

NATIONAL REPORT NORWAY

Executive Summary

This report gives the summary of the activities that has taken place within the Norwegian Hydrographic Service since the last report given at the NHC/53 meeting in Helsinki, May 2009.

1. Hydrographic Office

The director gave notice late 2009 and he left his position in February 2010. The IHO Yearbook will be updated as soon as a new Director is appointed.

Administrative information:

Some changes to the organisational structure were made in 2009 as result of an Organisation Development (OD) process. The new structure is shown in figure 1 below.

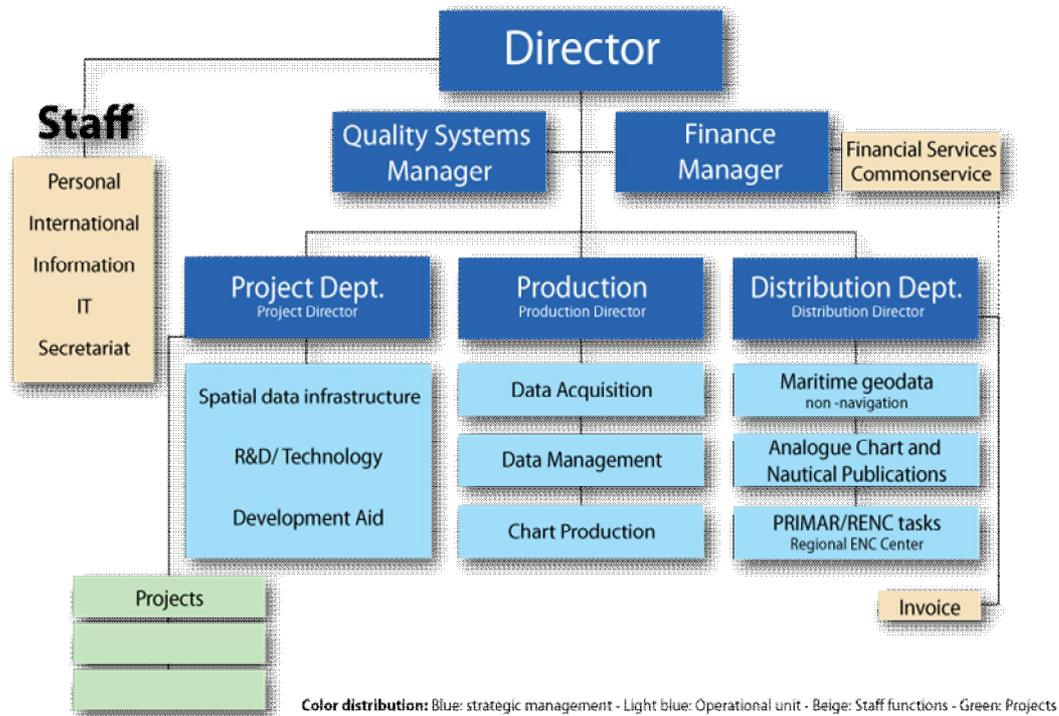


Figure 1. The organisational structure of the Norwegian Hydrographic Service as implemented in 2009.

The main change is the establishment of the Project Department. This department will have the responsibility for all major development projects, but work in close cooperation with the other departments. The Distribution Department is organised with the purpose of making a clear distinction between the PRIMAR tasks and the national responsibilities related to making other products available. A solution to outsource the management of crew and technical operation of our survey vessel to the Institute of Marine Research is pending.

Total budget for 2010 is NOK 199.6 mill., included expected annual sales revenue of NOK 54 mill.

2. Hydrographic Surveys

2.1. Internal conducted surveying 2009

R/V Hydrograf had its EM710 installation modified in the spring of 2009, and the echo sounder is now mounted in an elevator mechanism.

Svalbard

Two survey launches equipped with EM 3002D have been operating on a 12-hour daily operation for 12 weeks in Svalbard. R/V Hydrograf, with an EM 710, has also been used in the deeper parts. The efficiency has been very good and a total of 1600 km² has been surveyed along the Svalbard coast, shown in red in the map below (figure 2). The green areas signify earlier multibeam surveys.

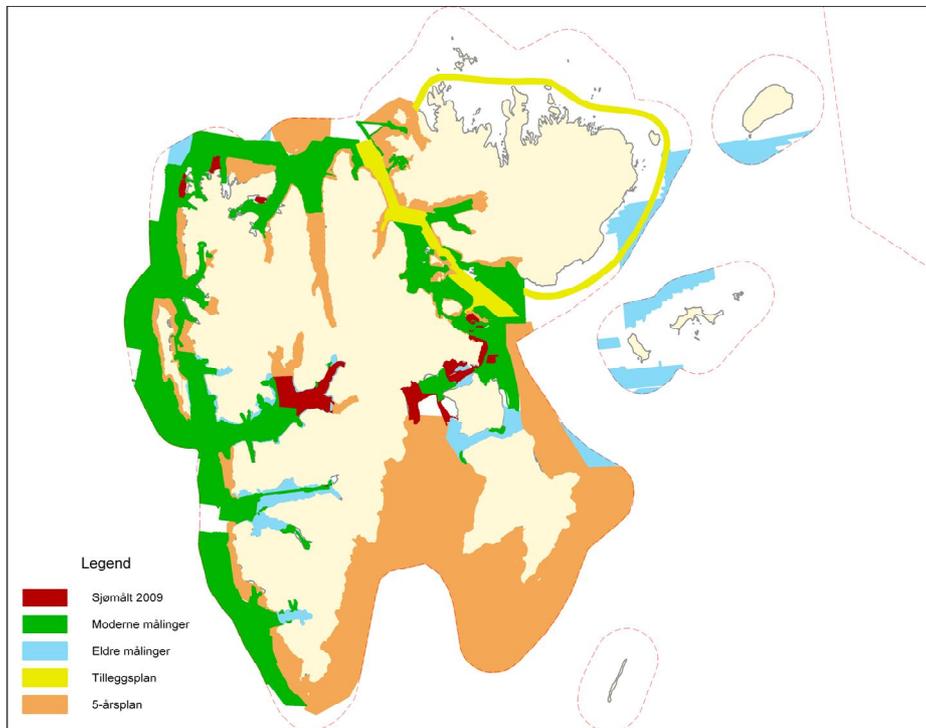


Figure 2. Actual and planned surveying of coastal waters, Svalbard

MAREANO

R/V Hydrograf has been engaged in a 4 weeks long surveying campaign for the MAREANO-project, using EM710 multibeam echo sounders. R/V Hydrograf collected a total of 1858 km².

Norwegian coast

Two survey launches, equipped with EM 3002D, have been operating on a 12-hour daily operation in 9.5 months in 2009 (before and after Svalbard survey campaign). R/V Hydrograf has contributed with the EM710. The efficiency has been reasonable good and a total of 524 km² has been surveyed along the Norwegian coast.

Plans 2010

In the period June-September the survey vessels will be used in coastal area along Svalbard. Expected area to be covered is 850 km².

Surveying of coastal area along the mainland of Norway is planned for January to mid April, and after Svalbard expedition for the rest of the year. Expected area to be covered is 500 km².

There will be an autonomous survey campaign along the Norwegian coast with our newest surveying launch while R/V Hydrograf is surveying deep water for the Mareano project.

2.2. External conducted sea surveying 2009

External partners MMT, F-OSAE and FFI have surveyed a total of 6741 km² related to the Mareano project in 2009. There will be a survey campaign for the project in 2010, but the extent and partner are not known at the moment.

3. Nautical Charts

3.1. Maritime Primary Database

The Maritime Primary Database consists of selected bathymetry, coastline, shoreline constructions, pontoons, lights and nav aids, submarine cables and pipelines, overheads cables, anchor berthing, marine farms, wrecks and obstructions, restrictions, precautionary area, traffic separation zones etc. A main goal was achieved in April 2008 with the full coverage of digital data for the Norwegian coast and western parts of Svalbard. Some areas are still based on rather old and insufficient survey information. In 2009 the production was aimed on replacing areas with older survey data with new survey data.

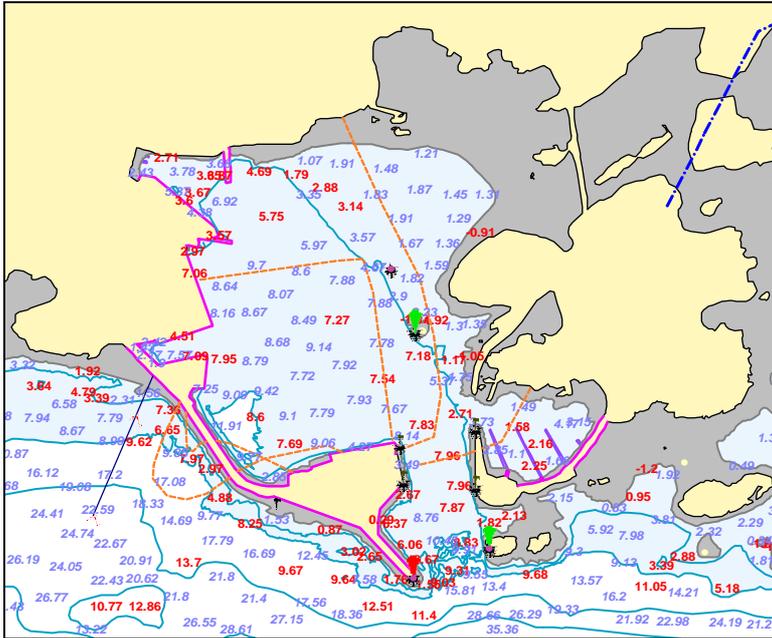


Figure 3. Example of information extracted from the Maritime Primary Database (From Chart 76: Melbu harbour) Scale M1:5000

The information is organized in an Oracle database and formatted according to S57. The topology is also established according to the S57-format. The data is continuously updated with information from internal and external sources. The production of Notices to Mariners (Etterretninger for sjøfarende) and chart production are based on the information from the Maritime Primary Database. A tracing service was successfully developed in 2009 and implemented in January 2010.

The bathymetry, the coastline and shoreline constructions are also available for downloading from the national geospatial infrastructure *Norge Digital*.

www.geonorge.no

3.2. Chart production

Since autumn 2008, when the NHS completed the major task of covering the Norwegian coast with ENC's and modernised paper charts, the production is currently concentrating on replacing areas with old survey data (approx 11000 km²) with new data. The NHS also has the objective to convert the remaining analogue charts (approx 70) of the paper chart portfolio to digital charts. The NHS will outsource some of the production tasks.

A chart plan comprising both surveying and ENC/chart production for the Norwegian coast and the Svalbard area for the period 2010 – 2014 has been prepared and sent to a number of users for their feedback. The input from the users will be of great importance in the yearly review of the chart plan which is due to take place during spring 2010.

3.3. ENC production

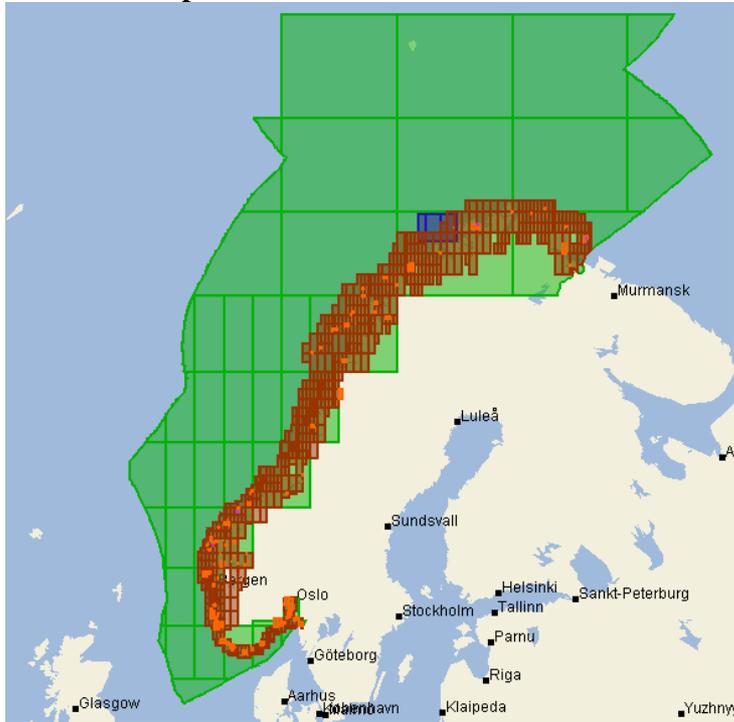


Figure 4

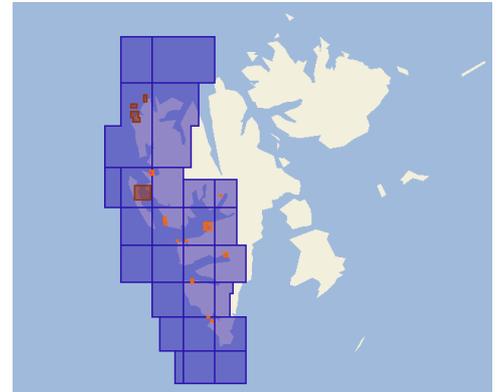


Figure 5

Figure 4: ENC coverage for the Norwegian coastal waters (ENCs in User Band 2-6).

Figure 5: ENC coverage in the Svalbard area.

In 2009 ENCs equal to 6 D-cells (30' x 30') in the Approach and Harbour User Band were produced. In addition 8 ENCs covering the west coast of Svalbard were published. The total number of ENCs is currently 983. One overview ENC covering the Norwegian Sea (INT 10, INT 100, INT 101, INT 113 and INT 140) was completed and published in January 2010, see Figure 6. The coverage of this ENC is planned to be extended to Svalbard in 2010.

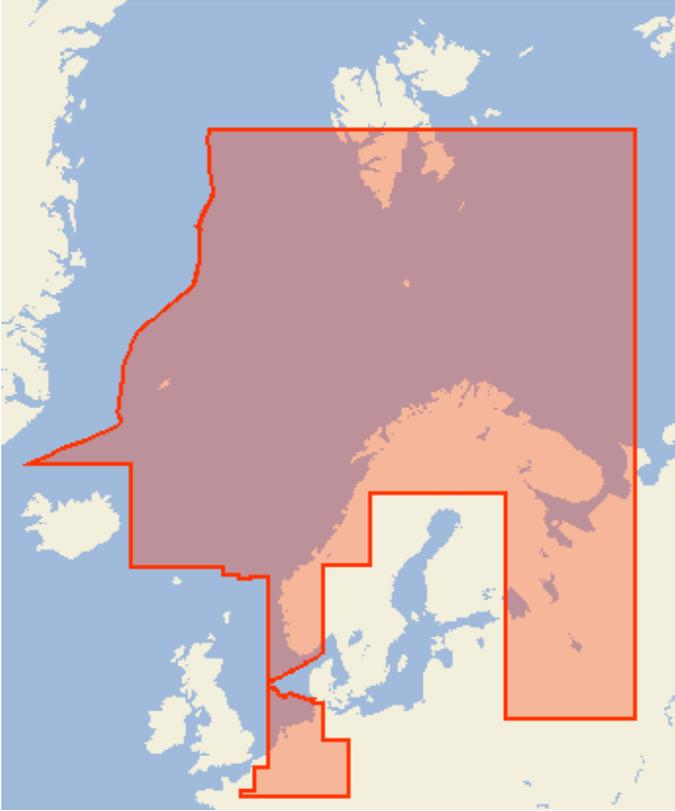


Figure 6. NO1A3000 Norskehavet

	Usage Band	Compilation scale	No of ENC's
1	Overview	<1:1 499 999	2
2	General	1:350 000 – 1:1 499 999	50
3	Coastal	1:90 000 – 1:349 999	30
4	Approach	1:22 000 – 1:89 999	731
5	Harbour	1:4 000 – 1:21 999	161
6	Berthing	>1: 4 000	3

Table above: Number of ENC's in each usage band

Updating via ER profiles were issued in accordance with the Notices to Mariners and distributed through PRIMAR. A total of 1039 ER files and 71 NE were issued as part of the continuous maintenance of the ENC's.

In connection with the transfer of ENC's to the new chart production system, a review of all ENC's are currently being undertaken in order to improve the quality of the data. New Editions of 231 ENC's were published in 2009 as a result of this task.

Planned activities in 2010:

In 2010 the NHS will continue the production of new harbour ENC's and new editions of existing harbour and approach ENC's where areas with older survey data will be replaced with new survey data. In addition coastal ENC's covering the Norwegian chart 306 are planned. These ENC's will be compiled from the Approach ENC's in order to ensure consistency between usage bands. This task is part of a harmonisation of the coastal chart series

3.4. Paper chart production

In 2009 a total number of 3 harbour charts and 2 main charts were published as new chart or new editions with areas with new survey data. One of the harbour charts, Grimstad, was published for the very first time and the response from the users has been very positive!

New charts/ new editions with new survey data published 2009:

Chart No.	Title	Scale
451	Grimstad	1: 20 000
457	Mandal	1: 10 000
513	Svalbard havner (4 harbour charts)	
	Sveagruva	1:15000
	Forlandsrevet	1: 50 000
	Adventsfjorden	1:25000
	Ny Ålesund	1:25000
5	Svenner – Porsgrunn - Jomfruland	1:50 000
69	Tranøy Raftsundet	1:50 000

Reconstructions¹ (published as New Editions) 2009:

Chart No.	Title	Scale
25	Sognesjøen - Stavenes	1:50 000
26	Håsteinen - Batalden	1: 50 000
27	Sunnfjord	1: 50 000
28	Bremanger	1: 50 000
29	Stad	1: 50 000
121	Ytre Sognefjorden	1: 75 000
122	Indre Sognefjorden	1: 75 000
123	Nordfjorden	1: 80 000
124	Sognefjorden. Fra Fresvik til Gudvangen og Flåm	1: 50 000
523	Isfjorden	1:100 000
300 (INT 10)	Norskehavet	1:10 000 000
301 (INT 140)	Nordsjøen	1:1 500 000

1. Reconstruction: Reconstruct a chart from Primary Data Base

Remarks:

- All charts are referred to WGS 84
- The charts are printed in 4 colours (CMYK)

Revised Reprints published in 2009:

68 charts were revised and reprinted (out of these 55 were updated through our Digital Production Line based on changes in the Primary Database).

Reconstruction of charts:

10 main charts and 2 small scale charts were taken into the digital production line, reconstructed, transformed to WGS 84 datum and published as New Editions.

Planned activities in 2010

The chart production for 2010 will be focused on production of 7 harbour charts, one large inset, 2 main charts and one coastal chart. We also plan to reconstruct 6 General charts on Svalbard.

3.5. Technology

Print On Demand (POD)

The NHS initiated in 2007 a project with the objective of establishing a Print on Demand service, with technical solution based on the dKart Office technology. Jeppesen has produced a product generator for POD files, to be finally delivered early 2010. After final testing, the intention is to establish the POD service in 2010.

Tracings

In 2009 Norconsult was contracted to develop tools for tracings production. The solution is based on Intergraph GeoMedia tools. The flowline was tested and accepted by the NHS late 2009, with the intention to offer a tracings service from the start of 2010.

The NMDB Project (Norwegian Bathymetric Database)

The Norwegian Hydrographic Service has contracted the Dutch company Atlis B.V to provide a new management and distribution system for high resolution depth data, called the Norwegian Bathymetric Database. The development has taken more time than anticipated, and the plan is now to implement NMDB in 2010.

For details related to the functionality etc of the NMDB please refer to the National report for 2008.

4. Nautical Publications

No new editions of the “Norwegian Pilot”, has been published in 2009, but volume 1, general information and volume 7, Svalbard, are planned in 2010.

Notices to Mariners (Etterretning for sjøfarende)

Totally 24 editions were published in 2009. The publication is available both as printed version and in PDF-format for distribution by e-mail. Notice to Mariners is also published on <http://www.statkart.no/efs/>.

5. MSI

The Norwegian Maritime Directorate is the responsible body for MSI in Norway.

6. C-55

Updates of C-55 was sent to IHB in October 2009.

7. Capacity building

We have participated in the annual meeting in the IHO Capacity Building Sub-Committee.

The Norwegian Agency for Development Cooperation (Norad) has launched a programme called *Oil for development*. NHS is represented in the programme, as subordinate of the Ministry of Environment. In December 2009 we participated in a Need Assessment Workshop in Ghana. No conclusion is yet available related to assistance within hydrography.

8. Oceanographic activities

One oceanographer at NHS is taking a PhD in numerical tidal/tidal current models. Norway has a lot of narrow straights with strong tidal currents, and we have the intention to be involved in modeling these areas.

The Norwegian Meteorological Institute is working on a tidal model for the North Sea, the Norwegian Sea and the Barents Sea. We will use the results to calculate harmonic tidal constants in a 4 km grid and find the LAT surface relative to the MSL surface (from the Danish National Space Center).

We have started a project to establish a model of the MSL for coastal/inshore waters. For this purpose we bought 20 pressure gauges and plan to collect one-month observation series at a lot of closely spaced locations. With the help of GPS measurements at each site we aim at finding the difference between the MSL and ellipsoid. In addition we utilize the information from the permanent gauges.

Data from our 23 tide gauges are transferred to the office once an hour. We collect one-minute data, and after an automatic quality control we publish ten-minute values on the Internet. The GPRS system is used for the data transfer from the different locations. For 2009 we obtained a data acquisition rate of approximately 99%.

9. Other activities

9.1. The BLAST project

Bringing Land and Sea Together (BLAST) is the title of a new transnational partnership between 16 organisations from six countries in the North Sea region. The Norwegian Hydrographic Service is Lead Partner. The overall aim of the project is to improve maritime safety and coastal zone planning and management – all in the context of climate change. It sets out to harmonise and integrate terrestrial and marine geographical datasets to create a consistent database, and develop planning and visualising tools for the new generation of marine information systems. The project was started in October 2009.

BLAST is funded by the European Union as part of the Interreg IVB North Sea Region Programme, which aims to help organizations to co-ordinate regional projects. The three-year project will be completed in 2012. The project's homepage is <http://www.blast-project.eu/>

9.2. The MAREANO Programme

Background: Mareano is a multidisciplinary marine mapping and documentation programme aiming at providing the foundation for ecosystem based sustainable management of the Norwegian coastal and sea areas. The primary focus is The Management plan for the Barents Sea (see figure 7 below). The aim is to bridge the knowledge gap in poorly mapped but very sensitive areas. High quality multibeam bathymetry is regarded as a premise for further geological and biological investigations. The Norwegian Mapping Authority Hydrographic Service (NHS) is responsible for bathymetry data acquisition, and effective data management and distribution of survey data, derived products and services. An important facet of the programme is the web-based geodata distribution, and distributed data management as part of a National Spatial Geodata Infrastructure (NSDI)

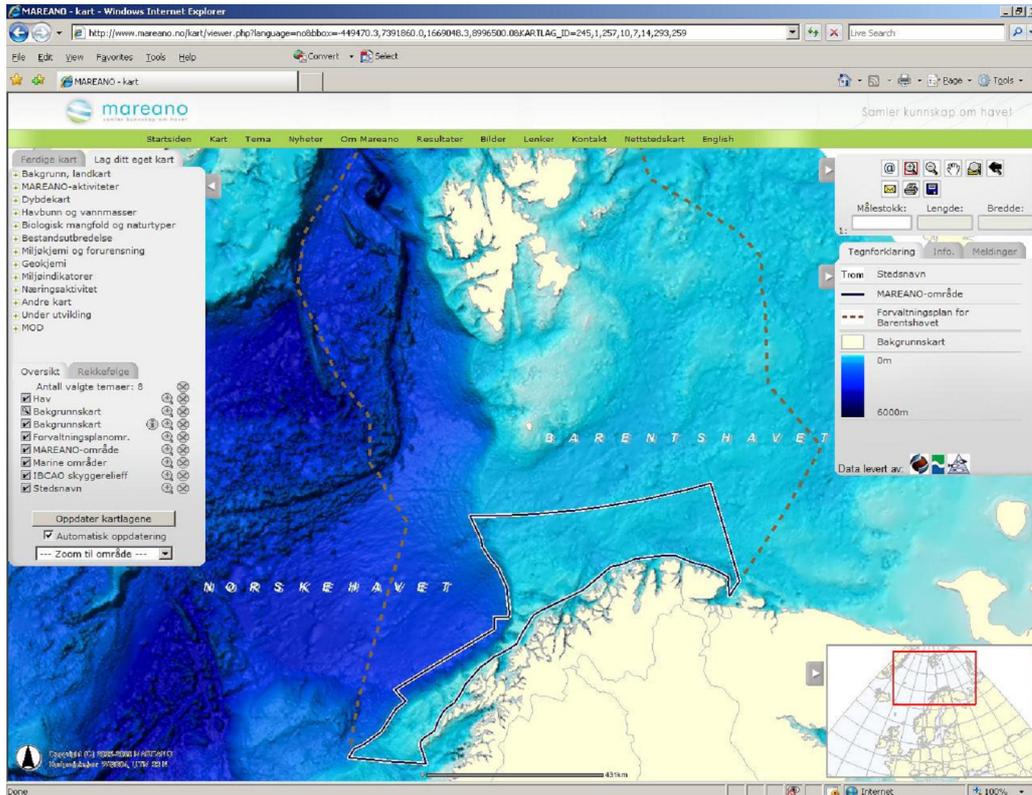


Figure 7. The solid lines indicate the *Mareano* project area. The stippled lines encircle the area for *The Management plan for the Barents Sea*

Organization: The NHS is a programme partner with the Institute of Marine Research (IMR, programme management) and the Geological Survey of Norway (NGU).

Results 2009: In 2009 the Mareano programme received NOK 51.5 mill in total through earmarked funding to Mareano through the National budget with a focus in the southern Barents Sea. NHS received NOK 20.6 mill and 13737 km² was surveyed in 2009 (see figure 8 below).

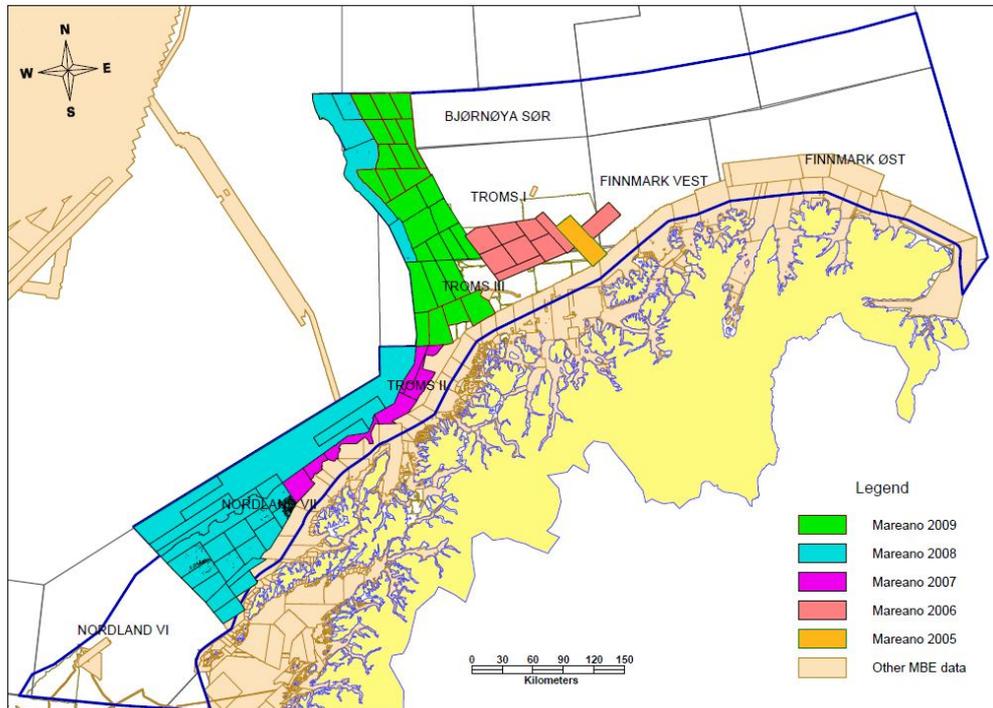


Figure 8. Overview of the surveyed area each year for the period 2005 - 2009

Data distribution: All the multibeam data in the NHS north of Lofoten has been modelled in grids of various resolutions, and visualized through shaded relief maps as a Web Map Service included in the map services on the Mareano webpage. Further overview bathymetry map services have been produced, also showing the coverage of all surveys in the NHS' data management system. Further information and results will be available on www.mareno.no. This website will be a portal for knowledge dissemination mainly through effective map services and documentation aimed at both government decision-makers and the general public. This will be a joint effort among the programme partners, but the project management is led by the Institute of Marine Research.

NSDI: According to the Mareano data policy all geodata from the Mareano programme will be published in the Norwegian spatial data infrastructure; *Norge Digitalt*.

Mareano will be a major undertaking for the NHS in the years to come, and is mainly aimed at non-navigational purposes, and it is planned to use the the Mareano concept also for the Management Plan for the Norwegian Sea.

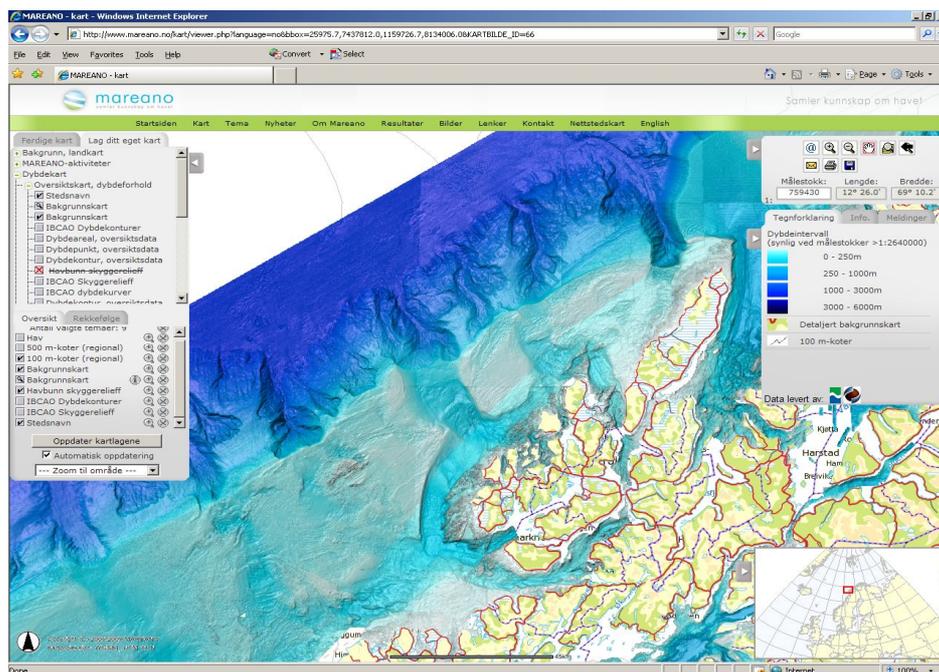


Figure 9. An example from the WMS shadow relief map service showing spectacular submarine canyons and slide scars on the edge of the most narrow part of the Norwegian shelf north of Lofoten and west of Andøya (screendump from map service on www.Mareano.no)

9.3. Integrated Maritime Services

The NHS and the Norwegian Coastal Administration have for some years been preparing a new production line for exchanging geospatial information between the two organisations. The two institutions were not able to finish the common tasks in the project in 2009 as planned, due to challenges within prioritizing and resource allocation.

9.4. Norway digital

Norway digital (www.norgedigitalt.no) is a nation-wide program for co-operation on establishment, maintenance and distribution of digital geospatial data. The aim is to enhance the availability and use of quality geographic information among a broad range of users, primarily in the public sector. After 5 years in operation, the co-operation counts over 600 collaborating partners, representing Norwegian public sector at national, regional and local level. Norway digital has developed a national geospatial infrastructure that offers more than 150 operational web map services, covering basic reference data and thematic data. Metadata is available together with the geospatial datasets. A national portal (www.geonorge.no) is giving information about the present status of the available data and web map services. Downloadable data are available on standard formats. The technologies used are based on international standards (ISO¹ and OGC²). Norway digital will further develop according to the INSPIRE³ development. Maritime geographic

¹ International Organization for Standardization. Ref. ISO/TC 211 Geographic information / Geomatics

² Open Geospatial Consortium

³ Infrastructure for Spatial Information in the European Community

information is an integrated part of the content that is being offered through Norway digital.

9.5. Arctic Regional Hydrographic Commission (ARHC)

During the EIHC in June Canada invited the 5 countries surrounding the Arctic Ocean to an informal meeting for discussing establishment of ARHC. The Arctic Ocean is the only region not covered by a HC. During the autumn 2009 Canada circulated Draft statues to the relevant countries and IHB. It is expected that an inaugural meeting will take place during 2010.