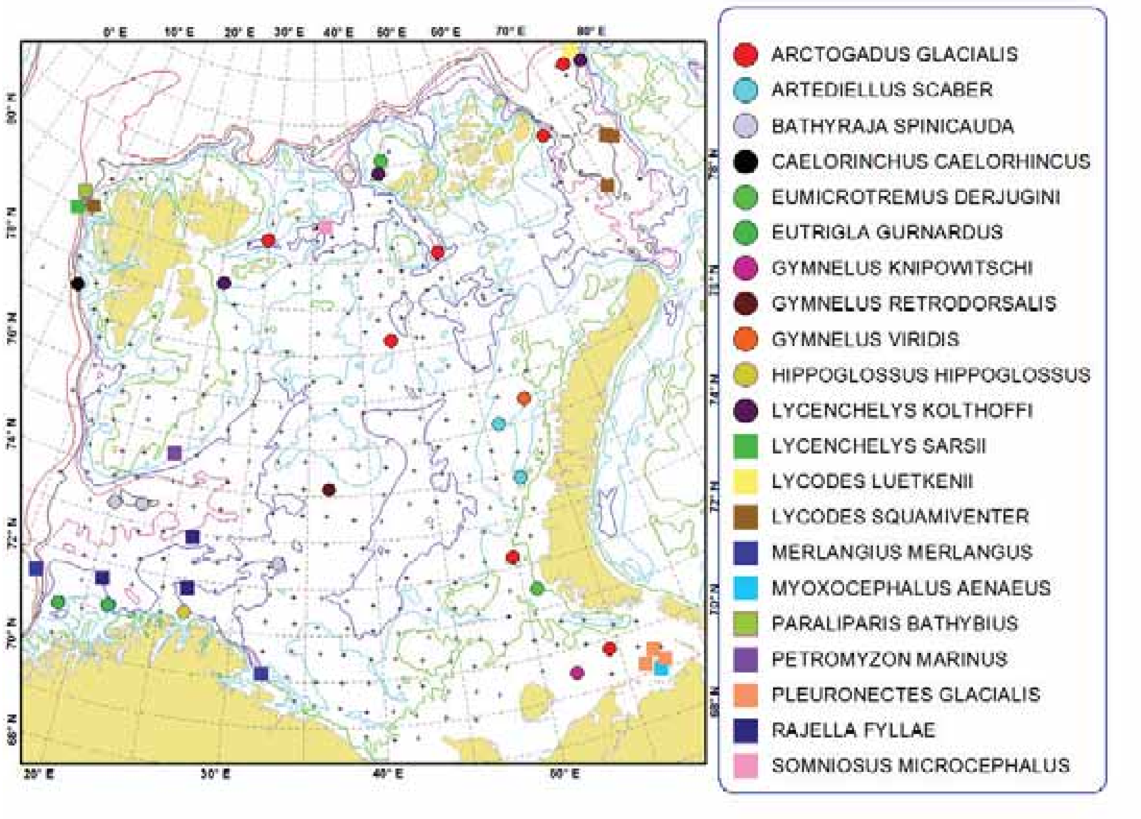



**Figure 2.4.17 Distribution of some rare species in the survey area, August-September 2010**

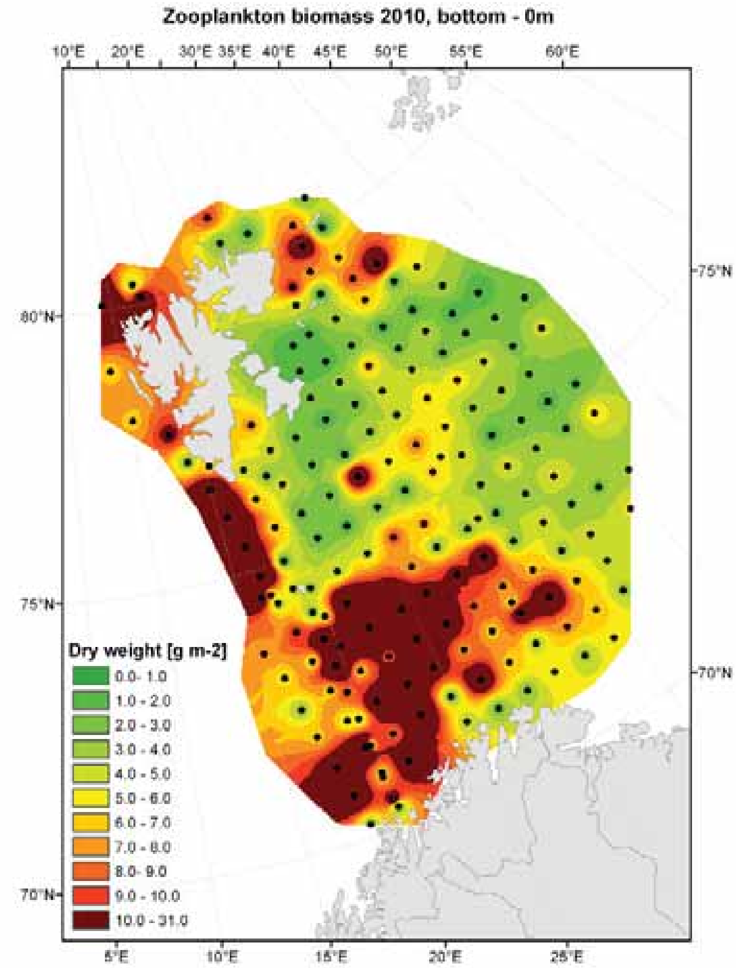



**Figure 2.6.1 Zooplankton biomass during the Barents Sea Ecosystem cruise in August-September 2010. Norwegian data from vertically operated 180 µm meshed WP2 net (bottom-0 m).**

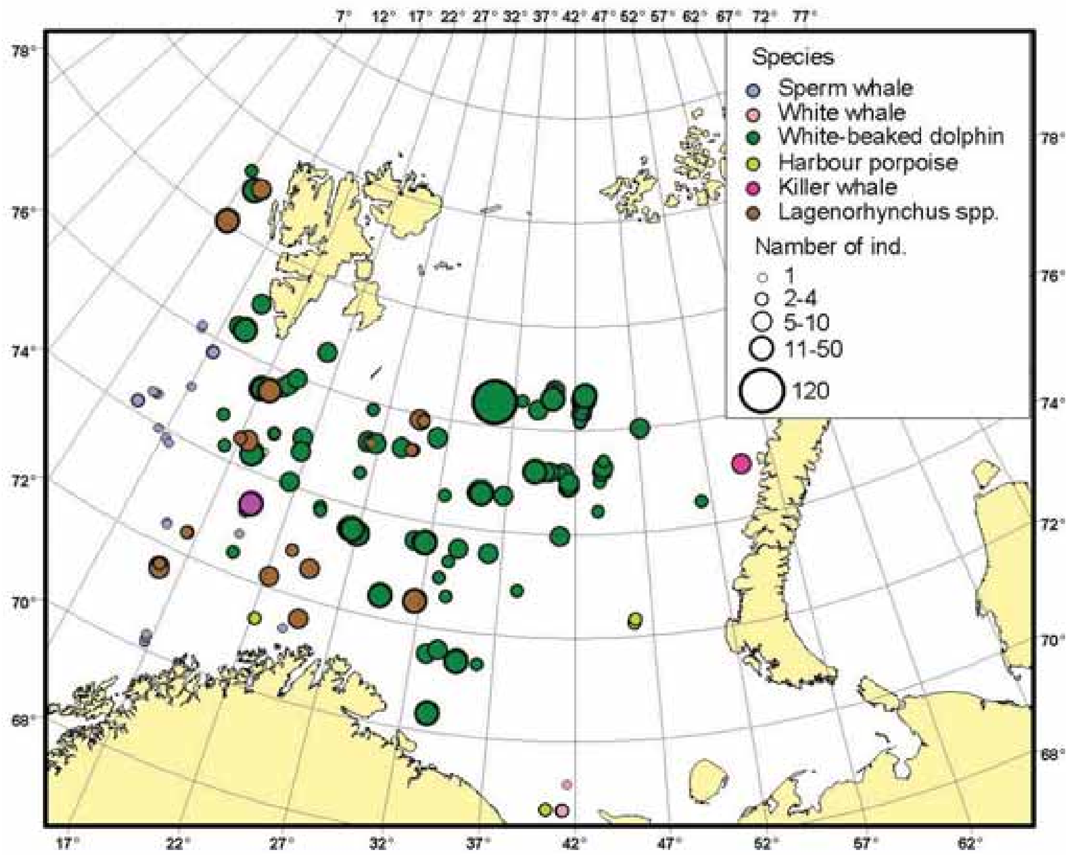



**Figure 2.7.1 Distribution of toothed whales observed in August-September 2010**

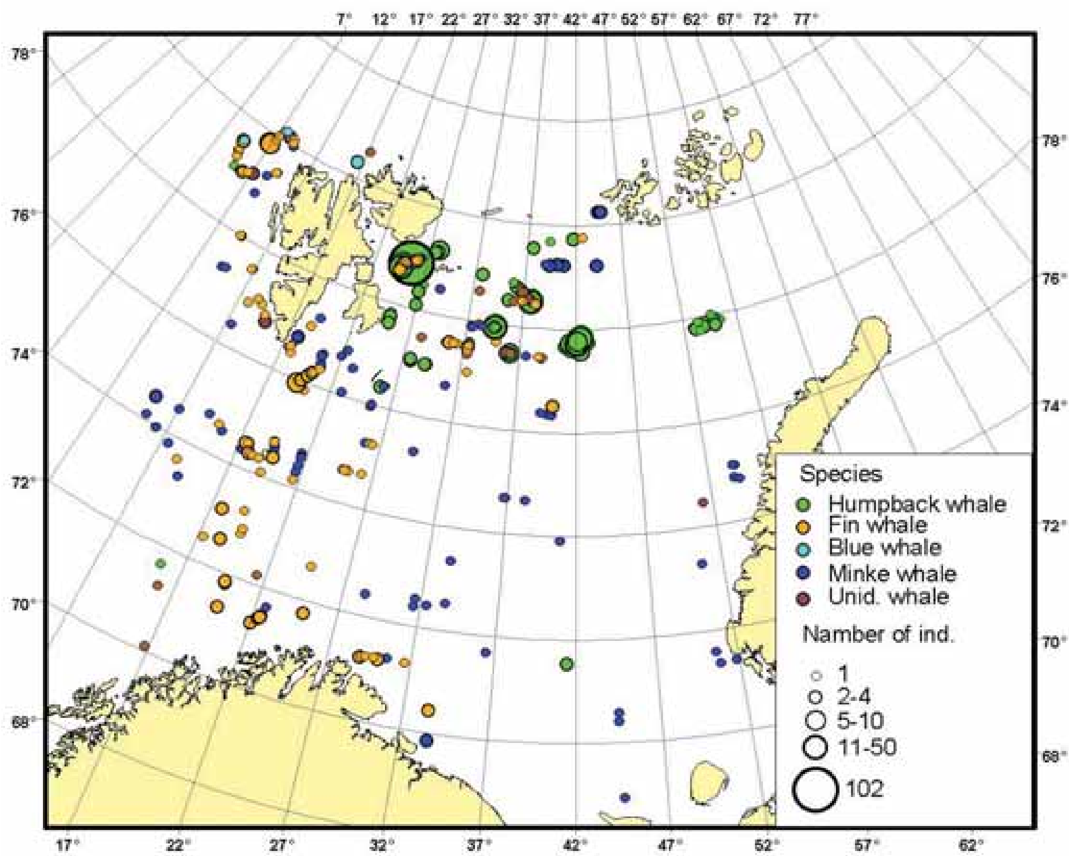



**Figure 2.7.2 Distribution of baleen whales observed in August-September 2010**

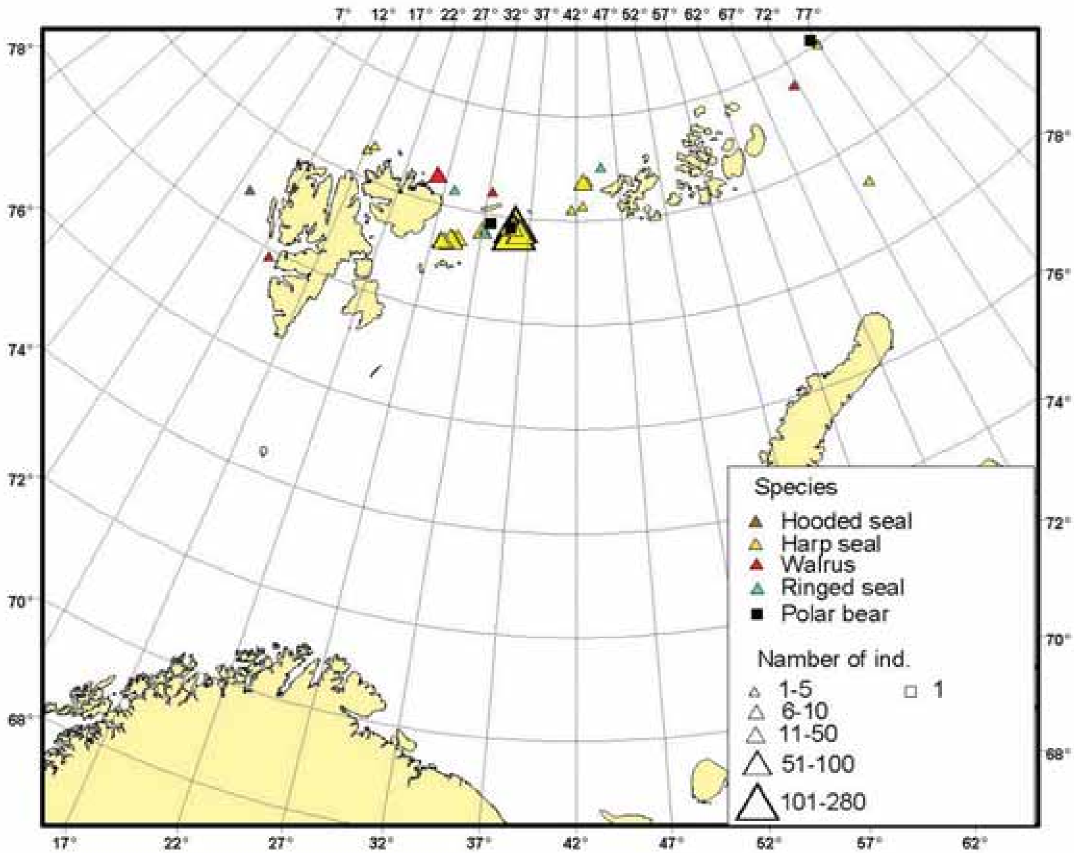



**Figure 2.7.3 Distribution of seals and polar bear observed in August-September 2010**

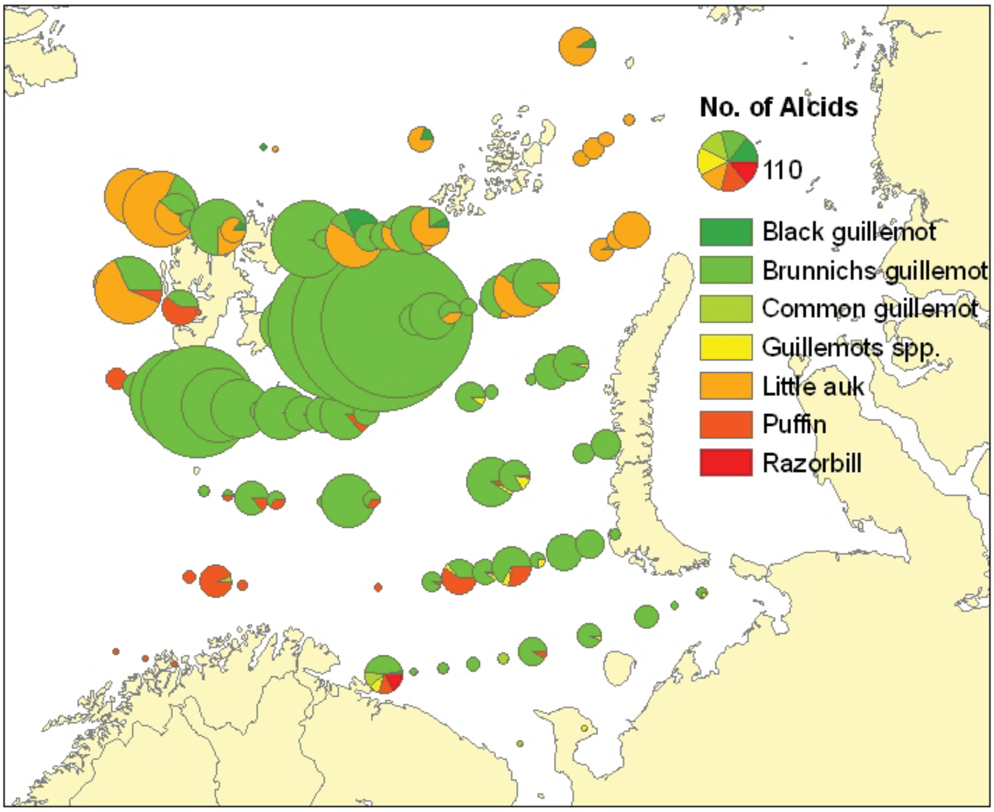



**Figure 2.7.4 Distribution of alcid seabirds observed during the Joint Norwegein/Russian Ecosystem Survey 2010**

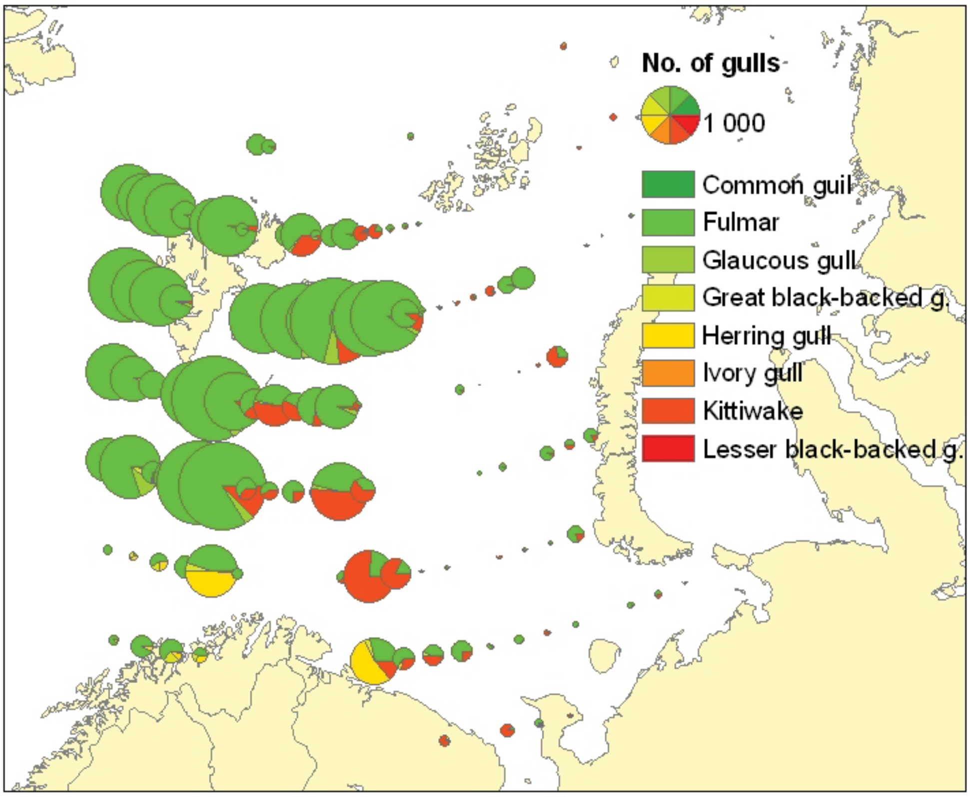



**Figure 2.7.5 Distribution of fulmars and gulls observed during the Joint Norwegein/Russian Ecosystem Survey 2010**

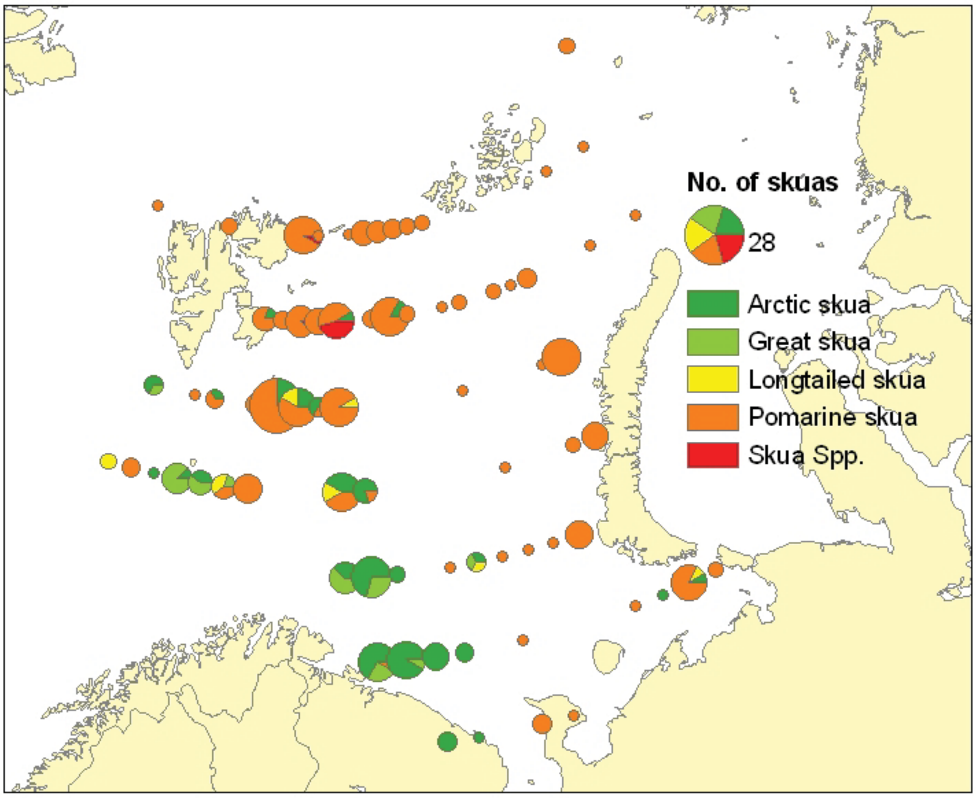



**Figure 2.7.6 Distribtuion of skuas observed during the Joint Norwegein/Russian Ecosystem Survey 2010**

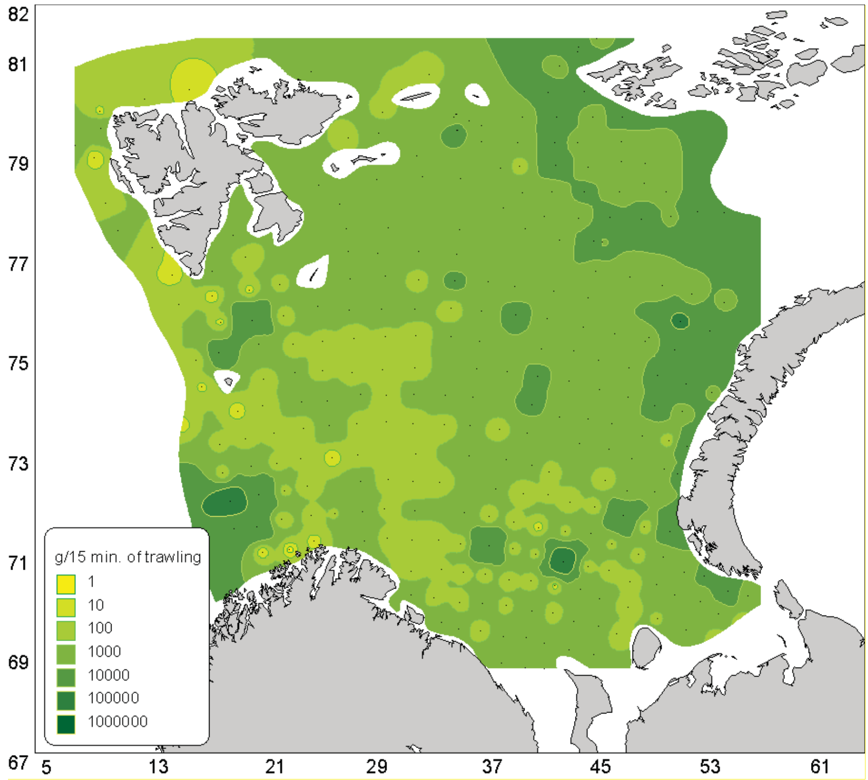



**Figure 2.8.1 The recorded biomass (extrapolated) of the benthos (except *Pandalus borealis* ") from Campelen bottom trawl haul in the Ecosystem Survey in August-September 2010. The black dots are sampled stations.**

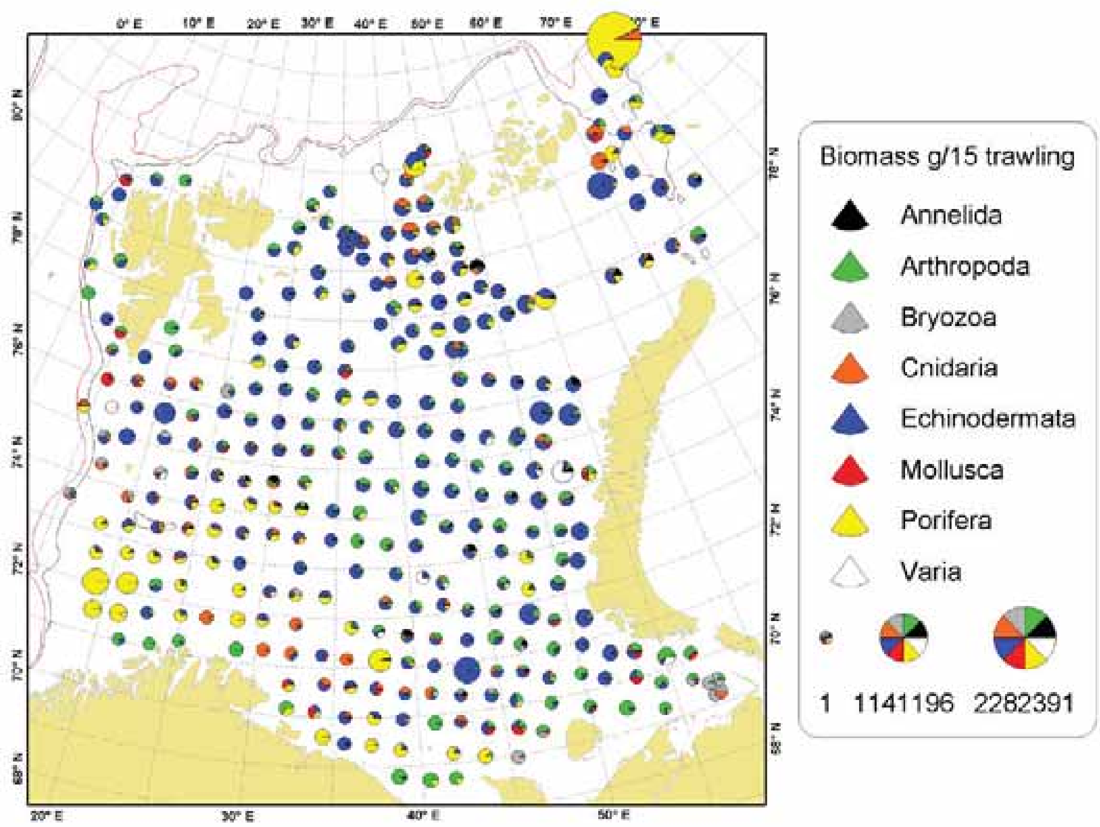



**Figure 2.8.2 The relative distribution of main benthic animal groups presented as quantitative circles at each sampled station with Campelen trawl in August-September 2010.**

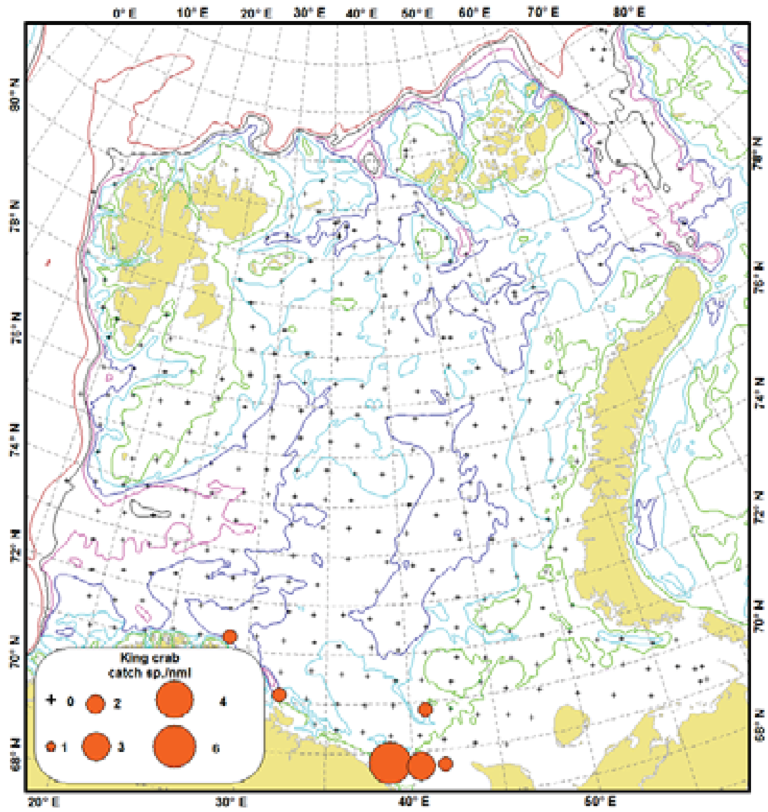



**Figure 2.8.3 The catch of the Red King Crab (*Paralithodes camtschaticus*) in Campelen bottom trawl on the Ecosystem Survey in August-September 2010.**

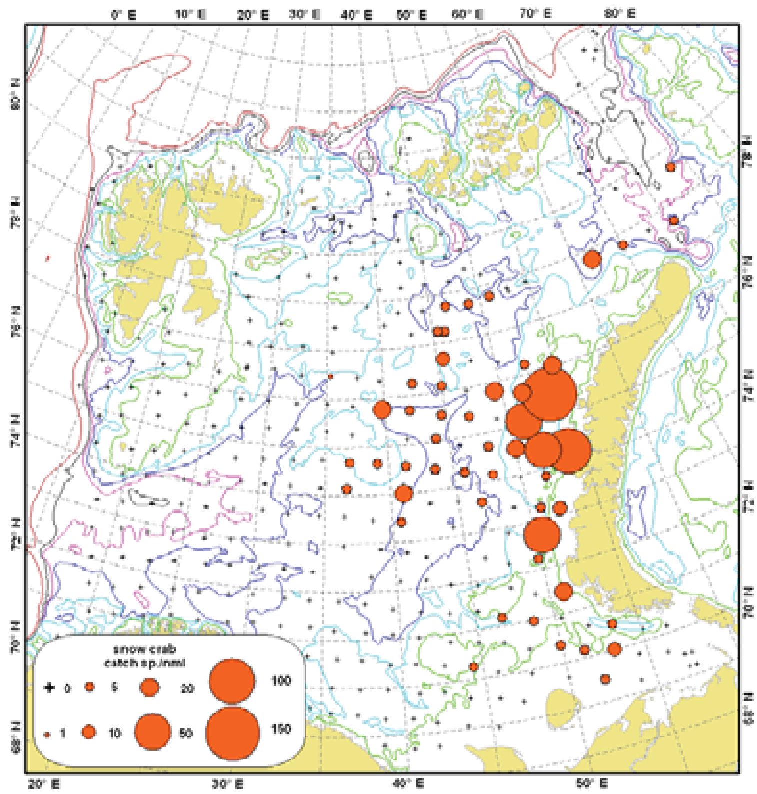



**Figure 2.8.4 The catch of the Snow crab (*Chionoecetes opilio*) in Campelen bottom trawl on the Ecosystem Survey in August-September 2010.**

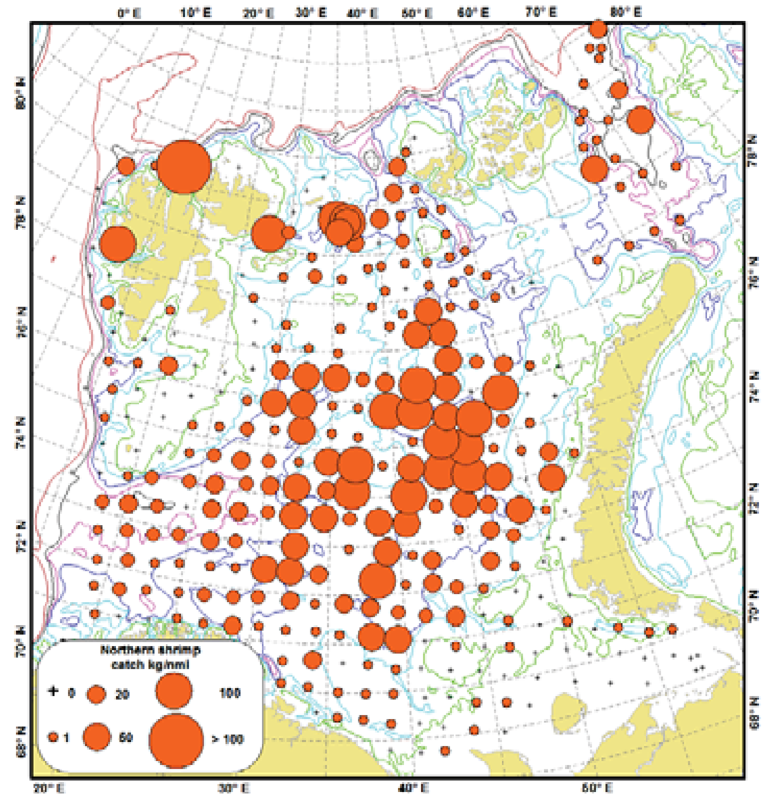



**Figure 2.8.5 The catch of the Northern shrimp (*Pandalus borealis*) in Campelen bottom trawl on the Ecosystem Survey in August-September 2010.**

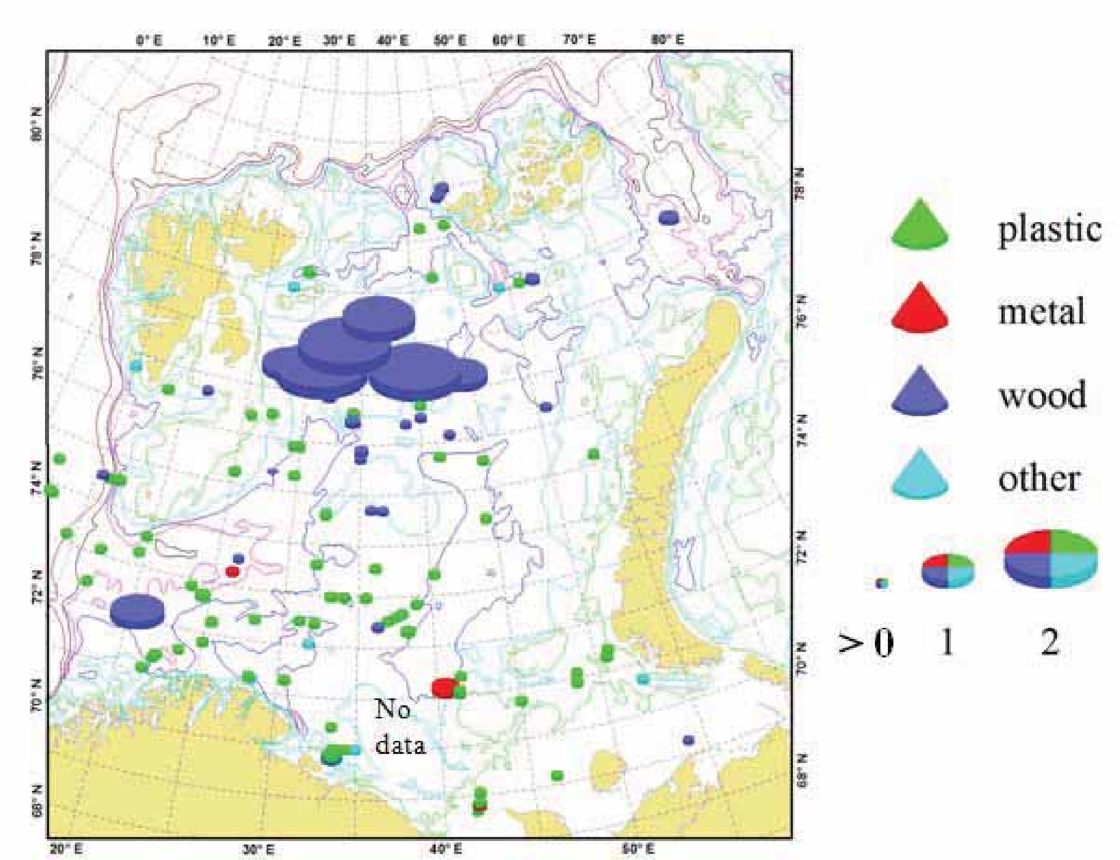



**Figure 2.9.1 Type of garbage visible at surface (m$^3$)**

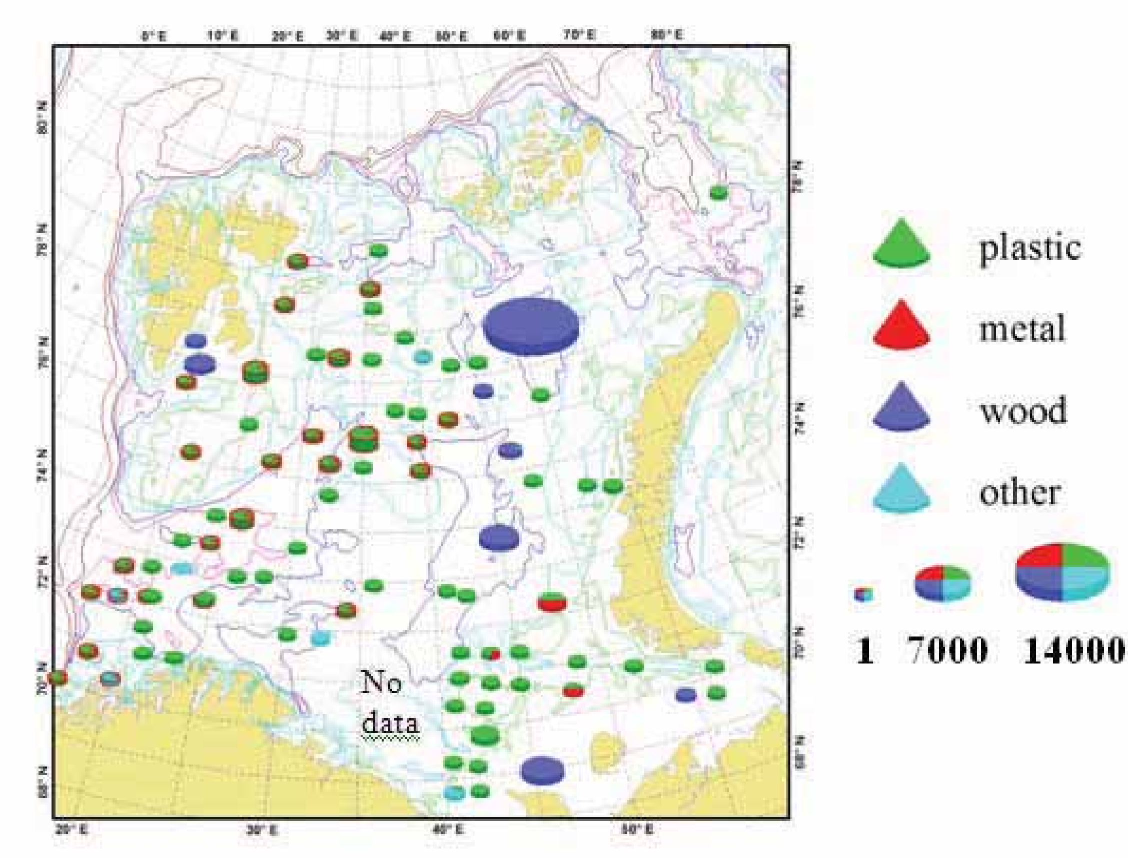



**Figure 2.9.2 Type of garbage collected in pelagic and bottom trawl (g) (symbols with contour – in pelagic trawl, symbols without contour – in bottom trawl)**

**Figure 2.9.3 Some types of garbage collected in survey area.**

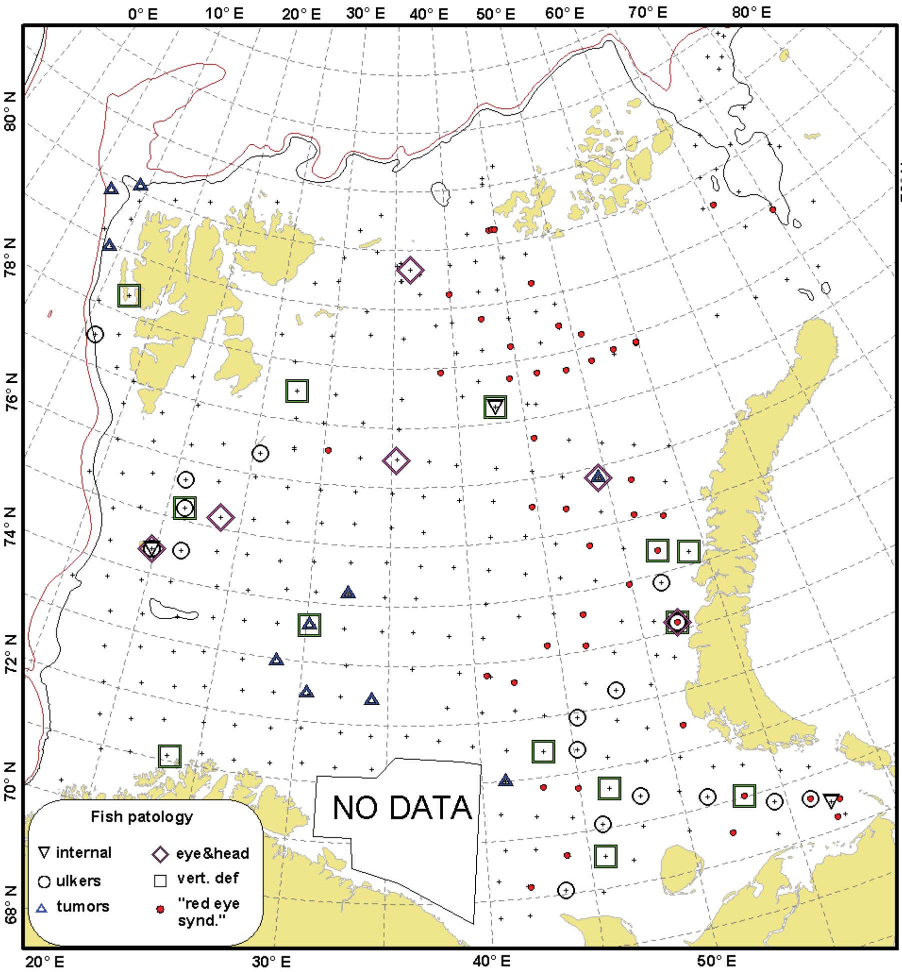



**Figure 2.10.1 Different type of the fish pathologies registered during the survey, August-September 2010**

**Figure 2.10.2 Tumors of an abdominal cavity side for 0-group cod**

# 6 APPENDIX

## Appendix 1

### Sampling of fish in ecosystem survey 2010

| Family | Latin name/ English name | **Norwegian vessels** | **Russian vessels** | **Sum** |
|---|---|---|---|---|
| Agonidae | **Leptagonus decagonus/ Atlantic poacher** | | | |
| | No of stations with samples | 87 | 104 | 191 |
| | Nos. length measured | 551 | 559 | 1110 |
| | Nos. aged | - | 61 | 61 |
| Agonidae | **Ulcina olrikii/ Arctic alligatorfish** | | | |
| | No of stations with samples | 1 | 20 | 21 |
| | Nos. length measured | 1 | 152 | 153 |
| | Nos. aged | - | 1 | 1 |
| Ammodytidae | **Ammodytes marinus/ Lesser sandeel** | | | |
| | No of stations with samples | 18 | - | 18 |
| | Nos. length measured | 58 | - | 58 |
| | Nos. aged | - | - | - |
| Ammodytidae | **Ammodytes sp./ Sandeels** | | | |
| | No of stations with samples | 11 | - | 11 |
| | Nos. length measured | 17 | - | 17 |
| | Nos. aged | - | - | - |
| Ammodytidae | **Ammodytes tobianus/ Small sandeel** | | | |
| | No of stations with samples | 1 | 27 | 28 |
| | Nos. length measured | 1 | 478 | 479 |
| | Nos. aged | - | - | - |
| Anarhichadidae | **Anarhichas sp./ Catfishes** | | | |
| | No of stations with samples | 7 | 7 | 14 |
| | Nos. length measured | 14 | 7 | 21 |
| | Nos. aged | - | - | - |
| Anarhichadidae | **Anarhichas denticulatus/ Northern wolffish** | | | |
| | No of stations with samples | 18 | 2 | 20 |
| | Nos. length measured | 24 | 2 | 26 |
| | Nos. aged | - | 1 | 1 |
| Anarhichadidae | **Anarhichas lupus/ Atlantic wolffish** | | | |
| | No of stations with samples | 37 | 10 | 47 |
| | Nos. length measured | 107 | 49 | 156 |
| | Nos. aged | - | 3 | 3 |
| Anarhichadidae | **Anarhichas minor/ Spotted wolffish** | | | |
| | No of stations with samples | 29 | 14 | 43 |
| | Nos. length measured | 57 | 16 | 73 |
| | Nos. aged | - | 2 | 2 |
| Argentinidae | **Argentina silus/ Greater argentine** | | | |
| | No of stations with samples | 16 | - | 16 |
| | Nos. length measured | 113 | - | 113 |
| | Nos. aged | - | - | - |
| Clupeidae | **Clupea harengus/ Atlantic herring** | | | |
| | No of stations with samples | 70 | 14 | 84 |
| | Nos. length measured | 2743 | 175 | 2918 |
| | Nos. aged | 174 | 7 | 181 |
| Clupeidae | **Clupea harengus/ Kanin herring** | | | |
| | No of stations with samples | - | 13 | 13 |
| | Nos. length measured | - | 491 | 491 |
| | Nos. aged | - | 147 | 147 |
| Cottidae | **Artediellus atlanticus/ Atlantic hookear sculpin** | | | |
| | No of stations with samples | 104 | 100 | 204 |

| | | | | |
|---|---|---|---|---|
| | Nos. length measured | 1090 | 1180 | 2270 |
| | Nos. aged | - | 15 | 15 |
| Cottidae | **Artediellus scaber/ Rough hamecon** | | | |
| | No of stations with samples | - | 3 | 3 |
| | Nos. length measured | - | 4 | 4 |
| | Nos. aged | - | - | - |
| Cottidae | **Cottidae g.sp./ Bullheads and Sculpins** | | | |
| | No of stations with samples | 7 | 24 | 31 |
| | Nos. length measured | 19 | 124 | 143 |
| | Nos. aged | - | - | - |
| Cottidae | **Gymnocanthus tricuspis/ Arctic staghorn sculpin** | | | |
| | No of stations with samples | - | 17 | 17 |
| | Nos. length measured | - | 207 | 207 |
| | Nos. aged | - | 14 | 14 |
| Cottidae | **Icelus bicornis/ Twohorn sculpin** | | | |
| | No of stations with samples | 10 | 9 | 19 |
| | Nos. length measured | 16 | 36 | 52 |
| | Nos. aged | - | - | - |
| Cottidae | **Icelus spatula/ Twohorn sculpin** | | | |
| | No of stations with samples | - | 20 | 20 |
| | Nos. length measured | - | 95 | 95 |
| | Nos. aged | - | 3 | 3 |
| Cottidae | **Myoxocephalus aenaenus/ Little sculpin** | | | |
| | No of stations with samples | - | 1 | 1 |
| | Nos. length measured | - | 1 | 1 |
| | Nos. aged | - | - | - |
| Cottidae | **Myoxocephalus scorpius/ Shorthhorn sculpin** | | | |
| | No of stations with samples | 11 | - | 11 |
| | Nos. length measured | 88 | - | 88 |
| | Nos. aged | - | - | - |
| Cottidae | **Triglops murrayi/ Moustache sculpin** | | | |
| | No of stations with samples | 33 | 6 | 39 |
| | Nos. length measured | 153 | 32 | 185 |
| | Nos. aged | - | 10 | 10 |
| Cottidae | **Triglops nybelini/ Bigeye sculpin** | | | |
| | No of stations with samples | 25 | 73 | 98 |
| | Nos. length measured | 378 | 1821 | 2199 |
| | Nos. aged | - | 61 | 61 |
| Cottidae | **Triglops pingeli/ Ribbed sculpin** | | | |
| | No of stations with samples | 5 | 18 | 23 |
| | Nos. length measured | 46 | 80 | 126 |
| | Nos. aged | - | 2 | 2 |
| Cottidae | **Triglops sp./** | | | |
| | No of stations with samples | 7 | 16 | 23 |
| | Nos. length measured | 134 | 119 | 253 |
| | Nos. aged | - | - | - |
| Cyclopteridae | **Cyclopterus lumpus/ Lumpsucker** | | | |
| | No of stations with samples | 81 | 24 | 105 |
| | Nos. length measured | 198 | 34 | 232 |
| | Nos. aged | - | - | - |
| Cyclopteridae | **Eumicrotremus derjugini/ Leatherfin lumpsucker** | | | |
| | No of stations with samples | - | 2 | 2 |
| | Nos. length measured | - | 14 | 14 |
| | Nos. aged | - | 10 | 10 |
| Cyclopteridae | **Eumicrotremus spinosus/ Atlantic spiny lumpsucker** | | | |
| | No of stations with samples | 5 | 7 | 12 |
| | Nos. length measured | 8 | 9 | 17 |

| | | | | |
|---|---|---|---|---|
| | Nos. aged | - | 3 | 3 |
| Gadidae | **Arctogadus glacialis/ Arctic cod** | | | |
| | No of stations with samples | 1 | 6 | 7 |
| | Nos. length measured | 2 | 8 | 10 |
| | Nos. aged | - | 4 | 4 |
| Gadidae | **Boreogadus saida/ Polar cod** | | | |
| | No of stations with samples | 109 | 189 | 298 |
| | Nos. length measured | 2937 | 26674 | 29611 |
| | Nos. aged | 626 | 774 | 1400 |
| Gadidae | **Ciliata mustela/ Fivebeard rockling** | | | |
| | No of stations with samples | 2 | - | 2 |
| | Nos. length measured | 7 | - | 7 |
| | Nos. aged | - | - | - |
| Gadidae | **Eleginus nawaga/ Atlantic navaga** | | | |
| | No of stations with samples | - | 5 | 5 |
| | Nos. length measured | - | 1127 | 1127 |
| | Nos. aged | - | 200 | 200 |
| Gadidae | **Gadiculus argenteus/ Silvery pout** | | | |
| | No of stations with samples | 13 | - | 13 |
| | Nos. length measured | 50 | - | 50 |
| | Nos. aged | - | - | - |
| Gadidae | **Gadus morhua/ Atlantic cod** | | | |
| | No of stations with samples | 264 | 213 | 477 |
| | Nos. length measured | 12343 | 13401 | 25744 |
| | Nos. aged | 877 | 2207 | 3084 |
| Gadidae | **Melanogrammus aeglefinus/ Haddock** | | | |
| | No of stations with samples | 170 | 76 | 246 |
| | Nos. length measured | 6015 | 7414 | 13429 |
| | Nos. aged | 338 | 718 | 1056 |
| Gadidae | **Merlangius merlangius/ Whiting** | | | |
| | No of stations with samples | 1 | 1 | 2 |
| | Nos. length measured | 1 | 1 | 2 |
| | Nos. aged | - | - | - |
| Gadidae | **Micromesistius poutassou/ Blue whiting** | | | |
| | No of stations with samples | 45 | 1 | 46 |
| | Nos. length measured | 933 | 1 | 934 |
| | Nos. aged | 110 | 1 | 111 |
| Gadidae | **Pollachius virens/ Saithe** | | | |
| | No of stations with samples | 44 | 23 | 67 |
| | Nos. length measured | 370 | 84 | 454 |
| | Nos. aged | - | 4 | 4 |
| Gadidae | **Trisopterus esmarkii/ Norway pout** | | | |
| | No of stations with samples | 49 | 11 | 60 |
| | Nos. length measured | 1189 | 487 | 2676 |
| | Nos. aged | - | 40 | 40 |
| Gasterosteidae | **Gasterosteus aculeatus/ Three-spined stickleback** | | | |
| | No of stations with samples | 8 | 10 | 18 |
| | Nos. length measured | 44 | 145 | 189 |
| | Nos. aged | - | - | |
| Liparidae | **Careproctus micropus/** | | | |
| | No of stations with samples | - | 7 | 7 |
| | Nos. length measured | - | 9 | 9 |
| | Nos. aged | - | 3 | 3 |
| Liparidae | **Careproctus ranula/ Scotian snailfish** | | | |
| | No of stations with samples | - | 4 | 4 |
| | Nos. length measured | - | 5 | 5 |
| | Nos. aged | - | - | - |
| Liparidae | **Careproctus reinhardii/ Sea tadpole** | | | |
| | No of stations with samples | 14 | 18 | 32 |
| | Nos. length measured | 22 | 53 | 75 |

| | | | | |
|---|---|---|---|---|
| | Nos. aged | - | 6 | 6 |
| Liparidae | **Liparis fabricii/ Gelatinous snailfish** | | | |
| | No of stations with samples | 14 | 74 | 88 |
| | Nos. length measured | 64 | 2059 | 2123 |
| | Nos. aged | - | 25 | 25 |
| Liparidae | **Liparis gibbus/ Variagated snailfish** | | | |
| | No of stations with samples | 2 | 10 | 12 |
| | Nos. length measured | 10 | 17 | 27 |
| | Nos. aged | - | 4 | 4 |
| Liparidae | **Liparis liparis/ Striped sea snail** | | | |
| | No of stations with samples | 2 | 1 | 3 |
| | Nos. length measured | 2 | 2 | 4 |
| | Nos. aged | - | 2 | 2 |
| Liparidae | **Liparis montague/ Montagu's sea snail** | | | |
| | No of stations with samples | - | 1 | 1 |
| | Nos. length measured | - | 4 | 4 |
| | Nos. aged | - | - | - |
| Liparidae | **Liparis sp./ Sea snails** | | | |
| | No of stations with samples | 27 | 19 | 46 |
| | Nos. length measured | 492 | 113 | 605 |
| | Nos. aged | - | - | - |
| Liparidae | **Paraliparis bathybius/ Threadfin seasnail** | | | |
| | No of stations with samples | 1 | - | 1 |
| | Nos. length measured | 1 | - | 1 |
| | Nos. aged | - | - | - |
| Lotidae | **Brosme brosme/ Cusk** | | | |
| | No of stations with samples | 9 | 1 | 10 |
| | Nos. length measured | 32 | 1 | 33 |
| | Nos. aged | 1 | 1 | 2 |
| Lotidae | **Enchelyopus cimbrius/ Fourbeard rockling** | | | |
| | No of stations with samples | 5 | 1 | 6 |
| | Nos. length measured | 8 | 1 | 9 |
| | Nos. aged | - | 1 | 1 |
| Macrouridae | **Caelorinchus caelorinchus/ Blackspot grenadier** | | | |
| | No of stations with samples | 1 | - | 1 |
| | Nos. length measured | 3 | - | 3 |
| | Nos. aged | - | - | - |
| Macrouridae | **Macrourus berglax/ Rough rattail** | | | |
| | No of stations with samples | 3 | - | 3 |
| | Nos. length measured | 3 | - | 3 |
| | Nos. aged | - | - | - |
| Myctophidae | **Benthosema glaciale / Glacier lanternfish** | | | |
| | No of stations with samples | 20 | 22 | 42 |
| | Nos. length measured | 146 | 95 | 241 |
| | Nos. aged | - | - | - |
| Myctophidae | **Lampanyctus sp./** | | | |
| | No of stations with samples | - | 3 | 3 |
| | Nos. length measured | - | 3 | 3 |
| | Nos. aged | - | - | - |
| Osmeridae | **Mallotus villosus/ Capelin** | | | |
| | No of stations with samples | 245 | 216 | 461 |
| | Nos. length measured | 16703 | 17688 | 34391 |
| | Nos. aged | 3785 | 1080 | 4865 |
| Osmeridae | **Osmerus eperlanus/ European smelt** | | | |
| | No of stations with samples | - | 5 | 5 |
| | Nos. length measured | - | 40 | 40 |
| | Nos. aged | - | 34 | 34 |
| Paralepididae | **Arctozenus risso/ White barracudina** | | | |
| | No of stations with samples | 17 | 1 | 18 |

| | | | | |
|---|---|---|---|---|
| | Nos. length measured | 49 | 1 | 50 |
| | Nos. aged | - | - | - |
| Petromyzontidae | **Petromyzon marinus/ Sea lampray** | | | |
| | No of stations with samples | 1 | - | 1 |
| | Nos. length measured | 1 | - | 1 |
| | Nos. aged | - | - | - |
| Pleuronectidae | **Hippoglossoides platessoides/ Long rough dab** | | | |
| | No of stations with samples | 159 | 162 | 321 |
| | Nos. length measured | 5904 | 7508 | 13412 |
| | Nos. aged | - | 379 | 379 |
| Pleuronectidae | **Hippoglossus hippoglossu/ Atlantic halibut** | | | |
| | No of stations with samples | 1 | - | 1 |
| | Nos. length measured | 1 | - | 1 |
| | Nos. aged | 1 | - | 1 |
| Pleuronectidae | **Limanda limanda/ Dab** | | | |
| | No of stations with samples | 1 | 3 | 4 |
| | Nos. length measured | 12 | 28 | 40 |
| | Nos. aged | - | - | - |
| Pleuronectidae | **Pleuronectes glacialis/ Arctic flounder** | | | |
| | No of stations with samples | - | 3 | 3 |
| | Nos. length measured | - | 4 | 4 |
| | Nos. aged | - | 3 | 3 |
| Pleuronectidae | **Pleuronectes platessa/ Europeian plaice** | | | |
| | No of stations with samples | - | 17 | 17 |
| | Nos. length measured | - | 241 | 241 |
| | Nos. aged | - | 83 | 83 |
| Pleuronectidae | **Reinhardtius hippoglossoides/ Greenland halibut** | | | |
| | No of stations with samples | 92 | 70 | 162 |
| | Nos. length measured | 503 | 1801 | 2304 |
| | Nos. aged | - | 1062 | 1062 |
| Psychrolutidae | **Cottunculus microps/ Polar sculpin** | | | |
| | No of stations with samples | 7 | 15 | 22 |
| | Nos. length measured | 7 | 31 | 38 |
| | Nos. aged | - | 2 | 2 |
| Psychrolutidae | **Cottunculus sadko/ Sadko sculpin** | | | |
| | No of stations with samples | - | 5 | 5 |
| | Nos. length measured | - | 9 | 9 |
| | Nos. aged | - | 1 | 1 |
| Rajidae | **Amblyraja hyperborean/ Arctic skate** | | | |
| | No of stations with samples | 5 | 16 | 21 |
| | Nos. length measured | 13 | 20 | 33 |
| | Nos. aged | - | - | - |
| Rajidae | **Amblyraja radiate/ Thorny skate** | | | |
| | No of stations with samples | 61 | 35 | 96 |
| | Nos. length measured | 119 | 105 | 224 |
| | Nos. aged | - | - | - |
| Rajidae | **Bathyraja spinicauda/ Spinetail ray** | | | |
| | No of stations with samples | 3 | - | 3 |
| | Nos. length measured | 3 | - | 3 |
| | Nos. aged | - | - | - |
| Rajidae | **Rajella fyllae/ Round ray** | | | |
| | No of stations with samples | 3 | - | 3 |
| | Nos. length measured | 3 | - | 3 |
| | Nos. aged | - | - | - |
| Scorpaenidae | **Sebastes marinus/ Golden redfish** | | | |
| | No of stations with samples | 19 | 2 | 21 |
| | Nos. length measured | 150 | 12 | 162 |
| | Nos. aged | - | - | - |

| | | | | |
|---|---|---|---|---|
| Scorpaenidae | **Sebastes mentella/ Deepwater redfish** | | | |
| | No of stations with samples | 100 | 67 | 167 |
| | Nos. length measured | 3335 | 875 | 4210 |
| | Nos. aged | - | 65 | 65 |
| Scorpaenidae | **Sebastes sp./ Redfishes** | | | |
| | No of stations with samples | 112 | 7 | 119 |
| | Nos. length measured | 4035 | 46 | 4081 |
| | Nos. aged | - | - | - |
| Scorpaenidae | **Sebastes viviparus/ Norway redfish** | | | |
| | No of stations with samples | 12 | - | 12 |
| | Nos. length measured | 183 | - | 183 |
| | Nos. aged | - | - | - |
| Squalidae | **Somniosus microcephalus/ Greenland shark** | | | |
| | No of stations with samples | - | 1 | 1 |
| | Nos. length measured | - | 1 | 1 |
| | Nos. aged | - | - | - |
| Sternoptychidae | **Maurolicus muelleri/ Pearlside** | | | |
| | No of stations with samples | 14 | 4 | 18 |
| | Nos. length measured | 74 | 6 | 80 |
| | Nos. aged | - | - | - |
| Stichaeidae | **Anisarchus medius/ Stout eelblenny** | | | |
| | No of stations with samples | 8 | 6 | 14 |
| | Nos. length measured | 13 | 55 | 68 |
| | Nos. aged | - | - | - |
| Stichaeidae | **Leptoclinus sp., Lumpenus sp./** | | | |
| | No of stations with samples | 1 | 10 | 11 |
| | Nos. length measured | 6 | 151 | 157 |
| | Nos. aged | - | - | - |
| Stichaeidae | **Leptoclinus maculates/ Daubed shanny** | | | |
| | No of stations with samples | 114 | 96 | 210 |
| | Nos. length measured | 859 | 796 | 1655 |
| | Nos. aged | - | - | - |
| Stichaeidae | **Lumpenus fabricii/ Slender eelblenny** | | | |
| | No of stations with samples | - | 2 | 2 |
| | Nos. length measured | - | 36 | 36 |
| | Nos. aged | - | - | - |
| Stichaeidae | **Lumpenus lampretaeformis/Snake blenny** | | | |
| | No of stations with samples | 59 | 17 | 76 |
| | Nos. length measured | 233 | 77 | 310 |
| | Nos. aged | - | 1 | 1 |
| Triglidae | **Eutrigla gurnardus/ Grey gurnard** | | | |
| | No of stations with samples | 2 | - | 2 |
| | Nos. length measured | 2 | - | 2 |
| | Nos. aged | - | - | - |
| Zoarcidae | **Gymnelus knipowitschi/ Halvbarred pout** | | | |
| | No of stations with samples | - | 2 | 2 |
| | Nos. length measured | - | 3 | 3 |
| | Nos. aged | - | - | - |
| Zoarcidae | **Gymnelus retrodorsalis/ Aurora unernak** | | | |
| | No of stations with samples | 1 | - | 1 |
| | Nos. length measured | 1 | - | 1 |
| | Nos. aged | - | - | - |
| Zoarcidae | **Gymnelus viridis/ Fish doctor** | | | |
| | No of stations with samples | - | 1 | 1 |
| | Nos. length measured | - | 2 | 2 |
| | Nos. aged | - | - | - |
| Zoarcidae | **Lycodes esmarkii/ Esmark's eelpout** | | | |
| | No of stations with samples | 3 | - | 3 |
| | Nos. length measured | 23 | - | 23 |
| | Nos. aged | - | - | - |

| | | | | |
|---|---|---|---|---|
| Zoarcidae | **Lycodes eudipleurostictus/ Double line eelpout** | | | |
| | No of stations with samples | 3 | 6 | 9 |
| | Nos. length measured | 5 | 13 | 18 |
| | Nos. aged | - | 9 | 9 |
| Zoarcidae | **Lycodes gracilis/ Vahl's eelpout** | | | |
| | No of stations with samples | 47 | 11 | 58 |
| | Nos. length measured | 225 | 31 | 256 |
| | Nos. aged | - | 29 | 29 |
| Zoarcidae | **Lycodes luetkenii/ Lutken's eelpout** | | | |
| | No of stations with samples | - | 2 | 2 |
| | Nos. length measured | - | 2 | 2 |
| | Nos. aged | - | - | - |
| Zoarcidae | **Lycodes pallidus/ Pale eelpout** | | | |
| | No of stations with samples | 12 | 28 | 40 |
| | Nos. length measured | 47 | 90 | 137 |
| | Nos. aged | - | 7 | 7 |
| Zoarcidae | **Lycodes polaris/ Canadian eelpout** | | | |
| | No of stations with samples | - | 12 | 12 |
| | Nos. length measured | - | 44 | 44 |
| | Nos. aged | - | 12 | 12 |
| Zoarcidae | **Lycodes reticulates/ Arctic eelpout** | | | |
| | No of stations with samples | 13 | 32 | 45 |
| | Nos. length measured | 22 | 152 | 174 |
| | Nos. aged | - | 38 | 38 |
| Zoarcidae | **Lycodes rossi/ Threespot eelpout** | | | |
| | No of stations with samples | 13 | 8 | 21 |
| | Nos. length measured | 29 | 14 | 43 |
| | Nos. aged | - | - | - |
| Zoarcidae | **Lycodes seminudus/ Longear eelpout** | | | |
| | No of stations with samples | 13 | 21 | 34 |
| | Nos. length measured | 46 | 50 | 96 |
| | Nos. aged | - | 10 | 10 |
| Zoarcidae | **Lycodes squamiventer/ Scalebelly eelpout** | | | |
| | No of stations with samples | 1 | 3 | 4 |
| | Nos. length measured | 5 | 6 | 11 |
| | Nos. aged | - | 2 | 2 |
| Zoarcidae | **Lycenchelys kolthoffi/ Checkered wolfeel** | | | |
| | No of stations with samples | 1 | 2 | 3 |
| | Nos. length measured | 1 | 7 | 8 |
| | Nos. aged | - | - | - |
| Zoarcidae | **Lychenchelus sarsii/ Sars wolf eel** | | | |
| | No of stations with samples | 1 | - | 1 |
| | Nos. length measured | 1 | - | 1 |
| | Nos. aged | - | - | - |

Length measurements include 0-group samples. Demersal fishes will be aged after the survey.

# Appendix 2

## List of identified species of the bottom invertebrates and frequency character at the stations through the Barents sea ecosystem survey in 2010

| Phylum | Class | Order | Family | Synonim | Author, year | GS | JH | JM | VI | FN |
|---|---|---|---|---|---|---|---|---|---|---|
| Porifera | Calcarea | Calcarea | Sycettidae | Sycon sp. | | 1 | 1 | 1 | | |
| | Demospongiae | Astrophorida | Geodiidae | Geodia barretti | Hentschel, 1929 | 11 | 12 | | | 3 |
| | | | | Geodia macandrewii | Bowerbank, 1858 | 2 | 14 | 4 | | 1 |
| | | | | Geodia sp. | | | 3 | | | |
| | | | Pachastrellidae | Thenea cf. muricata | (Bowerbank, 1858) | | | 4 | | |
| | | | | Thenea muricata | (Bowerbank, 1858) | 20 | 4149 | 3 | | |
| | | | Tetillidae | Tetilla cranium | (O.F. Mueller, 1776) | 1 | 5 | 4 | | 67 |
| | | | | Tetilla polyura | Schmidt, 1870 | 152 | 99 | 8 | | 81 |
| | | | | Tetilla sp. | | | | | 132 | |
| | | Axinellida | Axinellidae | Axinella ventilabrum | (Johnston, 1842) | 2 | | | | |
| | | Hadromerida | Polymastiidae | Polymastia mammillaris | (Mueller, 1806) | | | | 2 | |
| | | | | Polymastia sp. | | | 8 | | 379 | |
| | | | | Polymastia thielei | Koltun, 1964 | | 3 | 4 | | |
| | | | | Polymastia uberrima | (Schmidt, 1870) | | 21 | 4 | | 40 |
| | | | | Radiella grimaldi | (Topsent, 1913) | 76 | 89 | | 211 | 1 |
| | | | | Radiella hemisphaericum | (Sars, 1872) | 18 | 92 | 3 | | |
| | | | | Sphaerotylus borealis | (Swarchevsky, 1906) | 1 | | | | |
| | | | | Tentorium semisuberites | (Schmidt, 1870) | 3 | 8 | 17 | 2 | 4 |
| | | | Stylocordylidae | Stylocordyla borealis | (Loven, 1866) | 5 | | | 64 | |
| | | | Suberitidae | Suberites ficus | (Johnston, 1842) | 5 | 8 | 5 | 20 | 12 |
| | | | Tethyidae | Tethya aurantium | (Pallas, 1766) | | 7 | | | |
| | | | | Tethya norvegica | Bowerbank, 1872 | 9 | | | | |
| | | Halichondrida | Axinelliidae | Phakellia bowerbanki | Vosmaer, 1885 | 2 | | | | |
| | | | | Phakellia cribrosa | (Miklucho-Maclay, 1870) | 1 | | | | |
| | | | | Phakellia sp. | | | 2 | | | 1 |
| | | Haplosclerida | Haliclonidae | Haliclona cinerea | (Grant, 1827) | | 1 | | | |
| | | | | Haliclona sp. | | 1 | 2 | 7 | | |
| | | | | Haliclona ventilabrum | (Fristedt, 1887) | 6 | | 3 | | |
| | | Poecilosclerida | Microcionidae | Antho dichotoma | (Esper,1794) | 1 | | | | |
| | | | Mycalidae | Mycale sp. | | | 8 | | | |
| | | | Myxillidae | Artemisina apollinis | (Ridley & Dendy, 1887) | 1 | | | | |
| | | | | Myxilla brunnea | Hansen, 1885 | 2 | | | | |
| | | | | Myxilla incrustans | (Johnston, 1842) | 19 | 4 | 22 | | 2 |
| | | | | Myxilla sp. | | 3 | 39 | | | |
| | | | Tedaniidae | Tedania suctoria | Schmidt, 1870 | 28 | 16 | 8 | | 1 |
| | | | | Porifera g. sp. | | 82 | 33 | 3 | 84 | 14 |
| Cnidaria | Anthozoa | Actiniaria | Actiniidae | Urticina felina | (L., 1767) | 21 | | | | |
| | | | Actinostolidae | Anthosactis janmaeni | Danielssen, 1890 | | 6 | 2 | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Stomphia coccinea | (O.F. Mueller, 1776) | | 1 | | | |
| | | **Hormathiidae** | Hormathia digitata | (O.F. Mueller, 1776) | 140 | 97 | 37 | 218 | 61 |
| | | | Hormathia sp. | | | | 4 | | |
| | | **Metridiidae** | Metridium senile | (L., 1767) | | 16 | 1 | | |
| | | | Actiniaria g. sp. | | | 8 | | 1299 | 19 |
| | Alcyonacea | **Clavulariidae** | Clavularia arctica | (M. Sars, 1860) | 2 | | | | |
| | | **Nephteidae** | Drifa glomerata | (Verrill, 1869) | 42 | 24 | 17 | 2 | 3 |
| | | | Duva florida | (Rathke, 1806) | 3 | 3 | 1 | | |
| | | | Gersemia fruticosa | (M. Sars, 1860) | | 49 | 39 | | |
| | | | Gersemia rubiformis | (Ehrenberg, 1834) | 181 | 10 | 7 | 401 | |
| | Pennatulacea | **Umbellulidae** | Umbellula encrinus | (L., 1758) | | | | 5458 | |
| | Zoanthacea | **Epizoanthidae** | Epizoanthus incrustatus | (Dueben & Koren, 1847) | 4 | | | | |
| | | | Epizoanthus sp. | | | 77 | | 377 | |
| | | | Anthozoa g. sp. | | | | | 11135 | |
| **Hydrozoa** | Athecata | **Eudendriidae** | Eudendrium capillare | Alder, 1856 | | 2 | | | |
| | | | Eudendrium vaginatum | Norman, 1864 | | | 1 | | |
| | | **Tubulariidae** | Tubularia sarsii (medusa) | | | 4 | | | |
| | Thecaphora | **Campanulariidae** | Campanularia volubilis | (L., 1758) | | | 83 | | |
| | | | Obelia longissima | (Pallas, 1766) | | | 44 | | |
| | | | Orthopyxis integra | (McGillivray, 1842) | | | 14 | | |
| | | | Rhizocaulus verticillatus | (L., 1758) | | | 7 | | |
| | | **Campanulinidae** | Calycella syringa | (L., 1767) | | | 8 | | |
| | | | Lafoeina maxima | Levinsen, 1893 | | 1 | 5 | | |
| | | **Haleciidae** | Halecium beanii | (Johnston, 1838) | | 1 | 3 | | |
| | | | Halecium labrosum | Alder, 1859 | | 1 | | | |
| | | | Halecium marsupiale | Bergh, 1887 | | | 4 | | |
| | | | Halecium muricatum | (Ellis & Solander, 1786) | | 2 | 17 | | |
| | | **Lafoeidae** | Grammaria immersa | Nutting, 1901 | | 1 | 1 | | |
| | | | Lafoea fruticosa | (M. Sars, 1850) | | 7 | 25 | | |
| | | **Laodiceidae** | Ptychogena lactea | A. Agassiz, 1865 | | 20 | | | |
| | | | Ptychogena lactea (medusa) | A. Agassiz, 1865 | | 61 | 1 | | |
| | | **Sertulariidae** | Abietinaria abietina | (L., 1758) | | | 26 | | |
| | | | Abietinaria filicula | (Ellis & Solander, 1786) | | | 1 | | |
| | | | Hydrallmania falcata | (L., 1758) | | | 15 | | |
| | | | Sertularella gigantea | Mereschkowsky, 1878 | | | 22 | | |
| | | | Sertularia mirabilis | (Verrill, 1873) | | | 12 | | |
| | | | Sertularia plumosa | (Clark, 1876) | | | 2 | | |
| | | | Symplectoscyphus tricuspidatus | (Alder, 1856) | | 3 | 9 | | |
| | | | Thuiaria breitfussi | (Kudelin, 1914) | | | 13 | | |
| | | | Thuiaria carica | Levinsen, 1893 | | | 1 | | |
| | | | Thuiaria cupressoides | (Lepechin, 1781) | | | 1 | | |
| | | | Thuiaria lonchitis | Naumov, 1960 | | 11 | 3 | | |
| | | | Thuiaria obsoleta | (Lepechin, 1781) | | | 4 | | |
| | | **Tiarannidae** | Modeeria plicatile | (M. Sars, 1863) | | 2 | 1 | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Hydroidea g. sp. | | 8 | | | | |
| | | | | Hydrozoa g. sp. | | | 4 | | | |
| | **Scyphozoa** | Semaeostomeae | **Cyaneidae** | Cyanea capillata | (L., 1758) | | 25 | 14 | | |
| | | | | Scyphozoa g. sp. | | | | | | |
| **Plathelminthes** | **Turbellaria** | | | Turbellaria g. sp. | | | 2 | | | |
| **Nemertini** | **Nemertini** | | | Nemertini g. sp. | | 4 | 5 | 5 | 80 | |
| **Annelida** | **Polychaeta** | Amphinomida | **Euphrosinidae** | Euphrosine borealis | Oersted, 1843 | | | | 67 | |
| | | Capitellida | **Maldanidae** | Maldane sarsi | Malmgren, 1867 | 2 | | | | |
| | | Chaetopterida | **Chaetopteridae** | Spiochaetopterus typicus | M. Sars, 1856 | 93 | 572 | 7 | 3 | |
| | | Eunicida | **Eunicidae** | Eunice sp. | | 1 | | | | |
| | | | **Lumbrineridae** | Lumbriconeris sp. | | | 2 | | | |
| | | | **Onuphidae** | Nothria hyperborea | (Hansen, 1878) | | 14 | | | |
| | | Flabelligerida | **Flabelligeridae** | Brada granulata | Malmgren, 1867 | 2 | 392 | 12 | 10 | 19 |
| | | | | Brada granulosa | Hansen, 1880 | | | | 34 | |
| | | | | Brada inhabilis | (Rathke, 1843) | 151 | 43 | 5 | 391 | |
| | | | | Brada sp. | | | | | 2 | |
| | | | | Brada villosa | (Rathke, 1843) | 7 | 2 | | 2 | |
| | | Opheliida | **Scalibregmidae** | Polyphisia sp. | | | 3 | | | |
| | | Phyllodocida | **Aphroditidae** | Aphrodita sp. | | 3 | 3 | 4 | | |
| | | | | Aphroditidae g. sp. | | | | | | 2 |
| | | | **Nephtyidae** | Nephtyidae g. sp. | | 1 | 3 | | | |
| | | | | Nephtys sp. | | 2 | 3 | 1 | 27 | |
| | | | **Nereididae** | Nereis sp. | | 3 | | | | |
| | | | **Polynoidae** | Harmothoe sp. | | 59 | 61 | 11 | 304 | 22 |
| | | | | Polynoidae g. sp. | | 1 | | | | |
| | | | **Syllidae** | Syllinae g. sp. | | 1 | | | | |
| | | Sabellida | **Sabellidae** | Sabellidae g. sp. | | 9 | 54 | | | |
| | | | **Serpulidae** | Serpulidae g. sp. | | 1 | | | | |
| | | Terebellida | **Pectinariidae** | Pectinaria hyperborea | (Malmgren, 1865) | 1 | 89 | | | 1 |
| | | | **Terebellidae** | Pista maculata | (Dalyell, 1853) | | 11 | 2 | | |
| | | | | Terebellinae g. sp. | | 40 | | | | |
| | | | | Polychaeta g. sp. | | 3 | 40 | 9 | 480 | |
| **Sipuncula** | **Sipunculidea** | Golfingiiformes | **Golfingiidae** | Golfingia sp. | | 5 | | | | |
| | | | | Nephasoma eremita | (M. Sars, 1851) | | | 1 | | |
| | | | **Phascolionidae** | Phascolion strombus strombus | (Montagu, 1804) | 21 | 5 | 1 | | |
| | | | | Sipunculidea g. sp. | | 7 | | | 125 | 1 |
| **Echiura** | **Echiurida** | Echiuroinea | **Bonelliidae** | Hamingia arctica | Danielssen & Koren, 1881 | 8 | 5 | | 2 | 2 |
| **Cephalorhyncha** | **Priapulida** | Priapulomorpha | **Priapulidae** | Priapulopsis bicaudatus | (Danielssen, 1868) van der Land, 1970 | | 1 | | 56 | |
| | | | | Priapulus caudatus | Lamarck, 1816 | | | 1 | | 1 |
| **Arthropoda** | **Cirripedia** | Thoracica | **Balanomorpha** | Balanus balanus | (L., 1758) | | 1 | 8 | | |
| | | | | Balanus sp. | | | | | 12 | |
| | | | | Semibalanus balanoides | (L., 1766) | | 36 | 51 | | |
| | **Malacostraca** | Amphipoda | **Acanthonotozomatidae** | Acanthonotozoma cristatum | (Ross, 1835) | 1 | | | | |
| | | | | Acanthostepheia | (Goes, 1866) | 12 | | | 121 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | malmgreni | | | | | | |
| | **Amathillopsidae** | Amathillopsis spinigera | Heller, 1875 | | | 1 | 10 | |
| | **Calliopiidae** | Cleippides quadricuspis | Heller, 1875 | | | 1 | 322 | |
| | **Epimeriidae** | Epimeria loricata | G.O. Sars, 1879 | 23 | 39 | 39 | 3 | |
| | | Paramphithoe hystrix | (Ross, 1835) | 17 | 6 | 7 | 16 | |
| | **Eusiridae** | Eusirus holmi | Hansen, 1887 | | | | 22 | |
| | | Rhachotropis aculeata | (Lepechin, 1780) | 4 | 15 | 8 | 63 | 6 |
| | | Rhachotropis helleri | A. Boeck, 1871 | | 7 | | | |
| | **Gammaridae** | Gammaridae g. sp. | | | 1 | | 5 | |
| | | Gammarus sp. | | | 1 | | | |
| | **Hyperiidae** | Hyperia galba | (Montagu, 1813) | | | 1 | | |
| | | Hyperiidea g. sp. | | | 2 | | | |
| | | Themisto libellula | (Lichtenstein,1882) | | 441 | | | |
| | **Liljeborgiidae** | Lilljeborgia fissicornis | (M. Sars, 1858) | | | 2 | | |
| | **Lysianassidae** | Anonyx nugax | (Phipps, 1774) | 16 | | 148 | | |
| | | Anonyx sp. | | | 10 | 12 | 87 | |
| | | Eurythenes gryllus | (Lichtenstein, 1822) | | | 3 | 1 | |
| | **Pleustidae** | Leucothoe spinicarpa | (Abilgaard, 1789) | | 17 | 2 | | |
| | **Stegocephalidae** | Stegocephalidae g. sp. | | | 7 | | | |
| | | Stegocephalus inflatus | Kroeyer, 1842 | 32 | 8 | 1 | 209 | |
| | | Stegocephalus sp. | | | 4 | | | 4 |
| | | Amphipoda g. sp. | | | | 23 | | |
| Cumacea | **Diastylidae** | Diastylis goodsiri | (Bell, 1855) | 2 | | | 2 | |
| Decapoda | **Crangonidae** | Pontophilus norvegicus | M. Sars, 1861 | 91 | 64 | 12 | | |
| | | Sabinea sarsi | Smith, 1879 | 9 | 3 | 6 | | |
| | | Sabinea septemcarinata | (Sabine, 1821) | 6345 | 1455 | 971 | 22228 | 78 |
| | | Sclerocrangon boreas | (Phipps, 1774) | | 19 | 20 | 352 | |
| | | Sclerocrangon ferox | (G.O. Sars, 1821) | 445 | 185 | 85 | 2956 | |
| | **Galatheidae** | Munida bamffica | (Pennant, 1777) | 5 | 27 | | | |
| | **Hippolitydae** | Bythocaris biruli | (Kobjakova, 1964) | | | | 155 | |
| | | Bythocaris payeri | (Heller, 1875) | | | | 143 | |
| | | Eualus gaimardi | (Milne-Edwards, 1837) | | 14 | | 2283 | 22 |
| | | Lebbeus polaris | (Sabine, 1821) | 339 | 126 | 351 | 3035 | |
| | | Spirontocaris spinus | (Sowerby, 1802) | 151 | 26 | 72 | 40 | |
| | **Lithodidae** | Lithodes maja | (L., 1758) | | 1 | | | |
| | | Paralithodes camtschaticus | (Tilesius, 1815) | 1 | | | 5 | 6 |
| | **Majidae** | Chionoecetes opilio | (Fabricius, 1788) | 47 | | | 389 | |
| | | Hyas araneus | (L., 1758) | 4 | 16 | 7 | 293 | |
| | | Hyas coarctatus | Leash, 1815 | 3 | 21 | 2 | 2 | 1 |
| | **Paguridae** | Pagurus bernhardus | (L., 1758) | | 11 | | | |
| | | Pagurus pubescens | (Kroeyer, 1838) | 9 | | 3 | 255 | 2 |
| | **Pandalidae** | Pandalus borealis | Kroeyer, 1837 | 151490 | 41137 | 56076 | 213456 | 14272 |
| | | Pandalus montagui | Leach, 1814 | 29 | | | 2 | |
| | | Pandalus sp. | | | | | 5 | |

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|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Pasiphaeidae** | Pasiphaea multidentata | Esmark, 1886 | 52 | 2 | | 84 | |
| | | | | Pasiphaea sivado | (Risso, 1816) | | | 883 | 211 | |
| | | | | Pasiphaea tarda | | | | 715 | | |
| | | | **Sergestidae** | Sargestes arcticus | Kroeyer, 1855 | | 54 | 12 | 40 | |
| | | Euphausiacea | **Euphausiidae** | Euphausiidae g. sp. | | | 4215 | | | |
| | | | | Meganyctiphanes norvegica | (M. Sars, 1857) | | 609 | | | |
| | | | | Thysanoessa inermis | (Kroeyer, 1846) | | 79 | | | |
| | | Isopoda | **Aegidae** | Aega psora | L., 1758 | | 1 | | | |
| | | | | Aega sp. | | | 4 | | | |
| | | | **Eurycopidae** | Munnopsurus giganteus | (G.O. Sars, 1877) | 1 | | | | |
| | | | **Idotheidae** | Saduria sabini | (Kroeyer, 1849) | 24 | 33 | | 453 | 1 |
| | | | **Ilyarachnidae** | Ilyarachna hirticeps | G.O. Sars, 1870 | | 5 | | | |
| | | | | Ilyarachna sp. | | | 1 | | | |
| | **Pycnogonida** | Pantopoda | **Ammotheidae** | Ascorhynchus abyssi | G.O. Sars, 1877 | | | 1 | | |
| | | | **Callipallenidae** | Cordylochele malleolata | (G.O. Sars, 1879) | | 8 | | | |
| | | | | Pseudopallene circularis | (Goodsir, 1842) | | 22 | 20 | | |
| | | | | Pseudopallene sp. | | 5 | | | | |
| | | | | Pseudopallene spinipes | (Goodsir, 1842) | | 1 | 13 | | |
| | | | **Colossendeidae** | Colossendeis angusta | G.O. Sars, 1877 | | 20 | | | 3 |
| | | | | Colossendeis proboscidea | (Sabine, 1824) | | | | | 7 |
| | | | | Colossendeis sp. | | | 18 | | 712 | |
| | | | **Nymphonidae** | Boreonymphon robustum | (Bell, 1855) | 58 | 59 | | | |
| | | | | Nymphon elegans | | | | 1 | | |
| | | | | Nymphon hirtum | (Fabricius, 1780) | | 61 | | | |
| | | | | Nymphon leptocheles | G.O. Sars, 1888 | | | 3 | | |
| | | | | Nymphon longitarse | Kroeyer, 1845 | | 1 | 3 | | |
| | | | | Nymphon microrhynchum | | | | 1 | | |
| | | | | Nymphon sp. | | 231 | | | | 8 |
| | | | | Nymphon stroemi stroemi | Kroeyer, 1845 | 36 | | | | |
| | | | | Nymphonidae g. sp. | | | | | | 12 |
| | | | | Pycnogonida g. sp. | | | 137 | | 3466 | |
| **Mollusca** | **Bivalvia** | Cardiiformes | **Cardiidae** | Clinocardium ciliatum | (Fabricius, 1780) | 88 | 19 | 8 | 372 | 1 |
| | | | | Serripes groenlandicus | (Bruguiere, 1789) | | | | 1 | |
| | | | **Myidae** | Mya sp. | | | | | 14 | |
| | | | | Mya truncata | L., 1767 | | | | 1 | |
| | | | **Tellinidae** | Macoma calcarea | (Gmelin, 1791) | 1 | | | | |
| | | Cuspidariiformes | **Cuspidariidae** | Cuspidaria arctica | (M. Sars, 1859) | 1 | 3 | | 45 | |
| | | Luciniformes | **Astartidae** | Astarte borealis | Schumacher, 1817 | | | | 52 | |
| | | | | Astarte crenata | (Gray, 1842) | | 43 | 9 | 706 | 25 |
| | | | | Astarte sp. | | 41 | | | 1 | |
| | | | **Hiatellidae** | Hiatella arctica | (L., 1767) | 8 | 16 | 9 | 79 | |
| | | | | Hiatella sp. | | | | 1 | | |
| | | Mytiliformes | **Arcidae** | Bathyarca glacialis | (Gray, 1842) | 302 | 101 | 12 | 574 | 5 |
| | | | **Mytilidae** | Musculus discors | (L., 1767) | | 4 | | | |

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|---|---|---|---|---|---|---|---|---|---|
| | | | Mytilus edulis | L., 1758 | | | 7 | | |
| | Nuculiformes | **Nuculanidae** | Nuculana pernula | (Mueller, 1779) | | 1 | | | |
| | | **Nuculidae** | Leionucula tenuis | (Montagu, 1808) | 2 | | | | |
| | | **Yoldiidae** | Yoldia hyperborea | (Torell, 1859) | 5 | | 1 | 2 | |
| | | | Yoldiella lenticula | (Moeller, 1842) | | | | 1 | |
| | | | Yoldiella sp. | | | | | 22 | |
| | Pectiniformes | **Anomiidae** | Anomia squamula | (L., 1767) | 52 | | | | |
| | | **Limidae** | Limatula hyperborea | (Jensen, 1905) | | | | 120 | |
| | | **Pectinidae** | Chlamys islandica | (O.F. Mueller, 1776) | 21 | 27 | 17 | 193 | 5 |
| | | | Chlamys sulcata | (O.F. Mueller, 1776) | | 12 | | | 18 |
| | | | Pseudamussium septemradiatum | (Mueller, 1776) | 12 | | 1 | | |
| | | **Propeamussiidae** | Arctinula greenlandica | (Sowerby, 1842) | 2312 | 21 | 5 | 1013 | 1 |
| | | | Bivalvia g. sp. | | | 1 | | 4 | |
| **Cephalopoda** | Octopoda | **Bathypolypodinae** | Bathypolypus arcticus | (Prosch, 1849) | 2 | | | 8 | |
| | | | Benthoctopus sp. | | | | 1 | 10 | |
| | | | Octopoda g. sp. | | | 6 | | | |
| | Sepiida | **Sepiolidae** | Rossia palpebrosa | Owen, 1834 | 8 | 2 | | 14 | |
| | | | Rossia sp. | | | | | 1 | |
| | Teuthida | **Gonatidae** | Gonatus fabricii | (Lichtenstein, 1818) | 5 | 32 | 16 | 11 | |
| | | | Todarodes sagittatus | (de Lamarck, 1798) | | | 3 | | |
| | | | Todaropsis eblanae | (Ball, 1841) | | | 19 | | |
| | | | Cephalopoda g. sp. | | | | 2 | | |
| **Gastropoda** | Bucciniformes | **Beringiidae** | Beringius ossiani | (Friele, 1879) | | 2 | 1 | 2 | |
| | | **Buccinidae** | Buccinidae g. sp. | | | | | 2 | 2 |
| | | | Buccinum angulosum | Gray, 1839 | | | | 6 | |
| | | | Buccinum ciliatum ciliatum | (Fabricius, 1780) | 2 | | | 4 | |
| | | | Buccinum ciliatum sericatum | Hancock, 1846 | | | | 1 | |
| | | | Buccinum elatior | (Middendorff, 1849) | 9 | 8 | 2 | 38 | 4 |
| | | | Buccinum fragile | Verkruezen in G.O. Sars, 1878 | | 17 | 3 | 39 | |
| | | | Buccinum glaciale | L., 1761 | | | | 19 | |
| | | | Buccinum hydrophanum | Hancock, 1846 | 5 | 41 | | 97 | |
| | | | Buccinum maltzani | Pfeiffer, 1886 | | | | 2 | |
| | | | Buccinum micropoma | Jensen in Thorson, 1944 | | | | 2 | |
| | | | Buccinum nivale | Friele, 1882 | | 1 | | 3 | |
| | | | Buccinum sp. | | 10 | | | 2 | 3 |
| | | | Buccinum undatum | L., 1758 | | | | 2 | |
| | | | Colus altus | (S. Wood, 1848) | | | | 5 | |
| | | | Colus holboelli | (Moeller,1842) | | 2 | | 5 | |
| | | | Colus islandicus | (Mohr, 1786) | | 12 | 1 | 5 | 3 |
| | | | Colus kroyeri | (Moeller,1842) | | 1 | 1 | | |
| | | | Colus pubescens | (Verrill, 1882) | 4 | 14 | 1 | | |
| | | | Colus sabini | (Gray, 1824) | 82 | 11 | 1 | 303 | 1 |
| | | | Colus sp. | | 8 | 1 | | 11 | |
| | | | Colus turgidulus | (Jeffreys, 1877) | | 15 | 1 | 40 | |

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| | | | | Eggs Buccinidae g. sp. | | | | | 23 | |
| | | | | Mohnia mohni | (Friele, 1877) | | 3 | | | |
| | | | | Neptunea communis | (Middendorff, 1901) | | | | 5 | |
| | | | | Neptunea denselirata | Brogger, 1901 | 3 | 1 | | 4 | |
| | | | | Neptunea despecta | (L., 1758) | | | | 1 | 1 |
| | | | | Neptunea sp. | | | | | | 2 |
| | | | | Turrisipho lachesis | (Moerch, 1869) | 4 | 7 | | 47 | |
| | | | | Turrisipho voeringi | Bouchet et Waren, 1985 | | 2 | | 1 | |
| | | | | Volutopsis norvegicus | (Gmelin, 1790) | 3 | 1 | | 4 | 1 |
| | | | **Muricidae** | Boreotrophon truncatus | (Stroem, 1767) | | | | 4 | |
| | | Cephalaspidea | **Philinidae** | Philine finmarchica | G.O. Sars, 1878 | | 112 | | 166 | |
| | | | | Philinidae g. sp. | | 25 | 11 | 17 | | |
| | | | **Scaphandridae** | Scaphander punctostriatus | (Mighels & Adams, 1842) | | 3 | 1 | 1 | 49 |
| | | | | Scaphander sp. | | | | | | 2 |
| | | Cerithiiformes | **Naticidae** | Bulbus smithi | Brown, 1839 | | 1 | | | |
| | | | | Cryptonatica affinis | (Gmelin, 1791) | 14 | 7 | 5 | 31 | 1 |
| | | | | Eggs Naticidae g. sp. | | | | | 1 | |
| | | | | Lunatia pallida | (Broderip & Sowerby, 1829) | | 3 | | 16 | |
| | | | **Velutinidae** | Limneria undata | (Brown, 1838) | 3 | | | 4 | 1 |
| | | | | Onchidiopsis glacialis | (M. Sars, 1851) | | 1 | 3 | 5 | |
| | | | | Onchidiopsis sp. | | | 1 | | | |
| | | Epitoniiformes | **Epitoniidae** | Boreoscala groenlandica | (Moeller, 1842) | | 1 | | | 1 |
| | | Nudibranchia | **Dendronotidae** | Dendronotus frondosus | (Ascanius, 1774) | | | | 1 | |
| | | | | Dendronotus robustus | Verrill, 1870 | | | | 4 | |
| | | | | Dendronotus sp. | | | | | 1 | |
| | | | | Nudibranchia g. sp. | | 7 | 1 | 1 | 26 | 4 |
| | | Patelliformes | **Lepetidae** | Lepeta coeca | (O.F. Mueller, 1776) | 1 | | | | |
| | | | **Tecturidae** | Capulacmaea radiata | (M. Sars, 1851) | | 1 | | 2 | |
| | | Pneumodermatiformes | **Clionidae** | Clione limacina | (Phipps, 1774) | | 15 | 2 | | |
| | | Trochiformes | **Trochidae** | Margarites costalis | (Gould, 1841) | | 3 | 1 | 84 | |
| | | | | Margarites groenlandicus groenlandicus | (Gmelin, 1790) | 3 | 4 | 1 | 8 | |
| | | | | Margarites groenlandicus umbilicalis | (Broderip & Sowerby, 1829) | | | | 3 | |
| | | | | Margarites sp. | | | | | 5 | |
| | | | | Eggs Gastropoda g. sp. | | 3 | | | | |
| | | | | Gastropoda g. sp. | | | | | 6 | 3 |
| **Echinodermata** | **Asteroidea** | Forcipulatidae | **Asteriidae** | Asterias rubens | L., 1758 | | 2 | 3 | 17 | 1 |
| | | | | Icasterias panopla | (Stuxberg, 1879) | 73 | 51 | 5 | 334 | 14 |
| | | | | Leptasterias muelleri | (M. Sars, 1846) | | 2 | | 1 | |
| | | | | Leptasterias sp. | | | | | 316 | 1 |
| | | | | Urasterias linckii | (Mueller & Troschel, 1842) | 121 | 67 | 5 | 239 | 1 |
| | | Notomyotida | **Benthopectinidae** | Pontaster tenuispinus | (Dueben & Koren, 1846) | 304 | 395 | 1 | 3250 | 17 |
| | | Paxillosida | **Astropectinida** | Bathybiaster vexillifer | (W. Thomson, 1873) | | 1 | | 18 | |

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| | | **e** | | | | | | | |
| | | | Leptychaster arcticus | (M. Sars, 1851) | | 4 | | | |
| | | **Ctenodiscidae** | Ctenodiscus crispatus | (Retzius, 1805) | 2875 | 3151 | 83 | 6284 | 513 |
| | Spinulosida | **Echinasteridae** | Henricia sp. | | 17 | 39 | 4 | 646 | 49 |
| | Valvatida | **Goniasteridae** | Ceramaster granularis granularis | (Retzius, 1783) | | 13 | | | |
| | | | Hippasteria phrygiana phrygiana | (Parelius, 1768) | 4 | 1 | | | 8 |
| | | | Pseudarchaster parelii | (Dueben & Koren, 1846) | 2 | | | | |
| | | **Poraniidae** | Poraniomorpha bidens | Mortensen, 1932 | | | 1 | | |
| | | | Poraniomorpha hispida | (Sars, 1872) | 1 | 2 | | | |
| | | | Poraniomorpha tumida | (Stuxberg, 1878) | 2 | 10 | | 99 | |
| | | | Tylaster willei | | | | | 1 | |
| | Velatida | **Korethrasteridae** | Korethraster hispidus | W. Thomson, 1873 | | 2 | | | |
| | | **Pterasteridae** | Hymenaster pellucidus | W. Thomson, 1873 | 2 | 14 | | 69 | |
| | | | Pteraster militaris | (O.F. Mueller, 1776) | 17 | 8 | 1 | 303 | 1 |
| | | | Pteraster obscurus | (Perrier, 1891) | | 2 | 1 | 40 | |
| | | | Pteraster pulvillus | M. Sars, 1861 | 4 | 15 | 5 | 8 | |
| | | **Solasteridae** | Crossaster papposus | (L., 1768) | 13 | 14 | 6 | 1129 | 1 |
| | | | Lophaster furcifer | (Dueben & Koren, 1846) | 11 | 4 | 2 | 165 | |
| | | | Solaster endeca | (L., 1771) | 4 | | 6 | | |
| | | | Solaster glacialis | (Danielssen & Koren, 1881) | | | | 2 | |
| | | | Solaster sp. | | | | | 49 | |
| | | | Solaster syrtensis | Verrill, 1894 | 3 | 3 | 1 | | |
| **Crinoidea** | Comatulida | **Antedonidae** | Heliometra glacialis | (Owen, 1833) | 136 | 244 | 26 | 5984 | |
| **Echinoidea** | Echinoida | **Strongylocentrotidae** | Strongylocentrotus droebachiensis | O.F. Mueller, 1776 | | 31 | 1 | 62 | |
| | | | Strongylocentrotus pallidus | (G.O. Sars, 1871) | 635 | 200 | 306 | 14595 | 1 |
| | | | Strongylocentrotus sp. | | 1 | | | | |
| | Pourtalesioida | **Pourtalesiidae** | Pourtalesia jeffreysi | Thomson, 1872 | | | | 2 | |
| | Spatangoida | **Spatangidae** | Brisaster fragilis | (Dueben & Koren, 1846) | 16 | 4 | | | 1 |
| **Holothuroidea** | Apodida | **Myriotrochidae** | Myriotrochus rinkii | Steenstrup, 1851 | 14 | 45 | | 1706 | |
| | Aspidochirotida | **Stichopodidae** | Stichopus tremulus | (Gunnerus, 1767) | 3 | 15 | | | |
| | Dendrochirotida | **Cucumariidae** | Cucumaria frondosa | (Gunnerus, 1867) | | | 330 | 287 | 1 |
| | | | Pentamera calcigera | (Stimpson, 1851) | | | | 1 | |
| | | **Phyllophoridae** | Thyonidium sp. | | | | | 16 | |
| | | **Psolidae** | Psolus phantapus | Strussenfelt, 1765 | 4 | | | 112 | |
| | Molpadiida | **Molpadiidae** | Molpadia arctica | von Marenzeller, 1878 | | 36 | 3 | 85 | |
| | | | Molpadia borealis | (M. Sars, 1859) | 150 | 33 | 1 | 245 | 20 |
| | | | Holothuroidea g. sp. | | | | | | 6 |
| **Ophiuroidea** | Euryalida | **Gorgonocephalidae** | Gorgonocephalus arcticus | (Leach, 1819) | 114 | 71 | 44 | 800 | |
| | | | Gorgonocephalus eucnemis | (Mueller & Troschel, | 41 | 30 | 23 | 743 | 4 |

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|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1842) | | | | | |
| | | | | Gorgonocephalus lamarcki | (Mueller & Troschel, 1842) | | 1 | 6 | | |
| | | | | Gorgonocephalus sp. | | 4 | | | 3 | |
| | | Ophiurida | **Amphiuridae** | Amphiura sundevalli | (Mueller & Troschel, 1842) | | | 1 | | |
| | | | **Ophiacanthidae** | Ophiacantha bidentata | (Retzius, 1805) | 734 | 2113 | 24 | 46181 | 39 |
| | | | **Ophiactidae** | Ophiopholis aculeata | (L., 1767) | 131 | 308 | 32 | 7153 | 13 |
| | | | **Ophiomyxidae** | Ophioscolex glacialis | Mueller & Troschel, 1842 | 33 | 216 | 1 | 5056 | |
| | | | **Ophiuridae** | Ophiocten sericeum | (Forbes, 1852) | 5 | 77 | 9 | 6689 | |
| | | | | Ophiopleura borealis | Danielssen & Koren, 1877 | 3 | 307 | 2 | 16261 | |
| | | | | Ophiura robusta | (Ayers, 1851) | | | 4 | | |
| | | | | Ophiura sarsi | Luetken, 1855 | 275 | 71 | 20 | 1008 | 54 |
| | | | | Ophiuridae g. sp. | | | | | 5 | |
| | | | | Stegophiura nodosa | (Luetken, 1854) | | | | 2 | |
| **Bryozoa** | **Gymnolaemata** | Cheilostomida | **Bicellariidae** | Dendrobeania fruticosa | Packard, 1863 | 1 | | | | |
| | | | | Dendrobeania sp. | | | 3 | 5 | | |
| | | | **Celleporidae** | Cellepora sp. | | 4 | 12 | 3 | 9 | |
| | | | **Flustridae** | Flustra sp. | | | 55 | 28 | 1 | |
| | | | **Membraniporidae** | Electra pilosa | (L., 1768) | | | 1 | | |
| | | | **Myriaporidae** | Leieschara sp. | | | 7 | 5 | | |
| | | | | Myriapora coarctata | (M. Sars, 1863) | 1 | | | | |
| | | | | Myriapora sp. | | | | 2 | | |
| | | | **Reteporidae** | Retepora beaniana | King, 1846 | | 11 | | | |
| | | | | Retepora sp. | | 1 | | | | |
| | | | | Sertella septentrionalis | Jullen, 1933 | 5 | | 3 | | 1 |
| | | | **Schizoporellidae** | Myriozoella sp. | | | 1 | | | |
| | | | **Scrupariidae** | Eucratea loricata | (L., 1758) | | 14 | 3 | | |
| | | | **Scrupocellariidae** | Scrupocellaria scabra | (Van Beneden, 1848) | | | 5 | | |
| | | | **Smittinidae** | Parasmittina jeffreysii | (Norman, 1903) | 1 | | | | 1 |
| | | | | Porella sp. | | 2 | | 1 | | |
| | | Ctenostomata | **Alcyonidiidae** | Alcyonidium disciforme | (Smitt, 1878) | 1 | | | 1 | |
| | | | | Alcyonidium gelatinosum | (L., 1767) | | 745 | 232 | 549 | |
| | | | | Alcyonidium sp. | | | | | 1 | |
| | | Cyclostomata | **Crisiidae** | Crisia eburnea | (L., 1758) | | 3 | | | |
| | | | **Diastoporidae** | Diplosolen intricarius | (Smitt, 1872) | 6 | 2 | | | |
| | | | **Horneridae** | Hornera sp. | | | | | 51 | 1 |
| | | | | Stegohornera lichenoides | (L., 1758) | 6 | 19 | | | 2 |
| | | | **Lichenoporidae** | Lichenopora hispida | (Fleming, 1828) | 3 | | | | |
| | | | | Bryozoa g. sp. | | | 9 | 6 | 37 | |
| **Brachiopoda** | **Rhynchonellata** | Rhynchonellida | **Hemithyrididae** | Hemithyris psittacea | (Gmelin, 1790) | 4 | 3 | 11 | 136 | 1 |
| | | Terebratulida | **Cancellothyrididae** | Terebratulina retusa | (L., 1758) | 19 | 8 | 2 | | |
| | | | **Macandreviidae** | Macandrevia cranium | (Mueller, 1776) | 6 | 1503 | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| **Chaetognatha** | **Sagittoidea** | Ctenodontina | **Sagittidae** | Parasagitta elegans | (Verrill, 1873) | | 5 | 1 | | |
| **Chordata** | **Ascidiacea** | Aplousobranchia | **Polyclinidae** | Synoicum tirgens | Phipps, 1774 | | 75 | 19 | | |
| | | Phlebobranchia | **Ascidiidae** | Ascidia prunum | (Mueller, 1776) | 27 | 10 | | | |
| | | | **Cionidae** | Ciona intestinalis | (L., 1767) | 12 | | | 1044 | |
| | | Stolidobranchia | **Pyuridae** | Boltenia echinata | (L., 1767) | | | | 44 | |
| | | | | Microcosmus glacialis | (M. Sars, 1859) | | | 2 | | |
| | | | **Styelidae** | Styela rustica | (L., 1767) | | | 5 | 2 | |
| | | | | Ascidiacea g. sp. | | 491 | 35 | 537 | 194 | 7 |
| | | | | Udonella murmanica | | | | 1 | | |

JOINT REPORT

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