

## **NATIONAL REPORT OF SWEDEN**

### **Executive summary**

This report gives a summary of the main activities within the Swedish Hydrographic Office since the last report given at the 20<sup>th</sup> BSHC meeting in Saint Petersburg September 2015.

### **1. Hydrographic Office**

The Swedish Hydrographic Office is organized within the Swedish Maritime Administration (SMA), which also consists of other services e.g. Pilotage, Fairway Service, Icebreaking, SAR and Maritime Traffic Information.

At the time of compiling this report the Hydrographic Office including the hydrographic survey personnel employs 120 persons.

The operations are certified in accordance with ISO 9001 and from 2014 also certified in accordance with the environmental standards ISO 14001. The quality management system covers all parts of the operations and supporting activities within the Swedish Maritime Administration.

The Hydrographic Office organisational structure has been stable and no management positions have changed during the period. The digitalization project, where analogue depth data from the SMA archive has been digitized, will be finalized this year 2016. This unit will be terminated in the end of 2016.

### **2. Surveys**

#### **2.1 Overall status and surveys 2015**

Most Swedish waters are surveyed to some degree over the years, but the long term objective is that all Swedish waters should be surveyed in accordance with the IHO standard S-44. Sweden and Finland have implemented a common Finnish-Swedish realisation of S-44; named FSIS-44. This standard is achieved in most areas used by SOLAS vessels, but there are still areas used by these vessels which needs to be surveyed by modern methods.

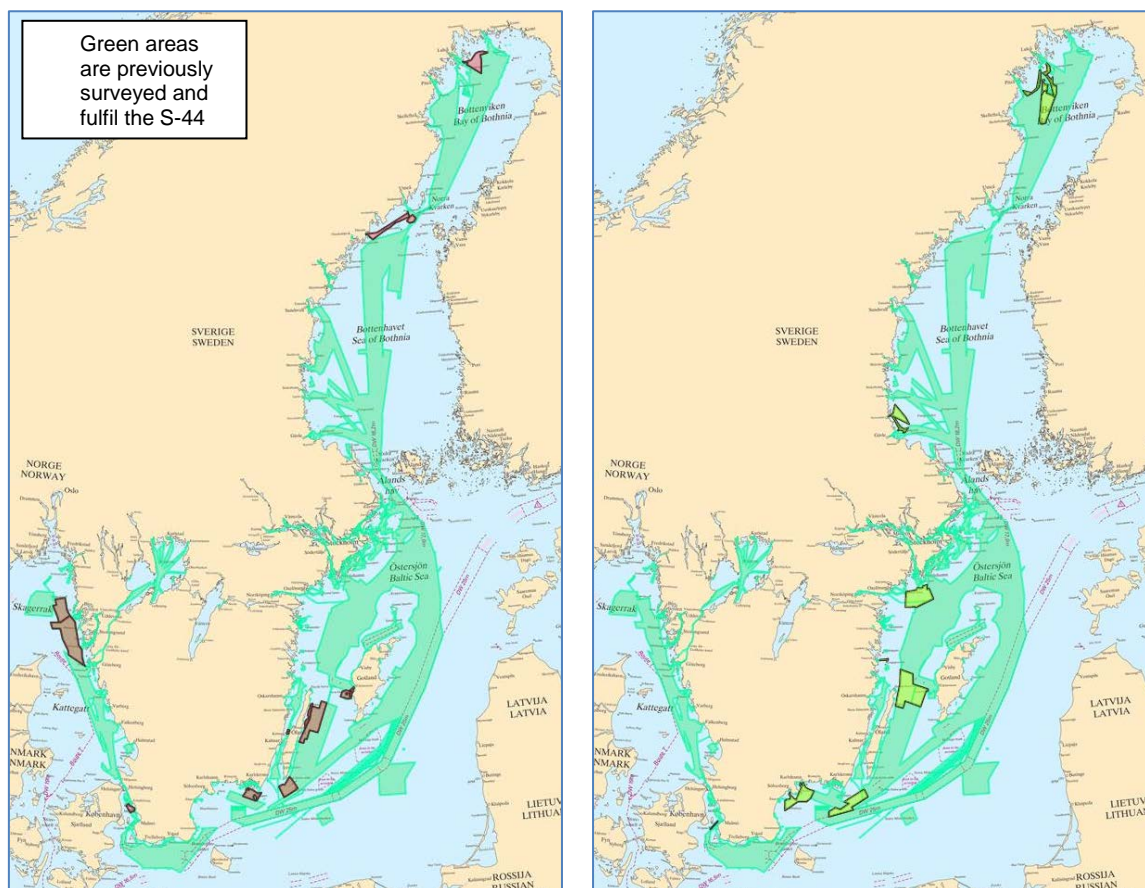
Surveys and re-surveys now and in the coming years are focused on shipping routes as defined as HELCOM Cat I and II areas in the Hydrographic Re-Survey plan for the Baltic Sea. Cat I and II encompasses 118 000 km<sup>2</sup> out of totally 165 000 km<sup>2</sup> within the Swedish EEZ. Sweden has targeted that the surveying of Cat I and II should be finalized 2020.

Since 2011 the Swedish HO, together with other Baltic Sea HOs, has received co-financing from the EU TEN-T and Connecting Europe Facility (CEF) programme for hydrographic surveying activities. The first phase of the global FAMOS project FAMOS Freja is

ongoing 2014 – 2016 with co-financing from the CEF-programme. The HO from Denmark, Estonia, Finland, Germany, Latvia and Sweden is participating in FAMOS Freja. The application for the second phase, FAMOS Odin 2016 – 2018, has also been successfully evaluated by the EU-Commission and also this second phase will be co-financed. In addition to the above mentioned HOs, also the Lithuanian HO will participate in FAMOS Odin. Additional activities in this second phase will be studies on route optimizing in the Baltic Sea in regards to bathymetry and squat. The Baltic Sea is a comparably shallow area and if routes could be optimized to areas where there is more water under the keel it would result in less fuel consumption and of course less impact on the environment. More information about FAMOS is available in a separate BSHC21 paper.



In 2015 a total amount of 4 627 km<sup>2</sup> were surveyed in Swedish waters by SMA vessels. Together with the surveys performed the first half of 2016 it means that 52% of Swedish waters are surveyed in accordance with FSIS-44, see figure 1. 66 % of waters used by commercial shipping are surveyed up to the IHO-standard.



**Figure 1 Hydrographic surveys performed 2015**

**Surveys planned 2016**

## 2.2 Survey Vessels



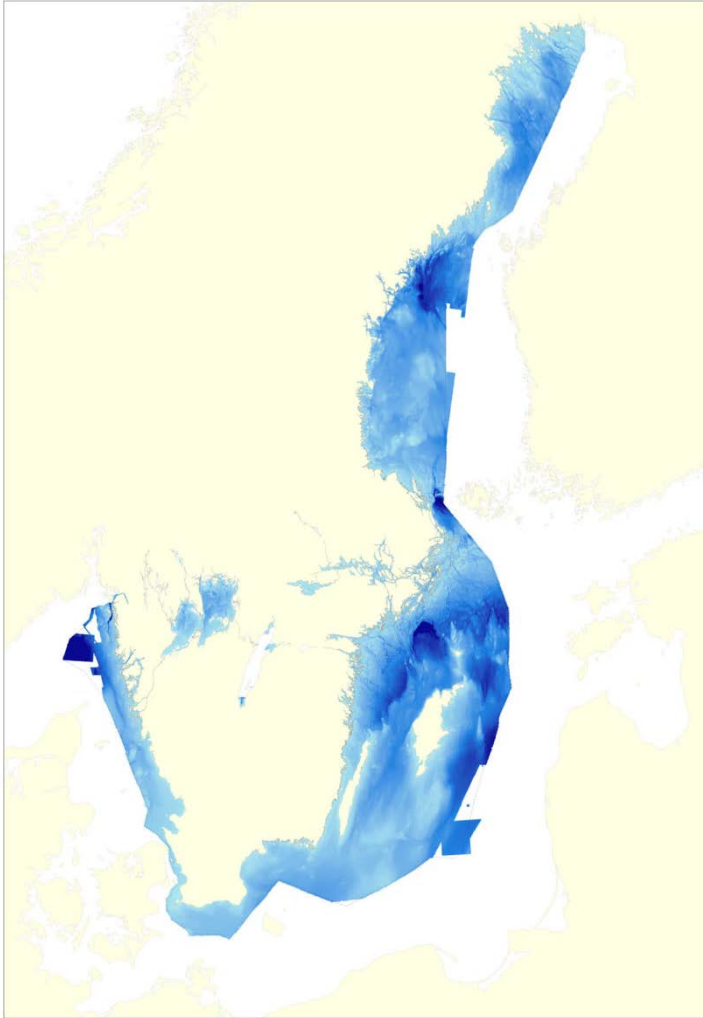
Figure 2- SMA Survey vessels equipped with multibeam. To the left the two survey vessels Jacob Hägg and Baltica where surveying are performed 24 hours per day and 7 days per week, weather permitted. To the right the two survey boats Petter Gedda and Anders Bure.



Figure 3 Bar sweeping survey vessel Gustaf af Klint. The bar is transverse across the stern and is here submerged into the water.

## 2.3 Depth Database

The depth database DIS (Depth Information System) is managed in an ESRI-system with some specialized tools developed by a Swedish GIS company specialized on ESRI tools. At the time writing this report 117,9 billion (117 917 708 407) depths was stored in the depth database.



**Figure 4 Coverage in the SMA Depth Database, August 2016.**

### **3. New charts and updates**

#### **3.1 New ENC and Paper Charts**

The Swedish paper chart portfolio consists of approximately 120 paper charts and 16 series of small craft charts. Special charts, tailored to the customer are also available as well as a service to provide S-57 or raster data to the end user service providers. For S-57 deliveries the PRIMAR service “GeoViewer” is used.

A chart index showing Swedish charts is available at:

<http://www.sjofartsverket.se/sv/Snabblankar/Kartviewers/Se-pa-sjokort-/>

The quality of depth data is also presented at the SMA external website:

<http://www.sjofartsverket.se/Snabblankar/Kartviewers/Sjofartsverkets-karttjanster1/>

62 New Editions of paper charts have been published from August 2015 – August 2016. During the same period, all 572 Swedish ENC's have been published as New Editions, which were a planned quality improvements for the SE ENC's.

The sales of Swedish ENC's for the last five years are shown in figure 5 below. The number of ENC users is increasing with approximately 15 % yearly and the number of ENC's sold is increasing with 13%.

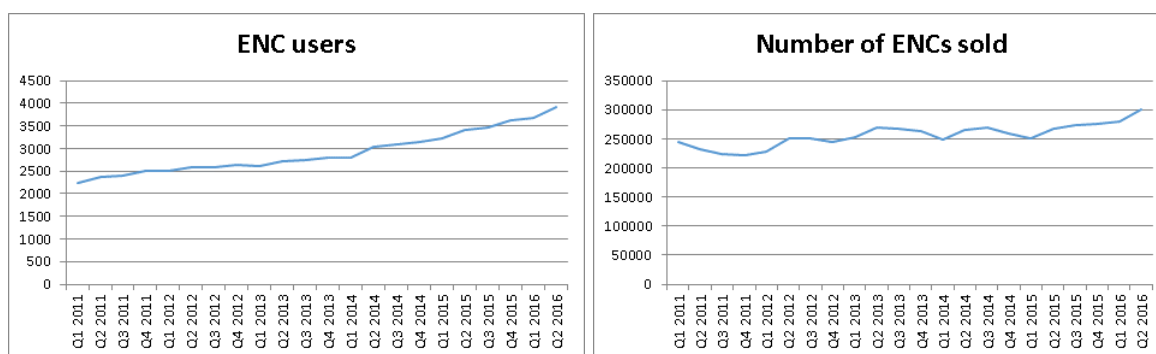


Figure 5 Swedish ENC's

Usage Band	Compilation Scale	No of SE ENC's
2 General	1:350 000 – 1:4 999 999	11
3 Coastal	1:90 000 – 1:349 999	81
4 Approach	1:22 000 – 1:89 999	224
5 Harbour	1:4 000 – 1:21 999	153
6 Berthing	>1:4 000	103
		<b>572</b> , total number of SE ENC's

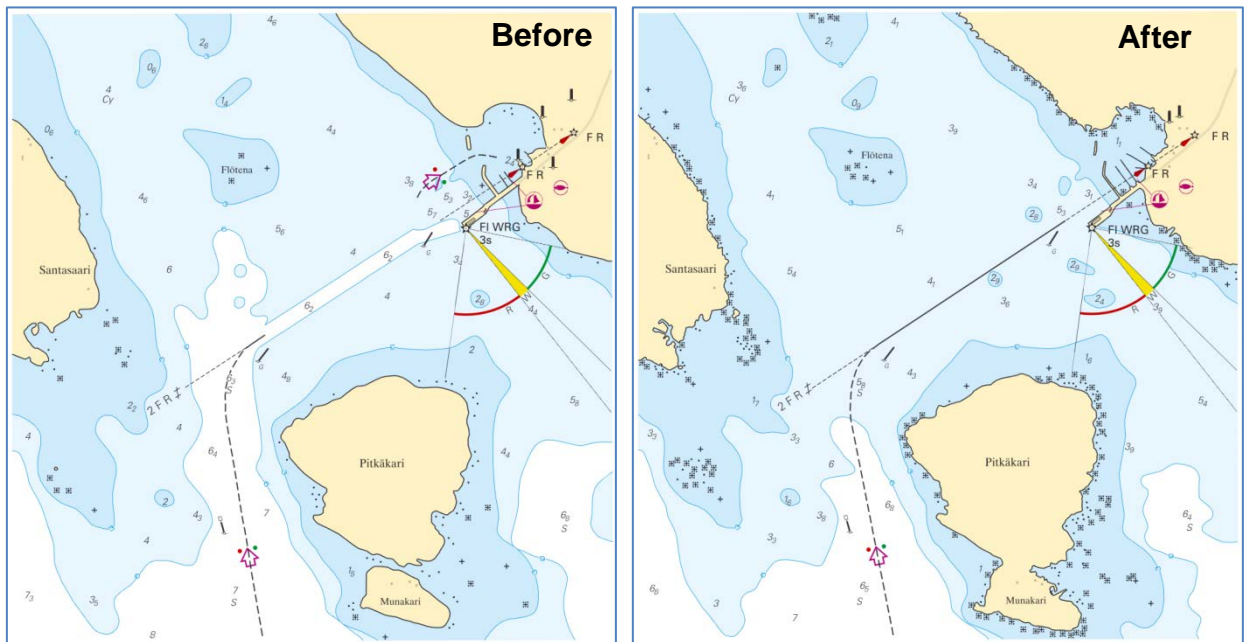
### 3.2 The Chart Improvement project – Sjökortsllyftet

Within the Baltic Sea Hydrographic Commission it has been agreed upon that all chart products within the Baltic Sea should be adjusted to a common vertical reference level; Baltic Sea Chart Datum 2000. As part of the commitment made in BSHC the SMA has started the Chart Improvement project (Sjökortsllyftet) in order to adjust the chart products to this new reference level. Apart from amend existing depth contours and depth figures also some other quality improvements will be made at the same time such as:

- New surveyed coastline, from the Swedish Landsurvey Administration (Lantmäteriet), will be used.
- Navigational aids will be adjusted to geodetical survey positions
- 15 and 30 m depth contours will be included as standard depth contours

8 New Editions of paper charts has been published (September 2016) with equivalent 14 New Editions of ENC's as a consequence of the project. The new vertical reference level

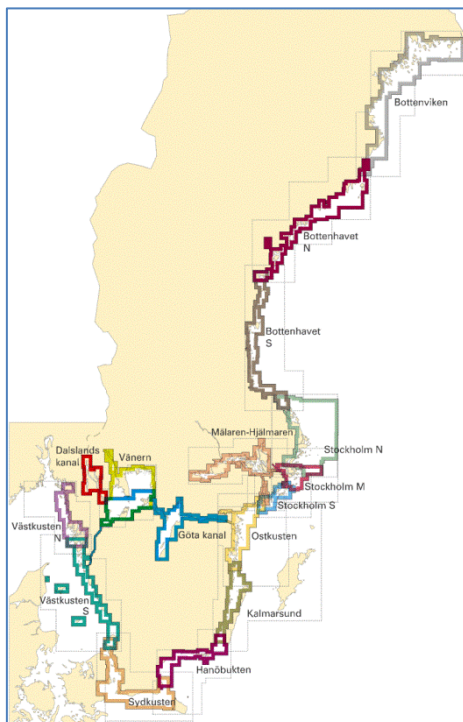
will be implemented in all Swedish chart products (120 paper charts and 572 ENCs) until 2020.



**Figure 6** Changes after the Chart Improvement project in the Haparanda region, near the Finnish border.

### 3.3 Small Craft Charts

The sales of Swedish small craft charts are very important for our net result. For the season 2016 were the three series covering Stockholm archipelago, the two covering the Swedish West Coast and the inland series Mälaren – Hjälmaren produced as New Editions.



**Figure 7** Small craft chart series in Sweden

### 3.4 New Chart Production System

The existing chart production system at SMA has been in use more in or less 25 years in different generations and in different operational systems. In 2013 the current IT-supplier, 1Spatial, announced that they will no longer supply any updates in one of the basic software Radius Vision. The decision was taken at SMA to procure a new system. After a public procurement 2015 a contract was signed with CARIS in November the same year in order to deliver a new system for chart production. The new CARIS HPD system is planned to be in production in October 2016. For more detailed information see the separate BSHC21-paper 'New Chart Production System at the Swedish Hydrographic Office'.

## 4. New publications and updates

The Swedish Notices to Mariners (Ufs) are available on our web site:

1. A daily updated database in which NtM information can be searched in many different ways, e.g. all notices published for a certain given area and published during a given period time period.
2. Each week one Swedish and one English PDF-file is published on the website [www.sjofartsverket.se/ufs](http://www.sjofartsverket.se/ufs) and [www.sjofartsverket.se/ntm](http://www.sjofartsverket.se/ntm) respectively.

The Swedish Chart Catalogue is published once per year. The small but comprehensive booklet Ufs A is from 2016 published biannual and is available on our web site as well as in paper format. This booklet contains general nautical information (about MSI, regulations, about ENC and paper charts, fairway information, etc.) needed for safe navigation in Swedish waters. It is also available in English [http://www.sjofartsverket.se/upload/Ufs/Ufs%20A%202016%20-%202017%20English\\_HQ.pdf](http://www.sjofartsverket.se/upload/Ufs/Ufs%20A%202016%20-%202017%20English_HQ.pdf).



## 5. MSI

All Swedish navigational warnings are drafted and broadcasted by the station **MSI SWEDEN**. This station also performs the NAVTEX broadcasting of MSI for the entire Baltic Sea with exception of area "U", which is covered by Tallinn Radio.

MSI SWEDEN is co-located with SWEDEN TRAFFIC and VTS EASTCOAST in Södertälje.

The station is manned H24 all days of the year and may be contacted as follows:

Tel: +46 771 63 06 85

E-mail: msi@sjofartsverket.se

VHF: Call MSI SWEDEN on relevant VHF Channel

The NtM department at the Hydrographic Office in Norrköping maintains the role “Baltic Sea Sub-area Coordinator”, with the responsibility of international coordinator of MSI in the Baltic Sea area. For further information, see the separate document BSHC21\_B5\_MSI Baltic Sea Sub Navarea 1B MSI Report.

## **6. C-55**

The latest update regarding Sweden in the C-55 database was delivered to the IHB in June 2016.

## **7. Capacity building**

Sweden has not been active in the area of capacity building during the period.

## **8. Oceanographic activities**

The SMA is responsible for a number of water level stations but it is the Swedish Meteorological and Hydrological Institute (SMHI) that has the main responsibility for the Swedish oceanographic activities. Other actors are the Swedish Geological Survey, universities and research institutes.

## **9. Other activities**

### **9.1 Environmentally hazardous wrecks**

The SMA was appointed by the Swedish Government to perform an investigation of environmental hazardous wrecks in Swedish Waters in 2014. Four wrecks were investigated to develop a standard method to assess and prioritize the environmental risk to be used for further possible necessary actions. The project was partly reported in October 2014 and was then extended to October 2015. In August and September 2015 wrecks in Skagerrak, containing munitions from the Second World War was investigated, where SMA did surveys and ROV operations. The final report was delivered in October 2015. In connection Chalmers University, with the support of SMA and other project partners, arranged the Wrecks of the World III Conference in October 2016 where experts in the subject from all over the world participated. SMA has in this project been cooperating with other Governmental agencies as the Swedish Coastguard, the Swedish Agency for Marine and Water Management, the Swedish Defence Research Agency and National Maritime Museums as well as Chalmers University and other expert institutions.

### **9.2 Surveys in shallow waters**

The Swedish HO has received funding from Swedish Contingencies Agency to perform a study to evaluate survey methods in shallow waters, 0-10 meter depth. SMA has in this project specifically cooperated with the Swedish Geological Survey. The aim of the project



has been to find cost effective methods, time required to survey the archipelago and an estimated total cost. The study was completed in the end of 2015 and the final report was published in April 2016.

As a very brief summary SMA can conclude that in order to survey 0 – 10 m depth in Swedish waters, to meet basic national requirements, different survey methods need to be used. SMA propose in the report that 0 – 10 m first should be surveyed with LIDAR and then 3 – 10 m should be complemented with seaborne acoustic methods. The total cost for surveying this 0 – 10 m area in Sweden has been estimated to 114 – 134 MEuro.

### 9.3 Converting fair sheet archive (ScanDIS)

The digitizing of soundings from fair sheets and similar maps in our archive continues with the overall aim of creating national coverage in the depth database (DIS). For the Hydrographic Office in particular, this will enable more efficient production of chart information.

This operation is, since 2007, permanent in our organization and will continue until the end of 2016. The Swedish Agency for Marine and Water Management (Havs- och Vattenmyndigheten) is funding this project and SMA is co-operating with them in planning and prioritizing this work. The project is now near finalizing the digitalization. 8618 of 8838 sheets and maps in the archive was digitized in June 2016. This means that in the end of 2016 all existing data covering the coast of Sweden and the inland lakes Hjälmaren, Mälaren, Vänern and Vättern will be digitized and stored in the depth database.

### 9.4 ADAPT - Assure Depth of fairways for Archipelago Public Transportation (ADAPT)

The overall objective of the ADAPT-project is to develop and implement safe, time-saving and fuel-efficient routes for the transportation of passengers and goods in the Åland and Stockholm archipelagos. SMA is lead partner in the project where SMA performs hydrographic surveys in fairways used by public transport where no S-44 surveys previously have been done. Subsequently the official ENC's and paper charts will be updated with the new survey data.

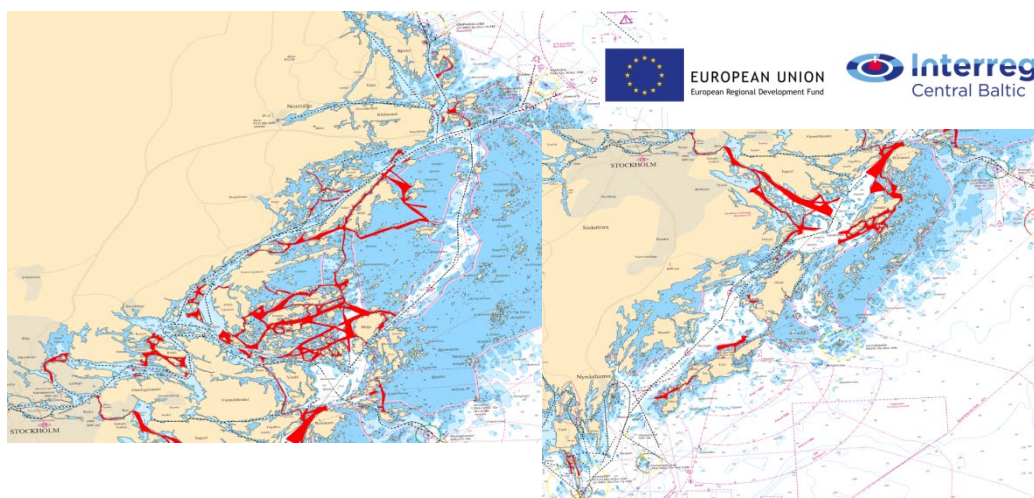


Figure 8 Areas to be surveyed in Stockholm archipelago in the ADAPT project

Apart from SMA the Stockholm County Council (Department for Transport Administration), who is responsible for waterborne public transports in Stockholm, and the

Government of Åland (Infrastructure Department, Waterborne Traffic), who is responsible for similar public transports in the archipelago of Åland, are partners in the project. The project was approved and will be supported with 75 % co-financing by the INTERREG Central Baltic Programme, which aims to stimulate co-operation between regions within the central parts of Sweden and Finland (along with Åland) and Estonia and Latvia. The project started 1 March 2016 and surveying in Sweden and Åland is in progress 2016 – 2017. Studies and further updating of the chart products will be performed 2018 – 2019.