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 21st BSHC meeting in Klaipeda September 2016.

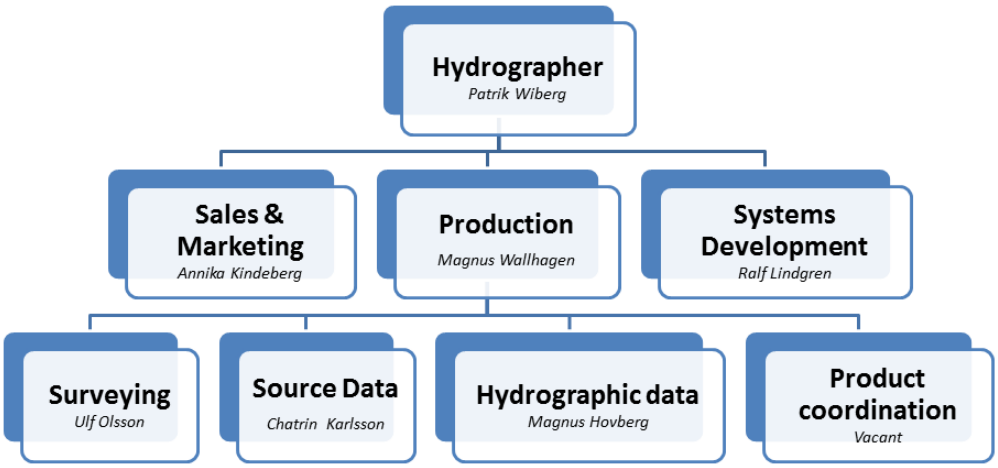
1. Hydrographic Office

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 117 persons.

The operations are certified in accordance with ISO 9001 and 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 slightly changed since the digitizing project was finalized in the end of 2016, which resulted in termination of this unit.



2. Surveys

2.1 Overall status and surveys 2016 – 2017 (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 standard S-44. Sweden and Finland have implemented a common Finnish Swedish

realisation of S-44; named FSIS-44. This standard is achieved in the majority of areas used by SOLAS vessels, but there are still vast areas used by SOLAS vessels that 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 119 000 km² out of totally 165 000 km² within Swedish waters. Sweden has targeted that the surveying of Cat I and II areas 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 was finalized 2016, but FAMOS is continuing with the second phase FAMOS Odin 2016 – 2018. FAMOS Odin was approved for co-financing by the EU Commission and the EU Parliament in July 2016. The HOs from Denmark, Estonia, Finland, Germany, Latvia Lithuania and Sweden is participating in FAMOS Odin. In addition to these HOs, there are also some other additional partners. Additional activities in this second phase are studies on route optimizing in the Baltic Sea in regards to bathymetry and squat. The project will also perform studies on better control of Under Keel Clearance, where the clearance is critical. See more in the FAMOS Status Report, document C6_BSHC22_SE.

FAMOS
FINALISING SURVEYS FOR THE BALTIC MOTORWAYS OF THE SEA
Co-financed by the European Union
Connecting Europe Facility

In 2016 a total amount of 4 443 km² were surveyed in Swedish waters by SMA vessels and additionally 2 205 km² was survey by external resources. Additionally 2661 km² was surveyed the first 6 months of 2017. The total amount of Swedish waters, surveyed in accordance with FSIS-44, is summarized in the table below.

Category of SE waters	**Area**	**FSIS-44 fulfilled**	**Percentage FSIS-44 fulfilled**
Total area SE waters	165 000 km²	93 000 km²	56 %
Shipping routes HELCOM Cat I and II + inland waters*	119 000 km²	85 000 km²	71 %
Other waters HELCOM Cat III + inland waters*	46 000 km²	8 000 km²	17 %
*The figures in this table differ slightly from the SE figures in the BSHC MWG Report since also areas in inland waters are included here.			

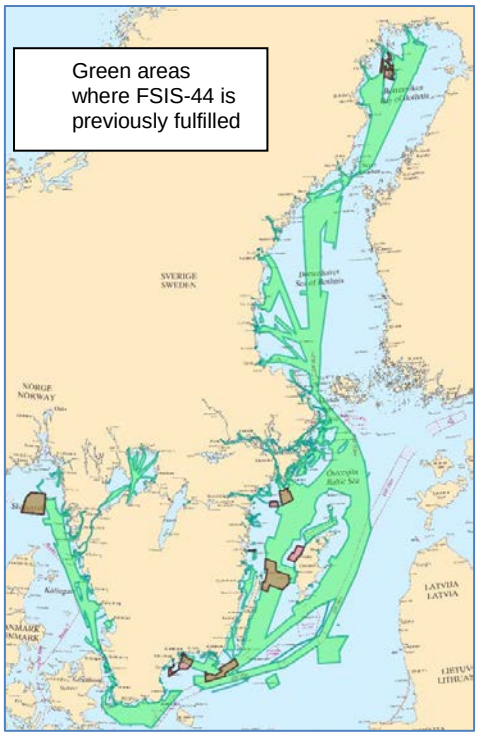


Figure 1 Surveys performed 2016

Surveys planned 2017 (SMA vessels)

At the last BSHC meeting it was identified that a small in area in Danish waters, north of the DW-route off Bornholm, was not included in the HELCOM Re-survey plan. Since Sweden had planned to do surveys in the adjacent area in Swedish waters, Sweden offered to also survey the small area in Denmark. As a compensation then Denmark offered to survey an equivalent since of area in Kattegat in Swedish waters. The surveys was performed the first half of 2017 and the good cooperation between Denmark and Sweden led to efficient surveying of the areas.

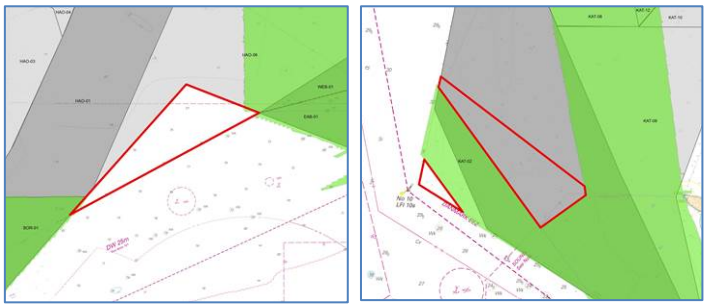


Figure 2 Sweden surveyed a Dannish area north of Bornholm an Denmark surveyed two equivalent Swedish areas in Kattegatt.

The FAMOS Odin project, with the co-financiation from the EU CEF-program, has given SMA possibillity to procure external resources for surveying. Framework agreements, regarding hydrographic surveys in Swedish areas 2017 – 2019 (with possible extension one year), have been awarded seven service providers. In July 2017 the first years survey agreement was signed with Clinton. The survey area is 6 700 km² (see figure below) and will be collected with Kongsberg EM2040. The water depth is ranging between 20 meters to 250 meters and will be conducted with the vessel M/V Northern Wind.

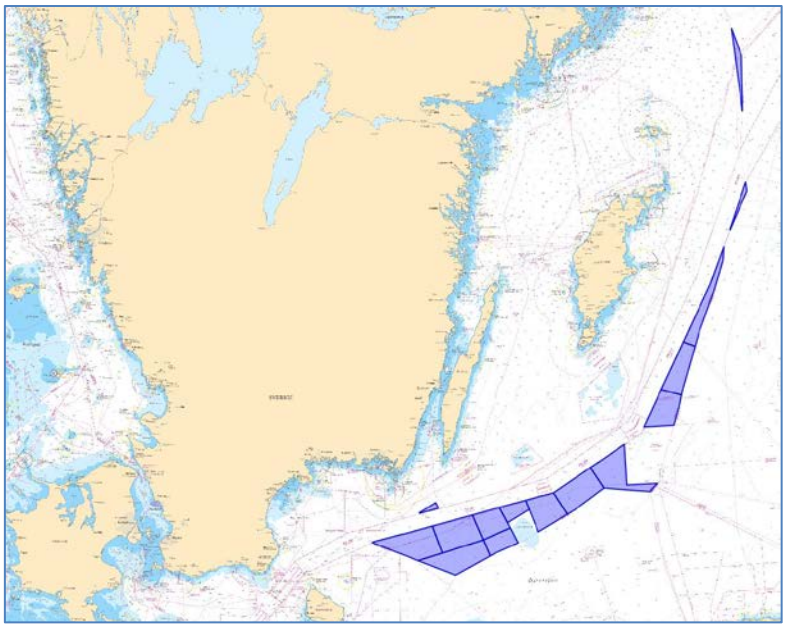


Figure 3 Areas being surveyed by Clinton 2017

2.2 Survey Vessels

Figure 4- 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 5 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 of writing this report, 128 billion depths were stored in the depth database.

3. New charts and updates

3.1 New ENC and Paper Charts

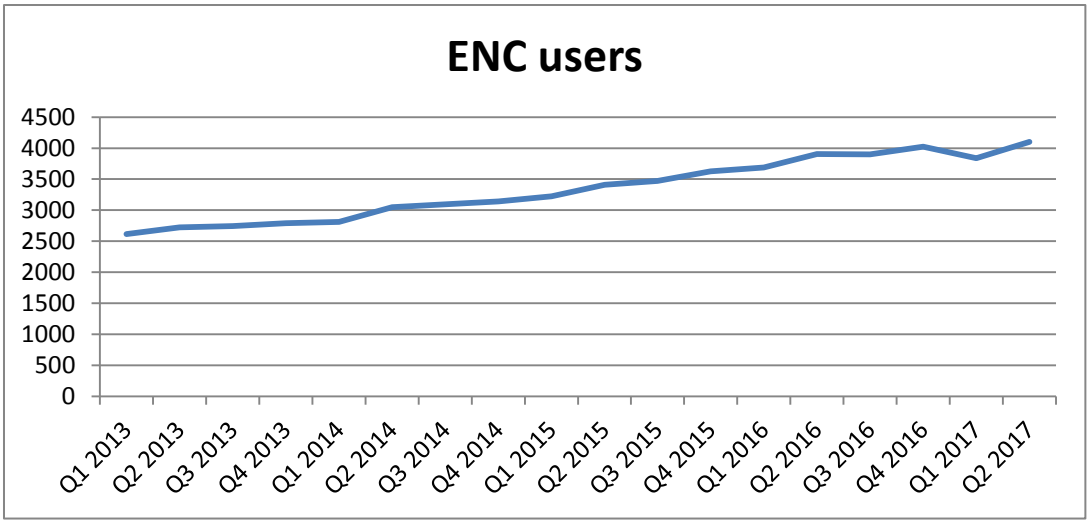
The Swedish paper chart portfolio consists of 117 paper charts and 16 series of small craft charts. Special charts, tailored to the customer are also available as well as a service to provide S-57 or raster data to the end user service providers. For S-57 deliveries to the leisure craft market the PRIMAR service "GeoViewer" is used.

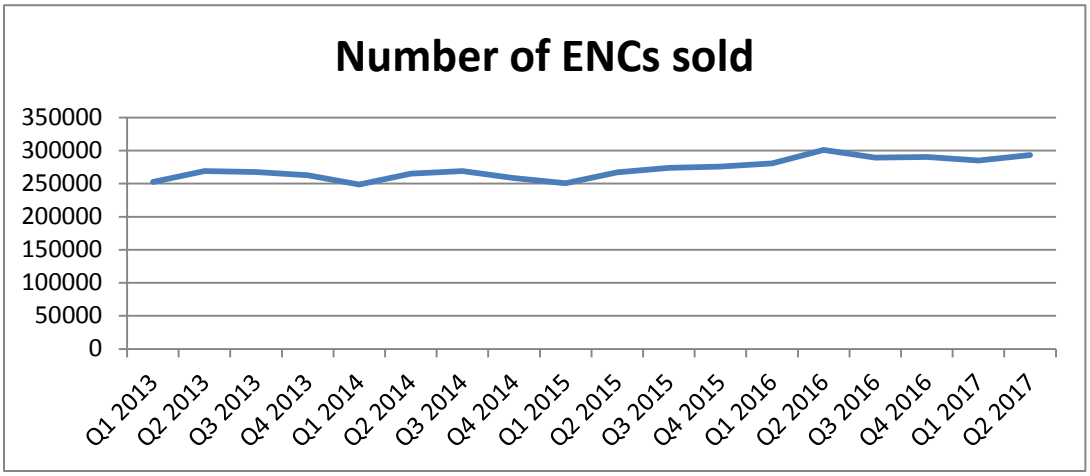
A chart index showing Swedish charts is available at:
http://www.sjofartsverket.se/sv/Snabblankar/Kartviewers/Se-pa-sjokort-/

The quality of depth data is also presented at the SMA external website:
http://www.sjofartsverket.se/Snabblankar/Kartviewers/Sjofartsverkets-karttjanster1/

58 New Editions of paper charts was published 2016. As a consequence of data migration, when starting up the ENC production in the new CARIS HPD system, all 579 Swedish ENCs had to be published as New Editions, which was made the first quarter of 2017.

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





Usage Band	Compilation Scale	No of SE ENCs
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	104
		579, total number of SE ENCs

3.2 The Chart Improvement project – Sjökortslyftet

Within the BSHC 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 started the Chart Improvement project (Sjökortslyftet) 2015 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 2016 with equivalent 14 New Editions of ENCs as a consequence of the project. The new vertical reference level will be implemented in all Swedish chart products (120 paper charts and 579 ENCs) until 2020.

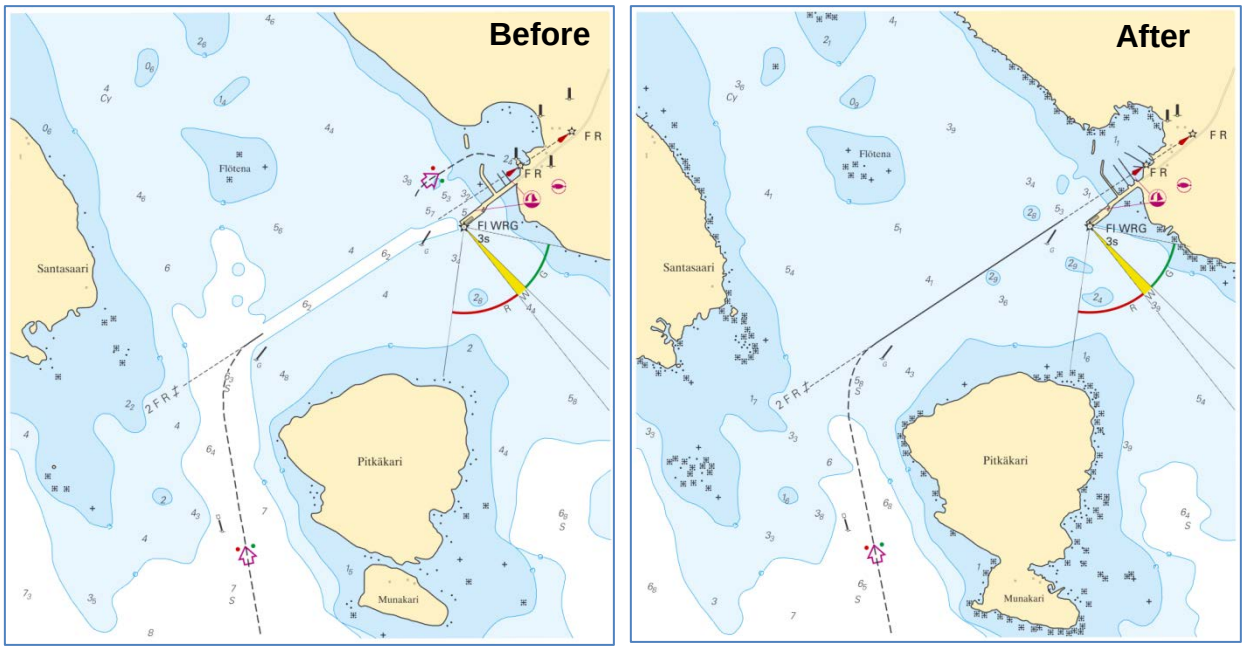


Figure 6 Changes after the Chart Improvement project in the Haparanda region, near the Finnish border.

3.3 Small Craft Charts

The sales of Swedish small craft charts are very important for the SMA net result. However since SMA has changed its production system for chart products late 2016 it was not possible to produce any new editions of small craft charts to the 2017 season. SMA plans to produce six new editions of small craft charts to the 2018 season.

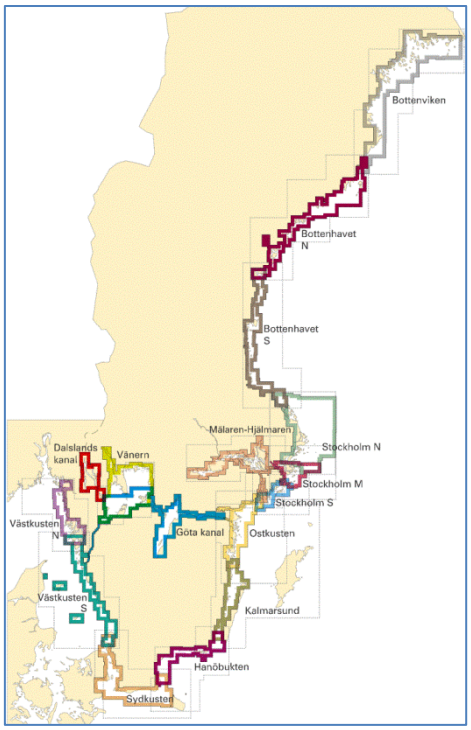


Figure 7 Small craft chart series in Sweden

3.4 New Chart Production System

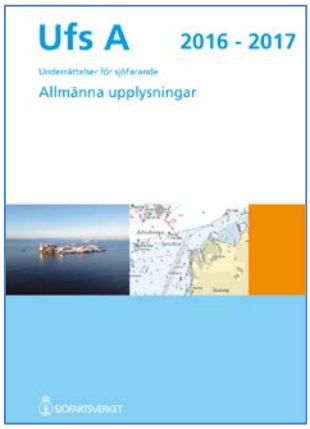
The previous chart production system at SMA was in use more or less 25 years. After a public procurement 2015 a contract was signed with CARIS in November the same year in order to deliver a new system for chart production. The new CARIS HPD system was taken in production in October 2016. ENCs were produced within weeks from production start-up, but the paper chart production is much more resource consuming to restore. All necessary cartography needs to be re-created and the first paper charts, produced from the new system, are scheduled to be published in August 2017. A limited amount of New Editions will be published the coming year. The whole cartography migration work should be finalized 2018.

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 and 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, 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.



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 operated 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 August 2017.

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 Converting fair sheet archive (ScanDIS)

The digitizing of soundings from fair sheets and similar maps in our archive continued 2016 with the overall aim of creating national coverage in the depth database (DIS). For the Hydrographic Office in particular, this enabled a more efficient production of chart information.

This operation was since 2007 being permanent in our organization, but the production unit was terminated in the end of 2016 since the whole project now is finalized. A total number of 8742 maps have been digitized during the whole project. This means that SMA now have bathymetry data in the depth database covering the coast of Sweden and the inland lakes Hjälmaren, Mälaren, Vänern and Vättern. The Swedish Agency for Marine and Water Management (Havs- och Vattenmyndigheten) was funding this project.

9.2 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 ENCs and paper charts will be updated with the new survey data.

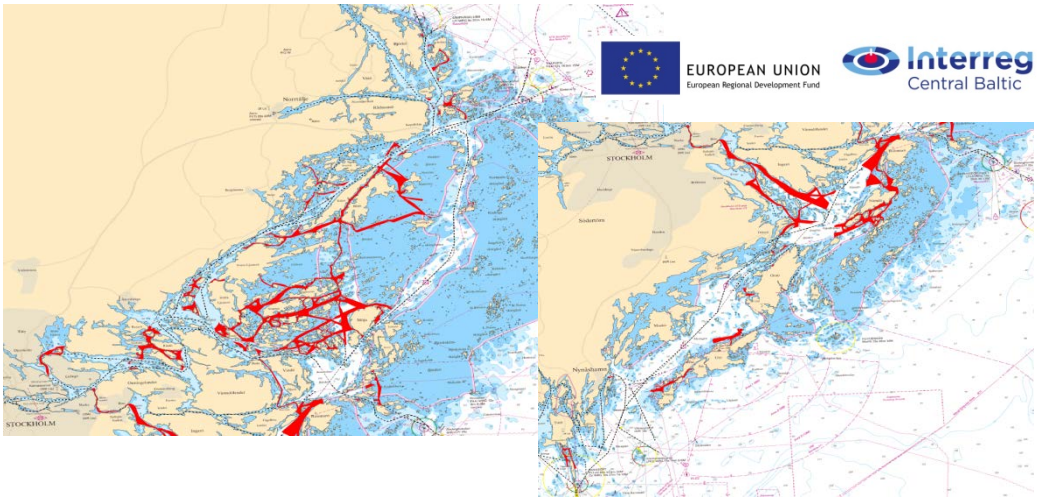


Figure 8 Areas to be surveyed in Stockholm archipelago in the ADAPT project

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. So far over 40 Notices to Mariner have been issued as a result of the surveying being done during 2016. Exceptional differences compared to the original chart have been discovered. Below an example of a passage where the 3 m depth contour had to be extended and a depth figure had to be changed from 5 to 3.4 m.