

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 25th BSHC VTC meeting in September 2020.

- There has been an adjustment in the management level at the Hydrographic Office. A new Deputy Hydrographer and responsible for international affairs and a new Production Manager from 1 January 2021.
- In 2020 a total amount of 8 500 km² was surveyed in Swedish waters by SMA, which was the largest area ever surveyed by SMA vessels in one year. From 2022 and onwards, hydrographic surveying will be focused on surveying the shallower areas used for commercial shipping other than SOLAS vessels. Surveying of HELCOM Cat I and II areas is planned to be finalized 2022.
- The new surveyed coastline, which is referenced to BSCD 2000, is implemented in all SE ENCs and paper charts (except for Lake Vänern).
- In May and June 2021 SMA had a new sales record, when almost 7 800 small craft charts were sold.

1. Hydrographic Office

The Swedish Hydrographic Office is organized within the Swedish Maritime Administration (SMA). Apart from hydrography, SMA is also responsible for other maritime services, where the main are Pilotage, Fairway Service, Icebreaking, Search and Rescue (SAR) and Maritime Traffic Information (VTS).

At the time of compiling this report the Hydrographic Office, including the hydrographic survey personnel, employs 115 persons. There has been an adjustment in the management level at the Hydrographic Office. Since Magnus Wallhagen is now the Deputy Hydrographer and responsible for international affairs, Magnus Hovberg took over as Production Manager from 1 January 2021. Anna Norin is now the Head of the production unit Hydrographic data. See also the organisation scheme in figure 1.

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

Since March 2020, the worldwide Covid-19 pandemic situation has influenced the operations at the Hydrographic Office. All staff who are able to work from home have been more or less absent from office and will be at least until the end of September 2021. Bathymetry data is classified data so the staff working with bathymetry is still at office.

Special routines are established for the staff on-board the survey vessels. Despite the complicated circumstances, the Swedish Hydrographic Office has ensured continuous delivery of navigational warnings, Notices to Mariners, Paper Charts and Electronic Navigational Charts (ENC).

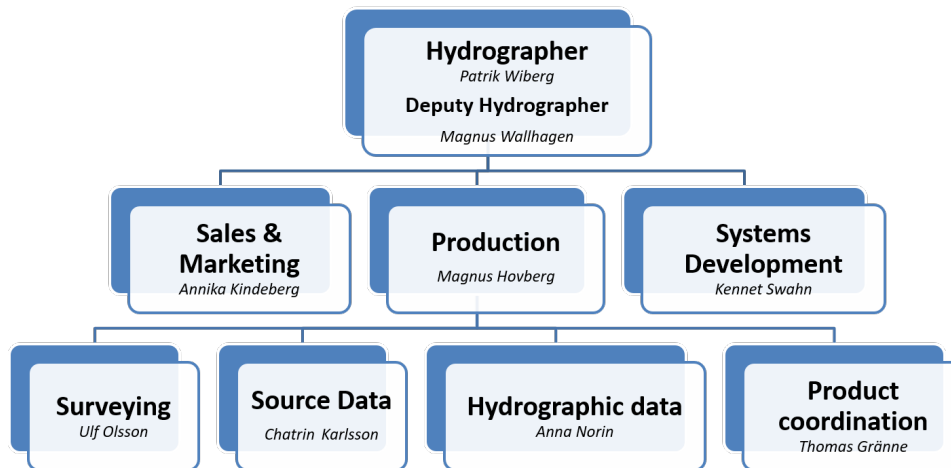


Figure 1 Organizational scheme of the Swedish Hydrographic Office

2. Surveys

2.1 Overall status and surveys 2020 and 2021 (Q1 – Q2)

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 S-44 standard. Sweden and Finland have implemented a common Finnish/Swedish realisation of S-44; named FSIS-44. There are still a few areas (less than 10 %) used by SOLAS vessels that need to be surveyed by modern methods.

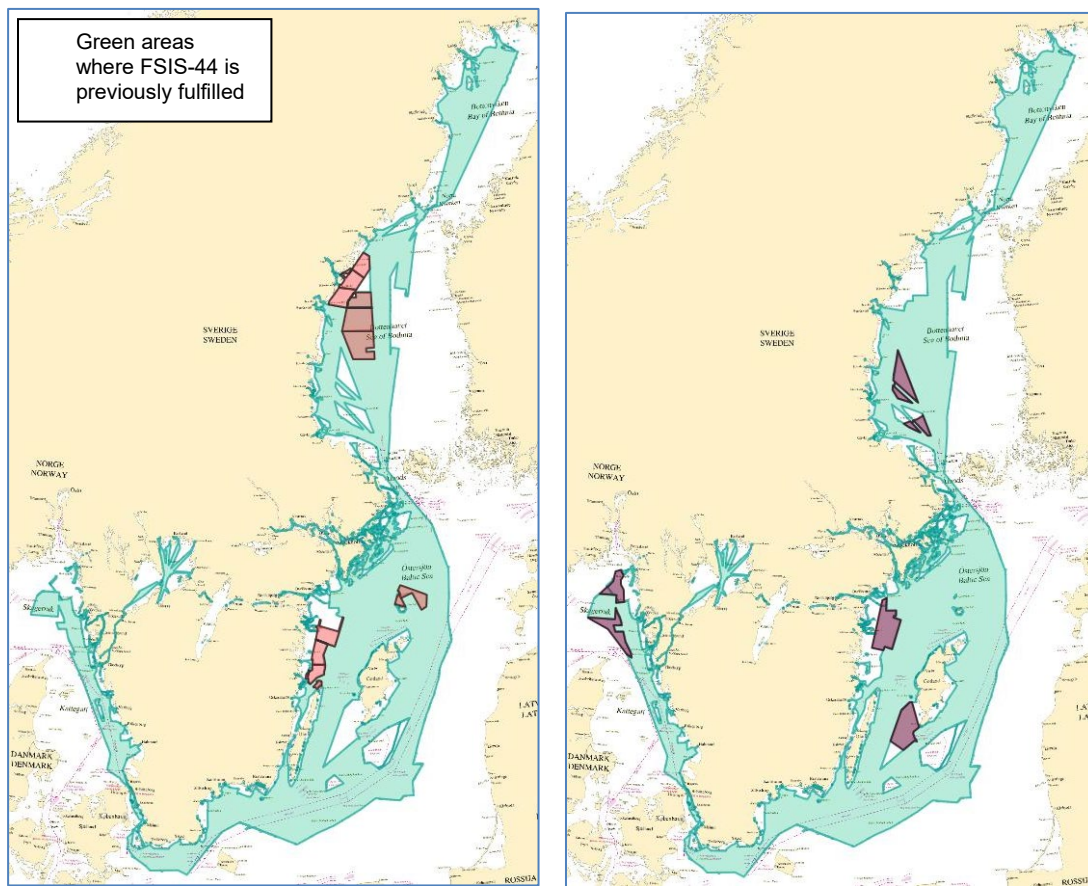
Surveys and re-surveys now and until 2022 are focused on shipping routes as defined as HELCOM Cat I and II areas in the HELCOM Re-Survey plan for the Baltic Sea. Cat I and II encompasses 118 000 km² out of totally 165 000 km² within Swedish waters. Sweden had initially targeted that the surveying of Cat I and II areas should be finalized 2020, but due to decreased co-financing from EU-programmes the latest years it will be finalized 2022.

From 2022 and onwards, hydrographic surveying will be focused on surveying the shallower areas used for commercial shipping other than SOLAS vessels. These areas are also used by larger leisure crafts and national authorities such as Police, Coast guard and Navy as well as SAR units. In the HELCOM Re-Survey plan such areas have been classified, by Sweden, as Cat III high and medium priority. The plan is to have finalized the surveying of these areas by 2036. To optimize the surveying of these shallower waters the SMA will put an additional survey vessel into operation; Johan Månsson, which is a sister vessel to the existing survey vessel Anders Bure. This year (2021) will be the last year our biggest survey ship Baltica will be operating as a survey ship.

For surveying of even shallower areas a national programme on coastal zone mapping is requested by the SMA and other mapping agencies in Sweden, but at present no decision has been taken to fund such a programme.

In 2020 a total amount of 8 500 km² was surveyed in Swedish waters by SMA, which was the largest area ever surveyed by SMA vessels in one year. Additionally 1700 km² has been surveyed by SMA vessels the first six months of 2021. The table below summarizes the total amount of Swedish waters, surveyed in accordance with FSIS-44 (status 30 June 2021).

Category of SE waters	Area	FSIS-44 fulfilled	Percentage FSIS-44 fulfilled
Total area SE waters	165 000 km ²	122 300 km ²	74 %
Shipping routes HELCOM Cat I and II	118 000 km ²	111 200 km ²	94 %
Other waters HELCOM Cat III + inland waters	47 000 km ²	11 100 km ²	24 %



2.2 Survey Vessels



Figure 3- SMA Survey vessels equipped with multibeam. To the left the two survey vessels Jacob Hägg and Baltica where surveying is performed 24 hours per day and 7 days per week, weather permitted. To the right the two survey boats Petter Gedda and Anders Bure.

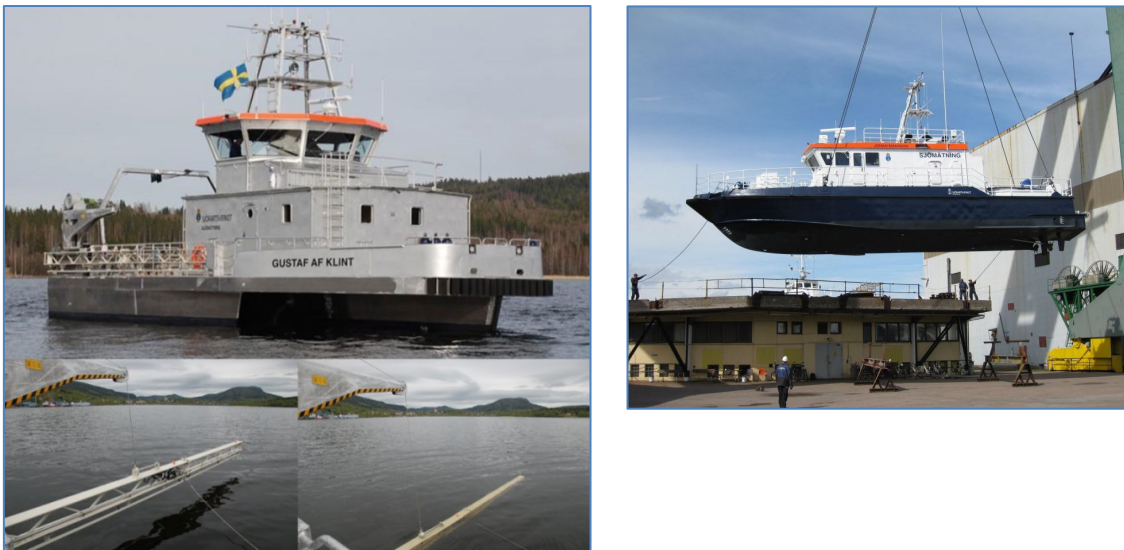


Fig 4, left: Bar sweeping survey vessel Gustaf af Klint. The bar is transverse across the stern and is here submerged into the water. Right: Survey vessel Johan Månsson (a sister vessel to Anders Bure) will be put into operation 2022.

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. In 19 August 2021 there were 282 410 744 963 (282 billion) depths stored in this database.

3. New charts and updates

3.1 ENC and Paper Charts

The Swedish paper chart portfolio consists of 117 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 and raster data to end user service providers. To provide data to the manufacturers, delivering electronic charts for the leisure market, the PRIMAR service “GeoView” is used.

At the SMA website under the headline “Se på sjökort” a chart index showing Swedish charts is available at: <https://geokatalog.sjofartsverket.se/kartvisarefyren/>

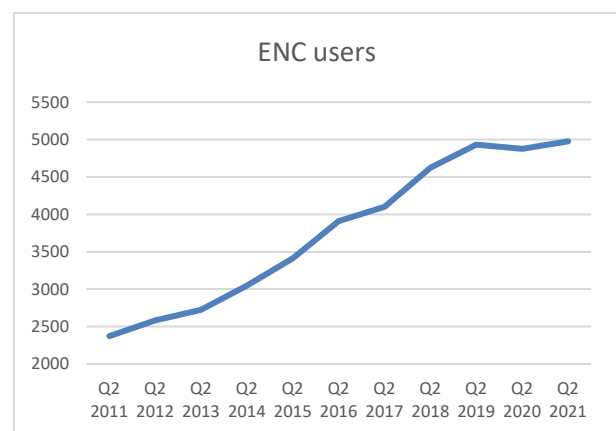
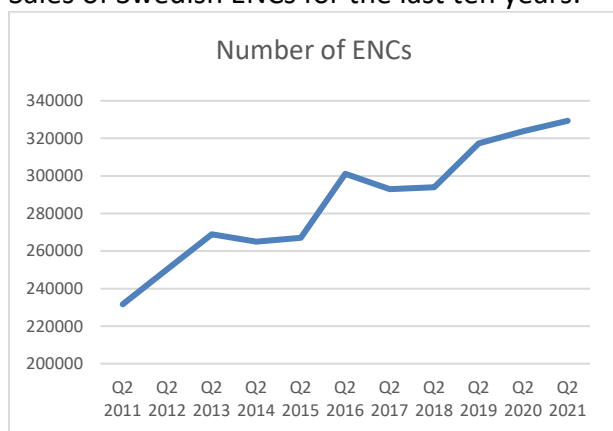
Under the headline “Djupinformationens kvalitet” the quality of depth data is presented: <https://geokatalog.sjofartsverket.se/kartvisarefyren/>

- ✓ 12 New Editions (NE) of paper charts were published 2020.
- ✓ 622 New Editions (EN) and 977 Revisions (ER) of ENCs were published 2020.

Number of Swedish ENCs:

Usage Band	Compilation Scale	
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	230
5 Harbour	1:4 000 – 1:21 999	153
6 Berthing	>1:4 000	105
Total		580

Sales of Swedish ENCs for the last ten years:



3.2 The Chart Improvement project – Sjökortsliftet

Within the BSHC it has been agreed upon that all chart products in 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 started the Chart Improvement project (Sjökortsliftet) 2015 in order to adjust the chart products to this new reference level. Apart from amending existing depth contours and depth figures, other quality improvements are made at the same time such as:

- New surveyed coastline, from the Swedish Land Survey Agency (Lantmäteriet), is implemented
- Navigational aids are adjusted to geodetically surveyed positions
- 15 and 30 m depth contours are included as standard depth contours

The new vertical reference level will be implemented in all Swedish chart products (117 paper charts and 580 ENCs). There are some challenges with the timeline for the project due to lack of resources. The project is expected to be finalized 2024. The geographical area from the SE – FI border to Söderhamn, in southern Sea of Bothnia, and some charts in Stockholm archipelago are finalized. The new surveyed coastline, which is referenced to BSCD 2000, is updated beforehand and is implemented in all SE ENCs and paper charts, except for Lake Vänern.

3.3 Small Craft Charts

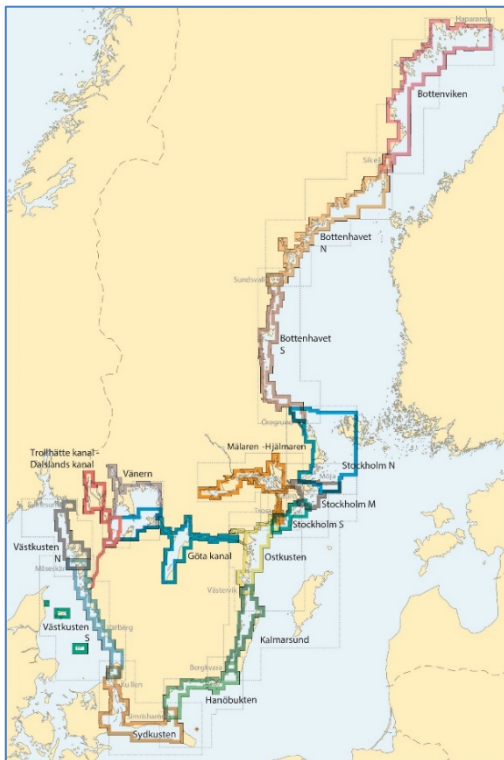


Figure 5 Small craft chart series in Sweden

The sales of Swedish small craft charts are still important for the SMA net result. In 2021 four New Editions of small craft charts have been published covering the Swedish West Coast (North and South), the South Coast and East Coast. In May and June 2021 SMA had a new sales record, when almost 7 800 small craft charts were sold. The reason is probably the ongoing Covid-19 pandemic resulting in increased domestic tourism.

4. New publications and updates

4.1 NtM and other publications

The Swedish Notices to Mariners (Ufs) is available on the SMA web site:

- 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. See [NtM database](#).
- Each week one Swedish and one English PDF-file are published on the website. See [Swedish version](#) and [English version](#).
- General nautical information (about MSI, regulations, ENC and paper charts, fairway information, etc.) needed for safe navigation in Swedish waters are available in Ufs A. It is published as a pdf version available both in Swedish and in English at the SMA website. See [the English version](#). It is easy to print the pdf version for the customers. The ambition is to update the information in Ufs A at least once per year.

The Swedish Chart Catalogue is published annually. It is available as a printed version as well as published pdf at the SMA website. See [Chart Catalogue](#).



4.2 Swedish Pilot

Swedish pilot books in paper format have not been produced in several years. Critical nautical information, traditionally published in the pilot books, is published at the respective SMA Pilot Area's website. To secure more harmonized nautical information and utilize for harbours to more easily contribute, a web service called Svensk Lots/Swedish Pilot is under development.

5. MSI

All Swedish navigational warnings are drafted and broadcasted by the station **SWEDEN Traffic**. 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.

The station is operated H24 all days of the year. Contact information: Tel: +46 771 63 06 85

E-mail: swedentraffic@sjofartsverket.se

The NtM section of the Hydrographic Office maintains the role "Baltic Sea Sub-area Coordinator", including the role of international coordinator of MSI in the Baltic Sea area.

6. C-55

The latest update regarding Sweden in the C-55 database was delivered to the IHO Secretariat in March 2021.

7. Capacity building

Sweden has not been active within the IHO Capacity building programme during the period.

8. Oceanographic activities

8.1 Tide gauge network

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. The SMA and the SMHI have a close cooperation on water level information. The network has been modernized through extra financing from the FAMOS Odin project. From 3 June 2019 all water level information from SMHI and SMA is presented in Baltic Sea Chart Datum 2000 instead of Mean Sea Level.

Other oceanographic actors are the Swedish Geological Survey, universities and research institutes.

8.2 Seabed 2030 – RDACC in Stockholm

The GEBCO Seabed 2030 project will facilitate mapping of the ocean floor by the year 2030. The aspiration is for Seabed 2030 to compile all available and newly collected bathymetric data into a high quality, high resolution digital model of the ocean floor and to promote international efforts to collect new data. This will be performed by Regional Data Centre for Digital Bathymetry (DCDBs). One of the DCDBs is the Department of Geological Sciences, Stockholm University, Sweden, which is responsible for the North Pacific and Arctic Ocean.

9. Marine Spatial Data Infrastructure in Sweden

Hydrographic data is used by many different stakeholders in Sweden. Apart from navigation it is crucial for many different purposes such as marine environmental mapping, climate change protection (such as flooding prediction) and marine spatial planning. In Sweden there is no specific initiative to establish a geodata portal only for marine data. The Swedish Land Survey Agency – Lantmäteriet – is the coordinator for all geodata in Sweden including marine data. At www.geodata.se marine spatial data is available together with all other geodata.

The Swedish Agency for Marine and Water Management has an overall responsibility for Marine Spatial Planning in Sweden, but the coastal municipalities are responsible for their waters from one nautical mile outside the limit of the baseline to the shoreline. For Marine Spatial Planning the municipalities have specifically expressed that the lack of marine data in the coastal region is problematic and hinder them to perform their planning.

10. Innovation

The SMA is testing hydrographic surveying with an Autonomous Surface Vehicle (ASV) for surveying of very shallow waters. It is a system called DeepCat and is delivered by the Swedish company Deep Vision.



Figure 6 Surveying with ASV is tested with this system from Deep Vision. Pictures from Deep Vision.

11. Other activities

Category B Hydrographic Surveyors Program established in Sweden

The SMA has been involved in the establishment of a Category B Hydrographic Surveyors Program in Sweden. This Cat B program has been certified by the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC). The University of Gothenburg is overall responsible for the program, but to be able to deliver the program a consortium of academia, industry and government organizations has been established. This is the first certified Hydrographic Surveyors program established in any of the Nordic countries.