

 <b>Kartverket</b>	<b>NHC 57<sup>th</sup> Meeting</b> <b>Arkö 15-17 April 2013</b>	<b>NHC</b> <b>National Report</b> <b>NORWAY</b>
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## ***NATIONAL REPORT NORWAY***

### **Executive Summery**

This report gives the summary of the activities and events that has taken place within the Norwegian Hydrographic Service (NHS) since the last report given at the NHC55 Conference in Stavanger, April 2011. Some main issues are:

- *Several new recruitments in the top management team*
- *3 new survey launches ordered*
- *A multiyear contract with the Coastal Administration*
- *Continued high activity in the Mareano project*
- *Delivery of a new multibeam data processing software has started*
- *A revised project for a bathymetric database is launched*

### **1. Hydrographic Office**

As an outcome of an organizational development process the IT resources within the Mapping Authority is centralized, implying that our IT department is no longer a formal part of NHS. Several new persons in the top management are recruited as a consequence of retirements (Production manager, Quality manager, Director Primar and distribution).

The continuous improvement efforts related to the LEAN process still had momentum during the last year.

The yearly audit related to the ISO certification has been accomplished with only a few minor deviations identified.

NHS has entered into a long term contract with the Norwegian Coastal Administration to assist in detailed surveying in connection with constructions and renovations of harbours and fairways.

In 2011 we experienced a considerable reduction in sales of paper chart. The trend with reduced sales continued in 2012.

Total budget for 2013 is NOK 254 mill., included expected annual gross revenues of NOK 60 mill for the Distribution Department. A considerable part of budget (NOK 33 mill.) is related to additional grant for the MAREANO project.

## 2. Hydrographic Surveys

### Internal conducted surveying 2012

During 2012 R/V Hydrograf and its two survey launches have been working in the coastal waters of Norway. In addition R/V Hydrograf also surveyed at open sea for the MAREANO project. NHS has not been surveying at Svalbard in 2012.

### The MAREANO project *(see also item 9.2)*

R/V Hydrograf worked about 7 months for the MAREANO project and a total of 4040 km<sup>2</sup> was surveyed. These areas are along the continental margin in the area between Ålesund and Rørvik..

### Norwegian coast

The surveying along the coast has been done with two survey launches equipped with EM3002D. In addition R/V Hydrograf has surveyed some deeper areas with its EM710. The surveying have been organised as 7/12 operations.

The primary survey area has been within Chart 29 (Statt), but the deeper parts of many fjords between Nordfjord and Rørvik has been surveyed as retreat areas for the Mareano survey.

The total area surveyed along the Norwegian coast in 2012 was 2984 km<sup>2</sup>. Figure 2 presents the coverage of surveying within the territorial waters.

### External conducted surveying 2012

For 2012 the German company Fugro OSAE has been awarded the contract for surveying for the MAREANO project.

### New survey launches

The NHS has started a procurement process to replace the two existing survey launches. In addition we include a third launch as part of the cooperation contract with the Coastal Administration. The Swedish company Swede Ship has been awarded the contract. The launches will be equipped with Em2040 multibeam echosounders, produced by Kongsberg Maritime. The launches will made of aluminium, 11.15 meters long and a transit speed of 25 knots

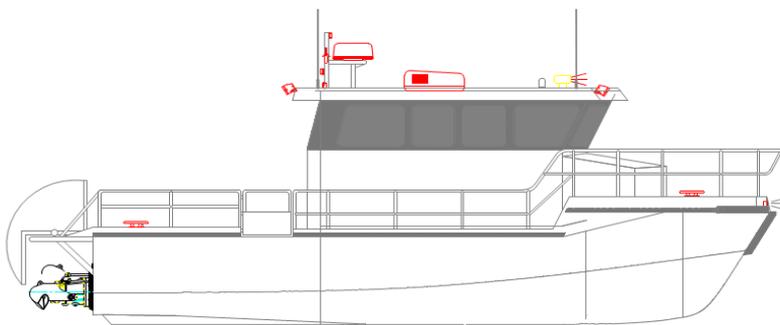


Figure 1. Sketch of survey launch

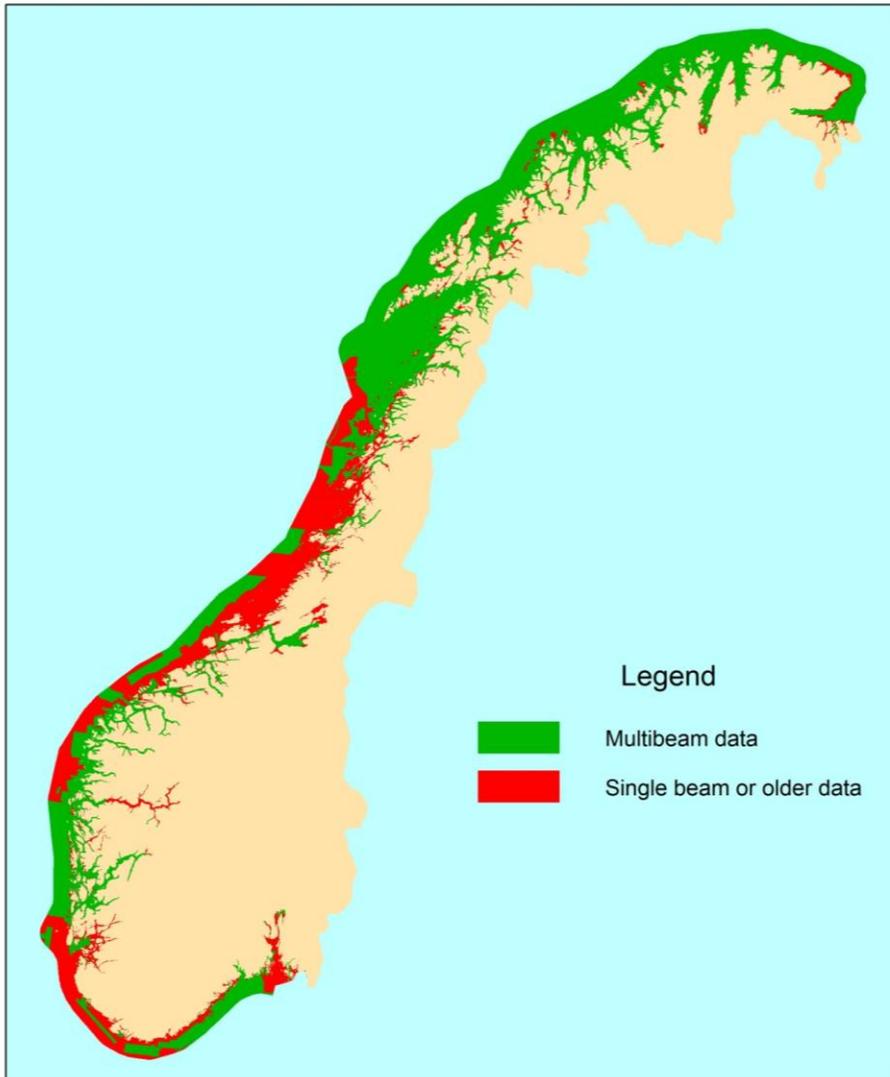


Fig. 2. The total area within the territorial waters (12 nm) of Norway. The red color indicate area NOT surveyed with multibeam.

### 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. The database has full coverage of digital data for the Norwegian coast and the west coast of Svalbard. Some areas are still based on rather old and insufficient survey information. In 2012 the production comprised replacing areas with older survey data with new survey data at Spitsbergen Chart 533 and Bjørnøya Chart 501 and three major harbours; Larvik, Sandefjord and Florø

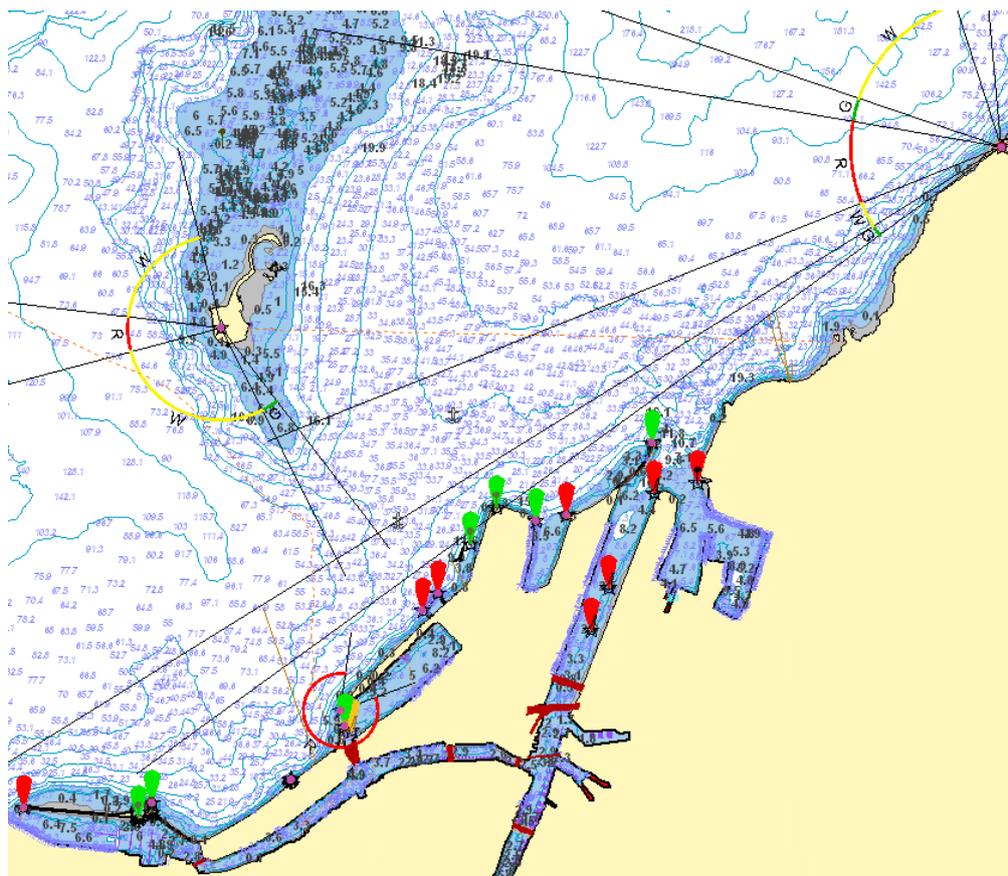


Figure 3. An example of information extracted from the Maritime Primary Database (From Chart 458: Trondheim)

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 updated continuously with information from internal and external sources. The production of Notices to Mariners (Etterretninger for sjøfarende) and the production of all charts/ENCs are based on the information from the Maritime Primary Database.

The bathymetry, the coastline and shoreline constructions are also available for downloading from the national geospatial infrastructure *Norge Digital*. [www.geonorge.no](http://www.geonorge.no)

Planned activities in 2013: In 2013 the NHS will continue the process of replacing older survey data with new survey data. The main focus area will be chart 24 on the west coast and the harbours charts for Sarpsborg and Fredrikstad.

### 3.2. Chart production

Since autumn 2008, when the NHS completed the major task of covering the Norwegian coast with ENCs and modernised paper charts, the production has been concentrating on replacing areas with old survey data (approx 11 000 km<sup>2</sup>) with new data. The NHS also has the objective to convert the remaining analogue paper charts (32 charts per 31 Dec. 2012) to digital charts. The NHS will outsource some of the production tasks.

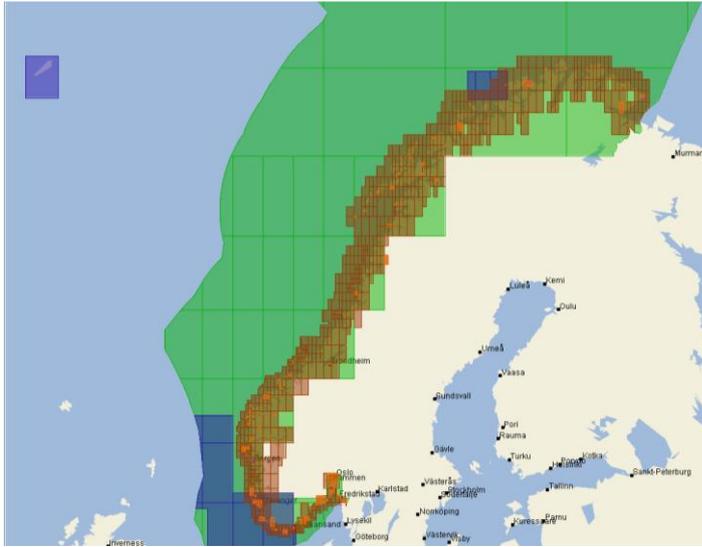


Figure 4. ENC coverage for the Norwegian coastal waters (ENCs in User Band 2-6).

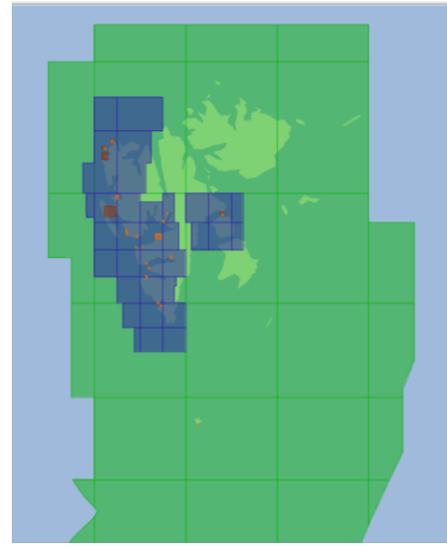


Figure 5. ENC coverage in the Svalbard area (ENCs in User Band 2-6).

### 3.3. ENC production

In 2012 ENCs equal to 7.5 D-cells (30' x 30') in the Approach and Harbour User Band were produced along the Norwegian coast. In addition 6 new ENCs in Coastal User Band were published. In Svalbard 6 ENCs (30' x 2°) in Coastal User Band were produced, see Figure 4. Also 6 existing ENCs in the General User Band were upgraded at the same time.

The total number of ENCs was 1059 at the end of 2012.

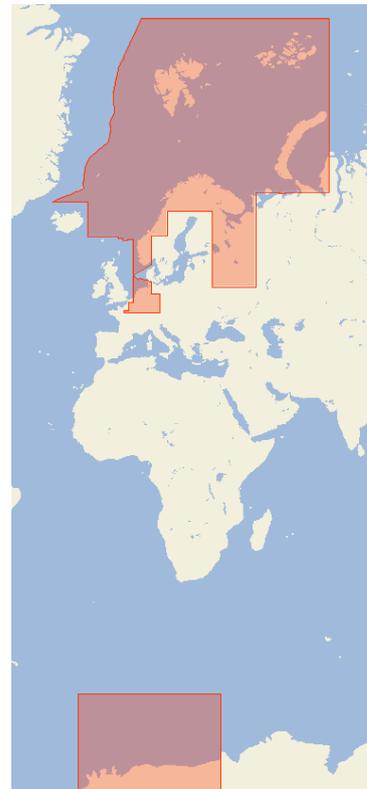


Figure 6.  
NO1A3000 Norwegian Sea and  
NO1A5500 Queen Maud Land

	Usage Band	Compilation scale	No of ENCs
1	Overview	< 1:1 499 999	2
2	General	1:350 000 – 1:1 499 999	68
3	Coastal	1:90 000 – 1:349 999	44
4	Approach	1:22 000 – 1:89 999	732
5	Harbour	1:4 000 – 1:21 999	186
6	Berthing	> 1: 4 000	27

Table above: Number of ENCs in each usage band per 31 Dec. 2012

Updating via ER profiles were issued in accordance with the Notices to Mariners and distributed through Primar. A total of 1439 ER files and 48 New Editions (NE) was issued as part of the continuous maintenance of the ENCs. The NEs were published to replace old survey data with new survey data.

In connection with the transfer of ENCs to the new chart production system, a review of all ENCs are currently being undertaken in order to improve the quality of the data. New Editions of 154 ENCs were published in 2012 as a result of this effort.

#### Planned activities in 2013:

In 2013 the NHS will continue the production of new editions of existing Harbour and Approach ENCs. Areas with older survey data will be replaced with new survey data. Approach and Coastal ENCs will be produced for the waters surrounding Bjørnøya. The production of new Coastal ENCs and upgrading of General ENCs covering chart 305 and 307 will be completed in 2013. Also INT 909 (Antarctic) is planned.

### **3.4. Paper chart production**

In 2012 a total number of 7 harbour charts, 14 main charts and 1 coastal chart were published as new charts or new editions for areas with new survey data available.

#### New charts/ new editions with new survey data published 2012:

Chart No.	Title	Scale
4	Oslo – Rødtangen – Drammen	1:50 000
11	Lindesnes – Lista	1:50 000
14	Ogna - Tananger	1:50 000
16	Tananger – Stavanger - Skudenenes	1:50 000
24	Fensfjorden - Sognesjøen	1:50 000
29	Stad	1:50 000
30	Haugsholmen - Ålesund	1:50 000

31	Breidsundet - Fjørtoft	1:50 000
33	Harøyfjorden - Molde	1:50 000
34	Romsdalsfjorden. Molde - Åndalsnes	1:50 000
87	Rystraumen – Tromsø - Grøtsundet	1:50 000
103	Måsøya – Nordkapp - Honningsvåg	1:50 000
104	Nordkapp – Lille-Tamsøya - Sværholt	1:50 000
144	Lopphavet	1:100 000
306	Kristiansand - Utsira	1:350 000
454	Kristiansund havn	1:10 000
455	Stavanger havn med innseilinger	1:25 000
458	Trondheim havn	1:10 000
466	Tromsøysundet – Sandnessundet med Tromsø havn	1:20 000
468	Tønsberg havn	1:10 000
471	Kvitsøy og Skudeneshavn	1:20 000
472	Drammen havn	1:10 000

#### Revised Reprints published in 2012:

12 charts were revised and reprinted (out of these 11 were updated through our Digital Production Line based on changes in the Primary Database).

#### Planned activities in 2013

The chart production for 2013 will be focused on production of 3 Harbour charts (479, 464, 465), 6 main charts (1, 3, 24, 26, 27, 28), two coastal chart (305 and 307) and one chart in polar area (549 [INT 909]).

We also plan to do reconstructions of 2 Harbour charts (478 and 488).

#### **Print On Demand (POD)**

At the end of 2012 there was 192 charts offered as POD.

143 charts from the main chart series, 38 Harbour charts and 11 charts from the main chart series of Svalbard.

The number of charts in the POD service is expected to increase with approximately 5 charts in 2013.

### **3.5. Technology**

#### **The NMDB Project (Norwegian Bathymetric Database)**

The NHS had a contract with the Dutch company Atlis B.V to provide a new management and distribution system for high resolution bathymetric data, NMDB. Sadly, Atlis became bankrupt in the beginning of 2012, and NHS has restarted the project with revised objectives. The new project, named Fønix, has an extended objective and will include the national land elevation data in addition to bathymetry.

### **The PLECO Project**

The NHS is running a project to replace the existing multibeam data processing tool. NHS has chosen Caris as the vendor of the system, which will have its final delivery in early 2014. The first part of the delivery, based on existing software, took place in January 2013.

### **Future Norwegian Pilots**

In 2012 an investigation of the options for the modernization of the Pilots took place. In 2013 we will look more closely into the best way for creating a future digital version with a frequent updating. Today's version has a broad target group including both SOLAS ships and the pleasure fleet. A new version of the Pilot might have a narrower target group, require fewer resources and based on a simplified production.

## **4. Nautical Publications**

Volume 3 of the Norwegian Pilot (western Norway) was published in 2012. An English version of Volume 7(Svalbard) was also launched.

### **Notices to Mariners ( Etterretninger for sjøfarende)**

Totally 24 editions were published in 2012. 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/>.

As a supplement to the NtM a tracings service is fully operationally.

## **5. MSI**

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

## **6. C-55**

Update of C-55 was sent to IHB in March 2013.

## **7. Capacity building**

Norway did not participate in the annual meeting in the IHO Capacity Building Sub-Committee but plan to be involved in the upcoming meeting at the end of May. Together with the Portuguese HO we conducted a Technical Visit to Mozambique on behalf of IHO in October 2012.

The Norwegian Agency for Development Cooperation (Norad) some years ago launched a programme called *Oil for Development*. NHS is represented in the programme, as subordinate of the Ministry of Environment. We were not involved in any practical implementation of any project in 2012.

## **8. Oceanographic activities**

New web-pages with tidal information were launched in 2012, <http://sehavniva.no>. Based on 23 permanent tide gauges and discrete tidal zoning the users can search for a location and get tidal predictions and water level from most of the Norwegian coast. A figure with different tidal levels relative to Chart Datum and levels with return periods up to 1000 years are also shown for each location.

In addition to observed water level and predicted tides we present a 5 days water level forecast from models run by the Norwegian Meteorological Institute (NMI). Near real time water level observations are transferred from NHS to NMI and are used to adjust the output from the model.

One big task has been to enhance the accuracy of short term water level observations, measured with pressure sensors. We are working on better procedures for calibration, installation of the equipment and processing of the data. These measurements are used for the reduction of soundings, better tidal-mapping of the coast and transferring land levelling datum to islands.

A new program, written in C++, for storing, processing, analysing and distributing water level data is developed at NHS. A rewritten program for harmonic analysis is integrated and it is now possible to analyse long data series in one operation.

## **9. Other activities**

### **9.1. The BLAST project**

The EU project Blast (Bringing Land and Sea Together) project has been finished and all deliverables has been produced.

Several tangible results have been achieved in particular on harmonization of topographic and marine data and harmonization of maritime information. The ENC checker and Marine data Collection System (MDCS) prototype are profound examples.

The other main topics been addressed are related to Integrated Coastal Zone Management (ICZM). The main work here was to develop web based computation of climate change indicators based on the harmonized land/sea datasets. The indicators will in turn be used by coastal zone planners as a basis for decision making.

The project report will be delivered in 2013.

See also the project website [www.blast-project.eu](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 has been The Management plan for the Barents Sea. In 2012 MAREANO also started mapping areas covered by the management plan for the Norwegian 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 NHS is responsible for bathymetric data acquisition (including backscatter and water column data), 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)

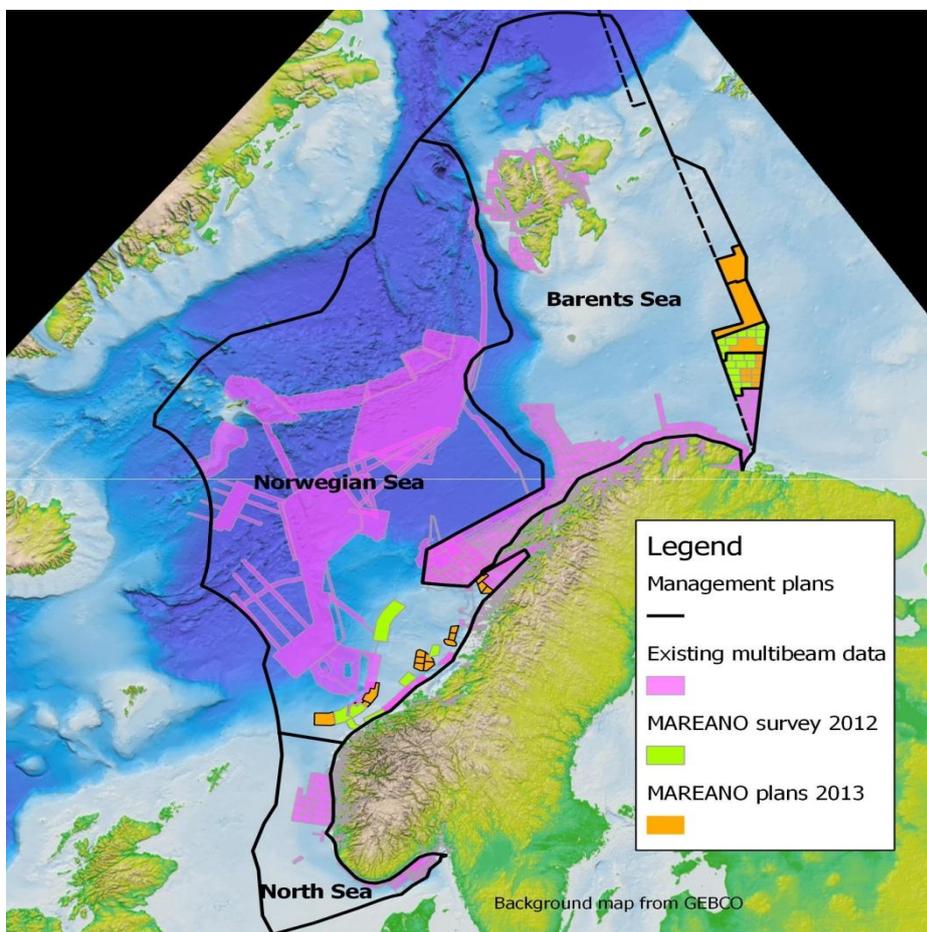


Figure 7. The Management plan areas and coverage of multi beam echo sounder data.

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

**Results 2012:** The MAREANO program received NOK 88.4 mill in total through earmarked funding. NHS received NOK 57.4 mill. 31000 km<sup>2</sup> was surveyed in 2012. See overview of surveyed areas in figure 8 below.

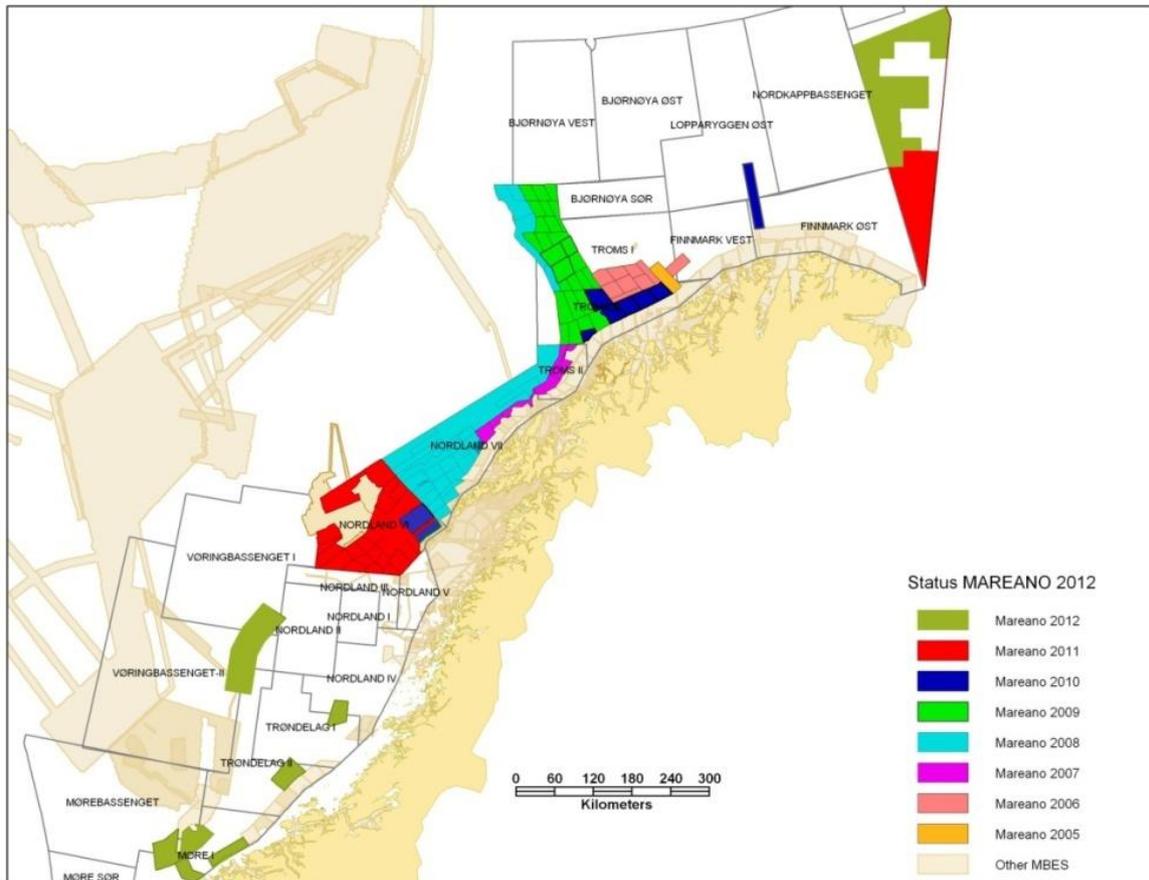


Figure 8. An overview of the surveyed area each year for the period 2005 - 2012

**Data distribution:** All our multibeam data north of Lofoten has been modeled 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 is available on [www.mareno.no](http://www.mareno.no). This website is a portal for knowledge dissemination mainly through effective map services and documentation aimed at both government decision-makers and the general public. The web service is a joint effort among the program partners, but the project is managed 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.

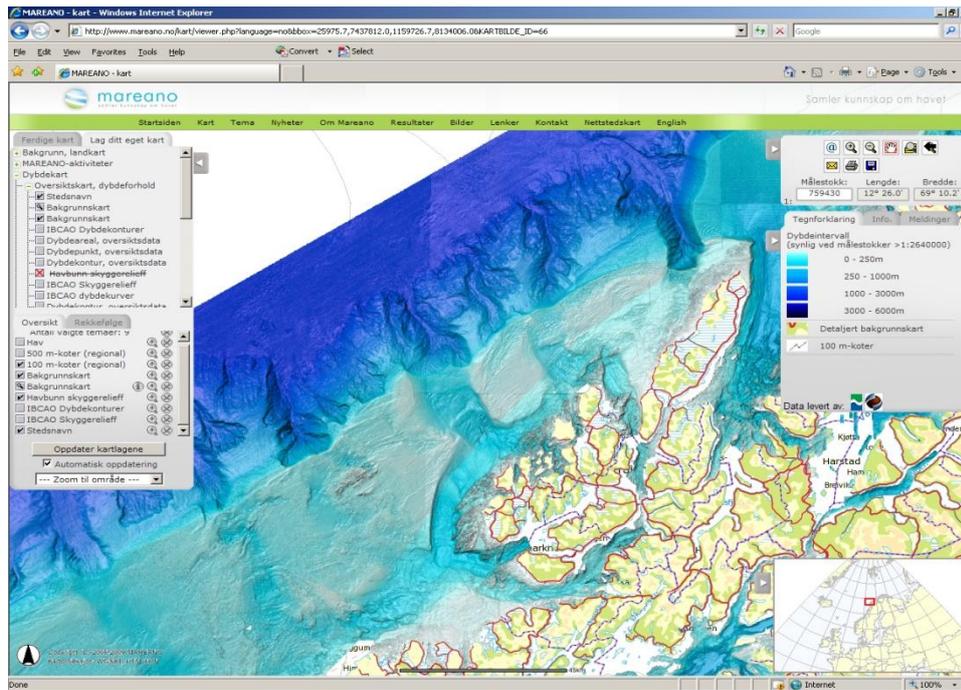


Figure 9. An example from the WMS shadow relief map service showing spectacular submarine canyons and slide scars on the edge of the most narrow part of the Norwegian shelf north of Lofoten and west of Andøya (screendump from map service on [www.mareano.no](http://www.mareano.no) )

### 9.3 Nordic INSPIRE Network

The Nordic mapping agencies have established a common network, focusing on sharing cross-border data and services, and exchanging knowledge on data harmonization and implementation of the INSPIRE specifications. Access to harmonized cross-border services will be of benefit within e.g. crisis management and emergency. A common project is under establishment, outlining objectives and targeting practical outcomes.

### 9.4 BarentsWatch

The Norwegian Mapping Authority are participating in an intergovernmental cooperation on developing and establishing a general Information and surveillance system, covering the High North and the Norwegian coastal and sea areas. BarentsWatch aim to offer integrated knowledge and information services to the public, and will also support efficient coordination between governmental services through a common information picture. A core part of the system consists of map services, based on geographic information services from official sources. So far, the cooperation counts 29 national partners. Ref.:

<http://www.barentswatch.no/en/om/>

### 9.5 International activities

The NHS is involved in several Working Groups, Committees and Commissions related to IHO. Norway has representatives in the following Working

Groups: TSMAD, CSPC, DIP, SNP, MSDI, DQ, TWL and WEND. We have participated in the HSSC meeting in 2012. Norway is actively participating in 5 Hydrographic Commissions: ARHC, HCA, NHC, NSHC and SAIHC. Two HC meetings (ARHC and NSHC) have been hosted by Norway in 2012.

As operator of Primar we participate in all related meetings.

During the last 2-3 years we have contributed with a substantial part of high resolution bathymetric data, obtained through the Mareano project, to GEBCO database.