

Depositing of dredged material in the Baltic Sea

Key message

- The total amount of material deposited at the Baltic Sea is highly variable between years, depending widely on the occurrence of larger capital dredging operations. Total amount of material deposited in 2018 was almost 10 million tonnes which is about 1 million tonnes more than in 2017. This is due to slight equal increase of both capital and maintenance dredging operations. Dredged material was deposited at 90 depositing sites.
- In 2018, similarly to 2017, the amount of material deposited at sea originated from capital dredging slightly prevailed over the maintenance operations. Capital dredging produced 5,34 million tonnes of the deposited material, which constitutes 54% of all dredged material deposited at sea in 2018. This amount slightly exceeds the volume produced by capital dredging in 2016-2017 but remains much lower than the amounts reported in 2013-15. Most of the capital dredging in 2018 was reported by Denmark and Lithuania.
- Maintenance dredging in 2018 contributed slightly less than 4,56 million tonnes, which constitutes about 46% of all dredged material deposited at the Baltic Sea. This amount is slightly more than in 2017 but remains at average level for the last 3 year. The main contributors in 2018 were Russia, Denmark and Germany.
- 71% (7.1 million tonnes) of the material deposited at sea in 2018 originates from sea and 28 % (2.85 million tonnes) from harbours or river estuaries. There was no material of unknown origin reported.
- There were six major contaminants reported by countries in 2018: four heavy metals (mercury, lead, cadmium and copper), tributyltin and polyaromatic hydrocarbons. The proportion of TBT and PAHs in sediments from harbours/river is about 99% and 98% of total amount respectively. Most of the copper in dredged material originates from operations at sea (53%) while mercury, cadmium and lead are mainly from harbour/river sediments (84%, 86% and 58%).
- Vast amount of beneficial use of dredged material in 2018 was reported. 8,8 million tonnes of dredged material were used at 25 sites in the Baltic Sea for construction, beach nourishment and other purposes. The site where dredged material was used are indicated on figure 1 but not included in the analysis.

Results and assessment

Relevance of the BSEFS for describing developments in the environment

The depositing of dredged material fact sheet is relevant for seabed integrity and input of hazardous substances to the marine environment. The fact sheet enables to assess the level of physical disturbance to the marine environment caused by dredging/depositing operations at sea, as well as the level of contamination of marine and coastal sediments and the amount of priority pollutants entering the marine environment or resuspended in the marine environment with deposited material.

Policy relevance and policy references

There is a general prohibition of dumping in the Baltic Sea according to the Helsinki Convention, except for dredged material; however, dumping of dredged material containing harmful substances is only permitted according to [HELCOM Guidelines for Management of Dredged Material at Sea](#). The Contracting Parties are obliged to regulate and report about the material that has been deposited in the Baltic Sea Area. Data on depositing of dredged material is to be reported annually by the end of September of the year following year the activities have been taken place.

The HELCOM Brussels Ministerial declaration (2018) states the importance of preventing physical damage of the seabed and to mitigate the effect of hazardous substances in marine environment. Both aspects mentioned in the declaration are of high relevance to the management of dredged material.

Regarding hazardous substances the declaration, among other things, states that “WE AGREE to re-examine the effectiveness of measures and recommendations for legacy pollutants and to identify the scale of problems of contaminants of emerging concern, including micro-pollutants in coastal and marine waters and, based on this knowledge, to consider possible cost-effective mitigation.”

And regarding seabed damage and disturbance that “WE AGREE, based on best available scientific advice, to work together to elaborate regional and national actions aiming at delivering the necessary reductions in adverse effects of physical disturbance caused by human activities.”

Majority of HELCOM Contracting Parties are also parties to the global "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972", the "London Convention" for short. Its objective is to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter. London Convention is also collecting information on the depositing activities of its Contracting Parties, and HELCOM started a trial with 2017 data to perform consolidated reporting to the London Convention on behalf of HELCOM Contracting Parties.

HELCOM Recommendation 36/2 recommends that the Contracting Parties follow the HELCOM Guidelines for Management of Dredged Material at Sea, and that the Contracting Parties annually report national data on management of dredged material according to the Reporting Format of the HELCOM Guidelines. Data from 2018 were reported by all countries. As agreed by PRESSURE 5-2016 ([Outcome](#), para 5.9), analysis of reported data have been made to illustrate deposition of dredged material and also the distribution of input of selected contaminants associated with it to the Baltic Sea marine environment.

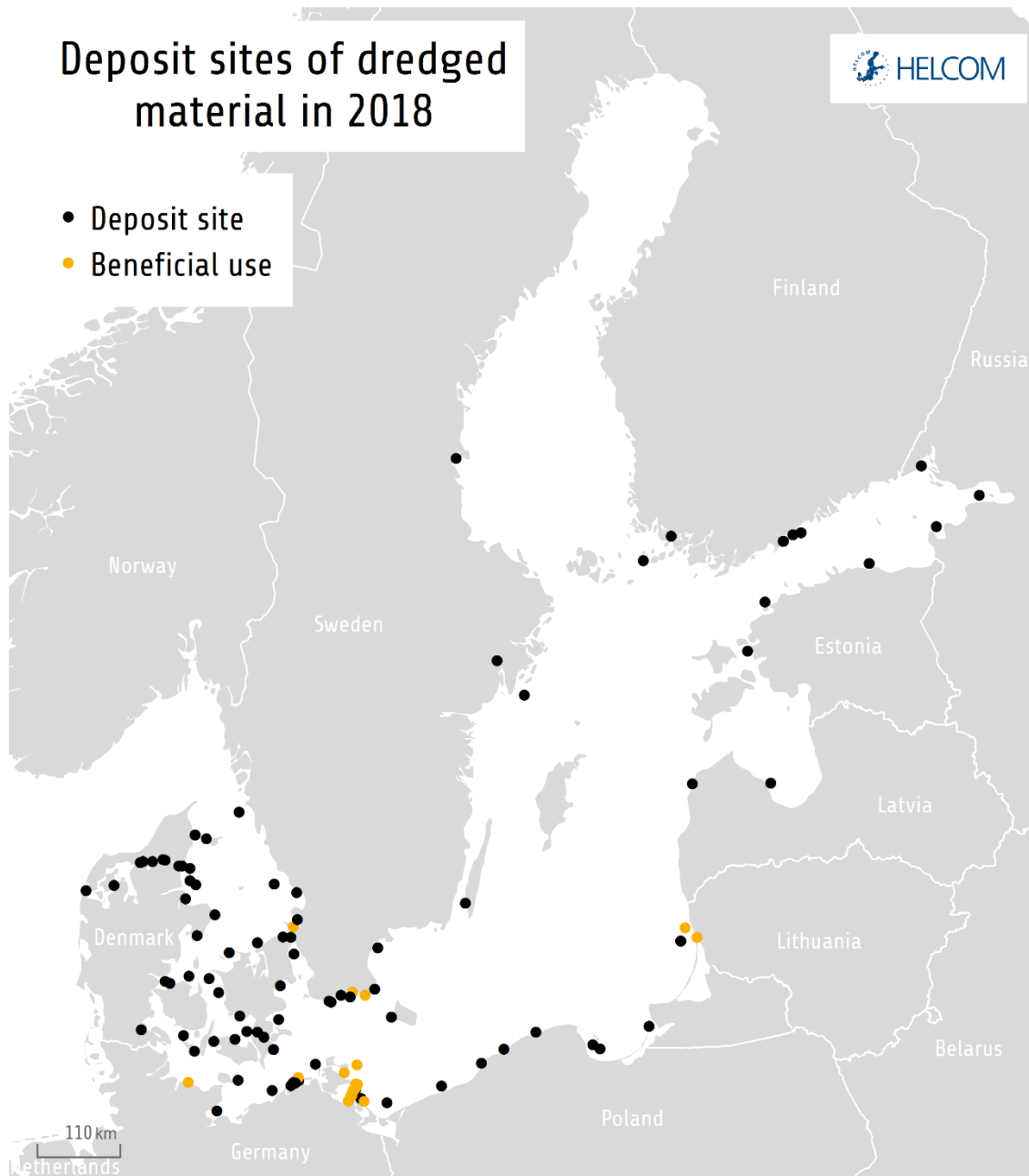


Figure 1. Location of depositing sites of dredged material in 2018 as well as locations where dredged material has been used for beneficial use.

The use of the updated data reporting format was tested in reporting of 2016 data. Fig. 1 illustrates the distribution of 90 locations where depositing of dredged material took place in 2018. The map also includes 25 locations where dredged material has been used for beneficial purposes, such as beach nourishment and land reclamation. As it can be seen from the map, the density of depositing sites is higher in the southern than northern Baltic Sea.

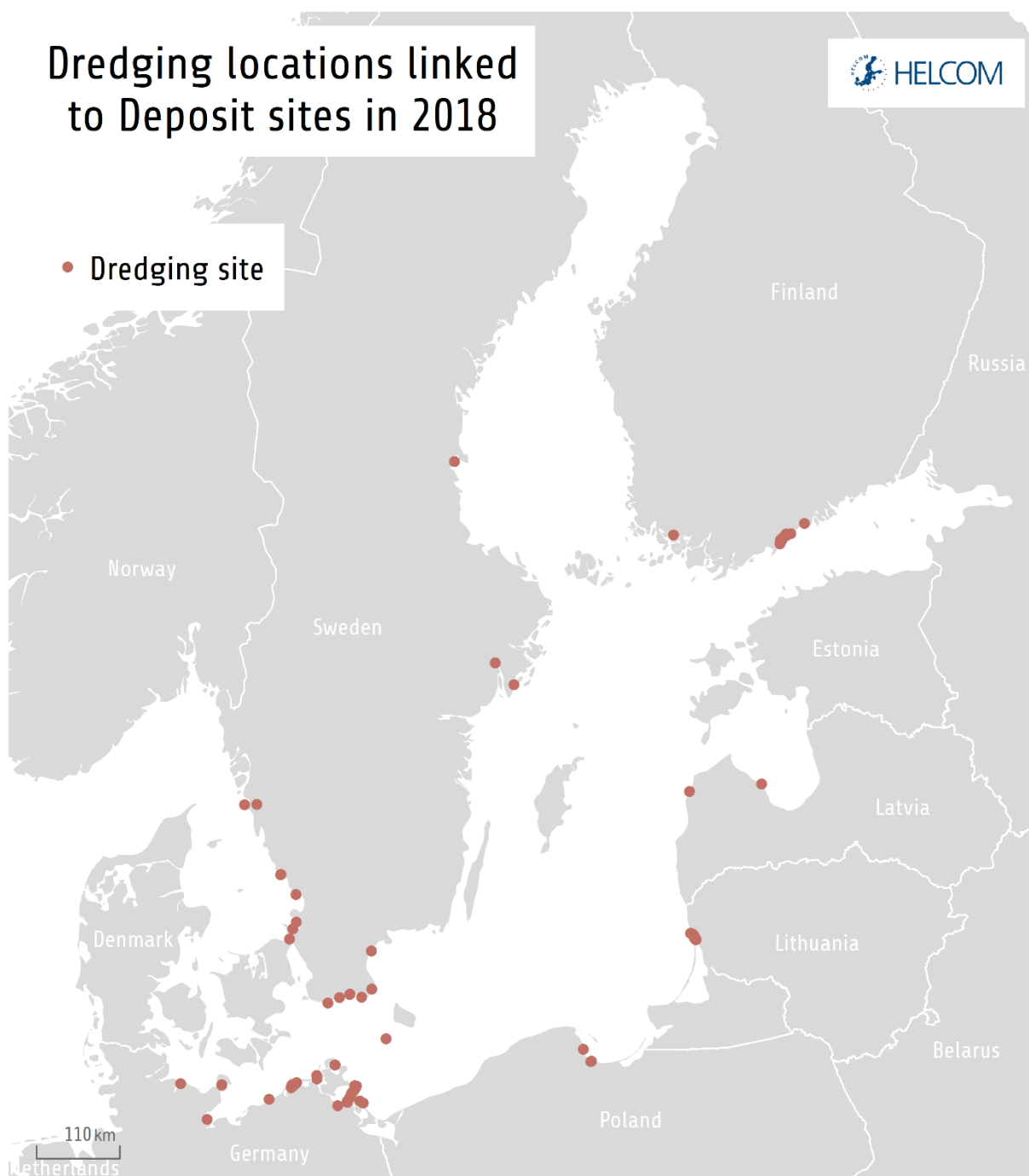


Figure 2. Location of dredging sites that are linked to depositing sites reported in 2018. Reporting of dredging sites is optional in HELCOM guidelines, and therefore not all dredging sites are reported and indicated on the map. Please also note that only dredging sites that are linked to depositing operations are reflected and the data doesn't give a comprehensive picture of dredging in the Baltic Sea.

The updated reporting format also includes information on dredging areas in the Baltic Sea and their link to the areas where dredged material was deposited. Fig. 2 illustrates the distribution of 125 sites of dredging operations in the Baltic Sea in 2018 according to the information reported by the Contracting Parties. Reporting of dredging is optional according to HELCOM Guidelines.

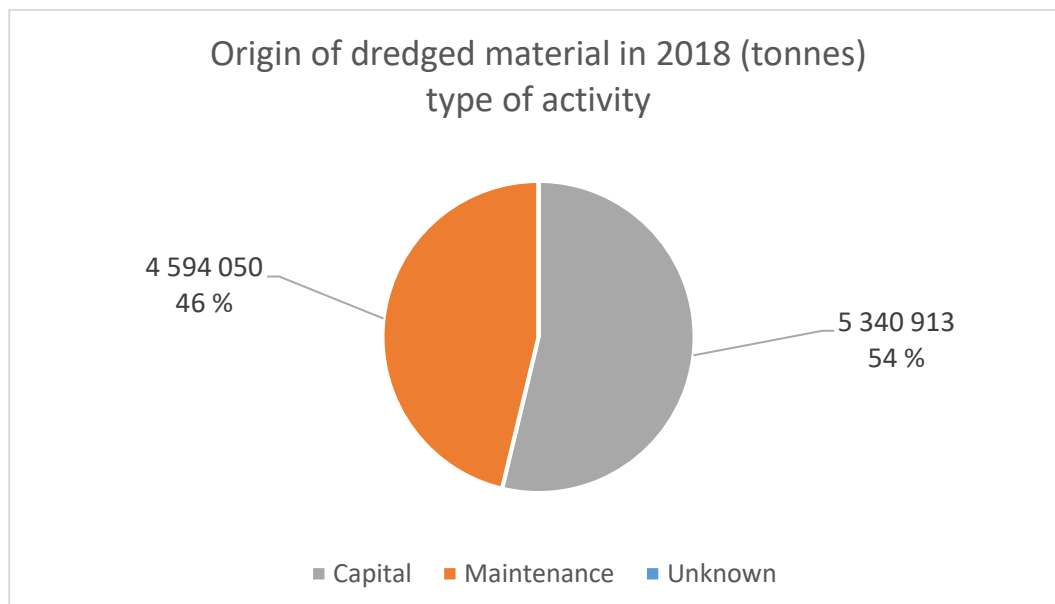


Figure 3. Proportions of material originating from maintenance dredging, capital dredging, and unknown operations in the total amount of dredged material deposited at the Baltic Sea in 2018.

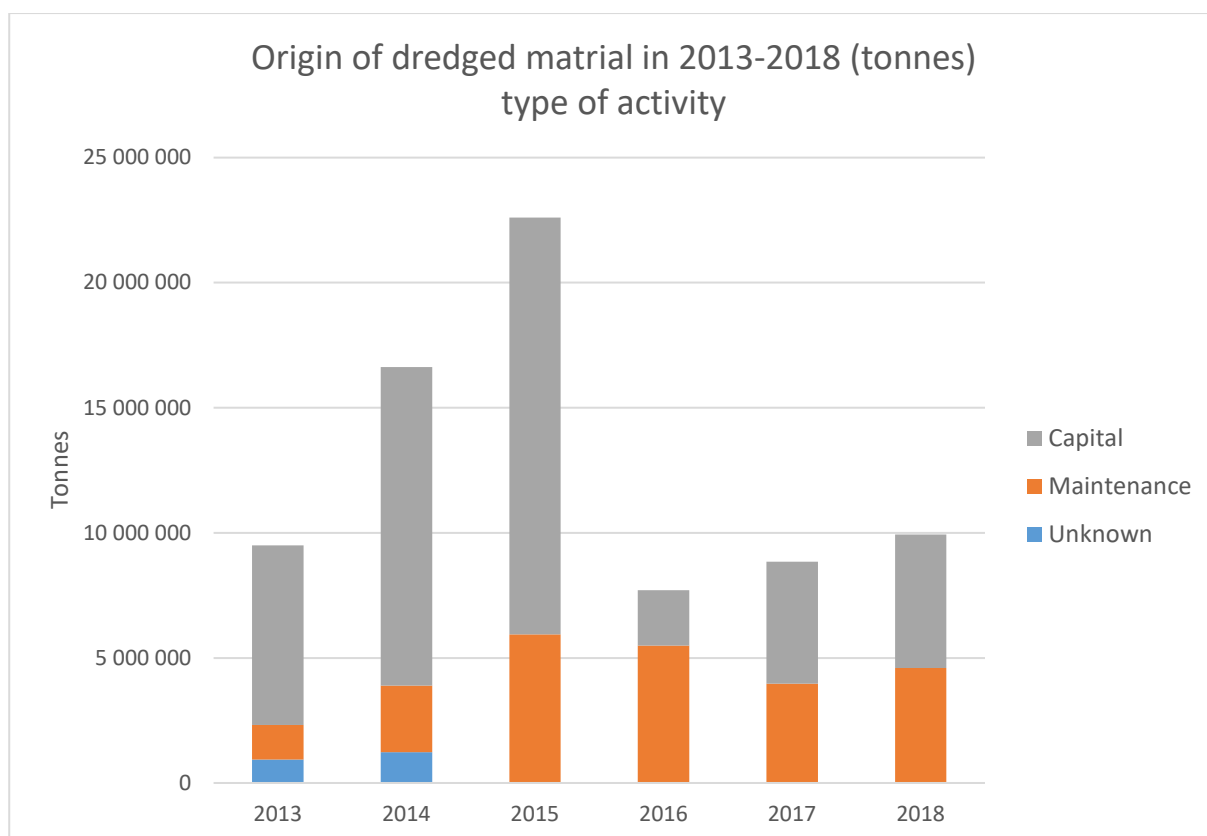


Figure 4. Amount of the material originating from maintenance dredging, capital dredging, and unknown operations in total of the amount of dredged material deposited at the Baltic Sea in the period from 2013 to 2018.

Slightly more than a half of the material (54%) deposited at sea in 2018 originates from capital dredging which is almost the same proportion as reported in 2017. Prevailing of capital dredging of maintenance is typical picture for the region except the year 2016 when capital dredging activities were minimal (Fig. 4). There was no material originating from unknown sources reported in 2018 as well as in two previous years. In 2013-14 the material of unknown origin constituted remarkable part but already in 2015 only a few percent were reported as unknown (Fig. 4).

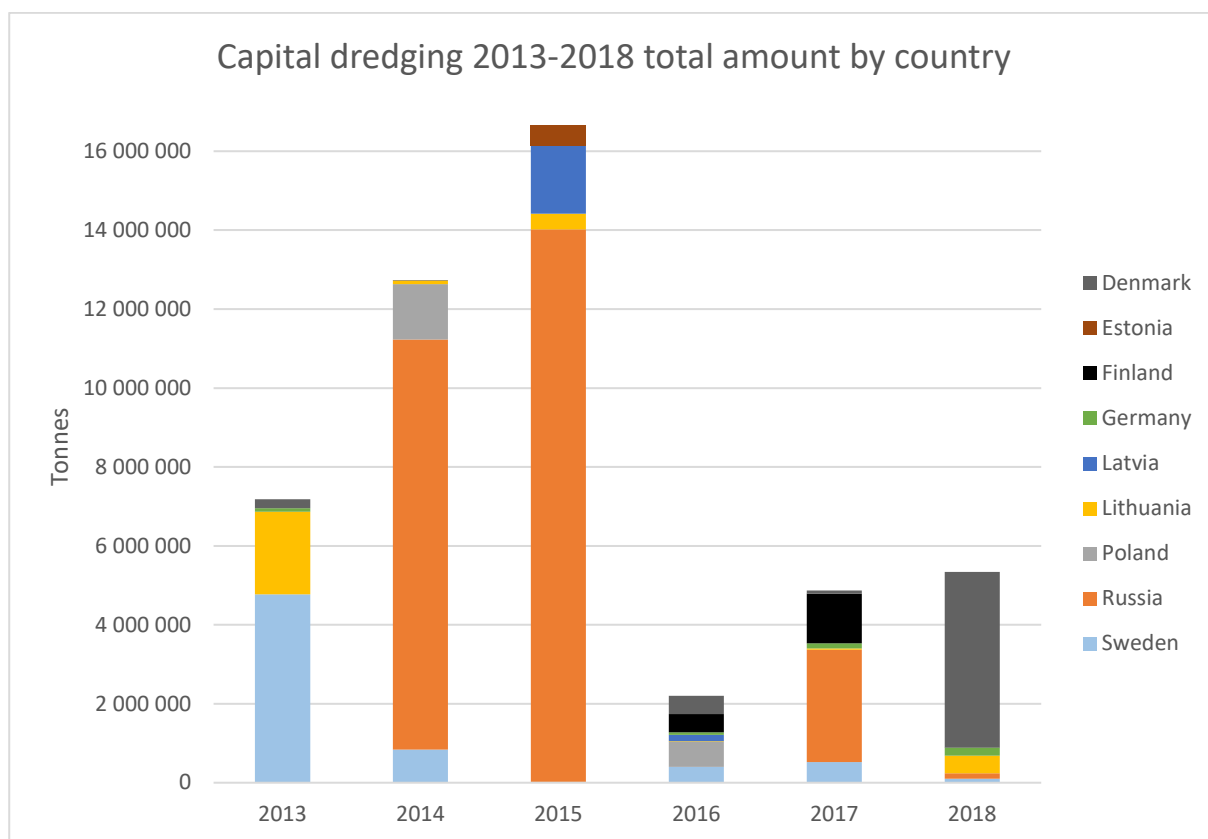


Figure 5. Deposition of material from capital dredging operations by country for the period 2013-2018.

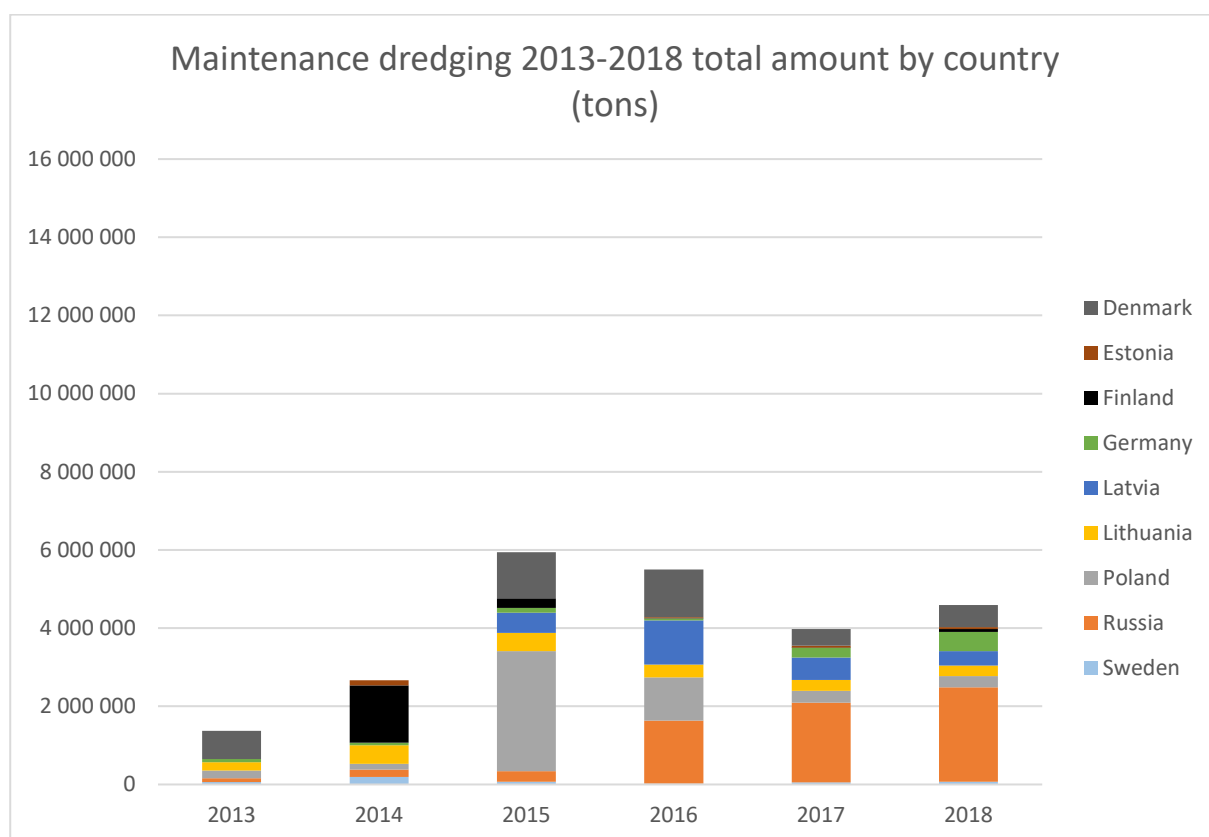


Figure 6. Amount of material deposited from maintenance dredging operations by country for the period 2013-2018.

The bar diagrams (Fig. 5 and Fig. 6) illustrate the depositing of material produced by capital and maintenance dredging activities per country. The diagrams show that a large amount of dredged material deposited at sea in 2018 was produced by capital dredging in Denmark and Lithuania. As regard to maintenance dredging the largest volume of deposited material was produced by Russia, Denmark and Germany.

Total amount of dredged material deposited

In 2018 almost 10 million tonnes which is about 1 million tonnes more than in 2017 which still much less than the amounts reported in 2014-15 (Fig. 4). In the given assessment period, the total amounts varied between 7 000 000 and 23 000 000 tonnes. Such a large variation in the amounts of deposited material is caused by the large amount of depositing reported by Russia in 2014-2015. In addition, it has to be pointed out that the completeness of reporting in the last 4 years is 100% which was not the case previously (Fig. 7).

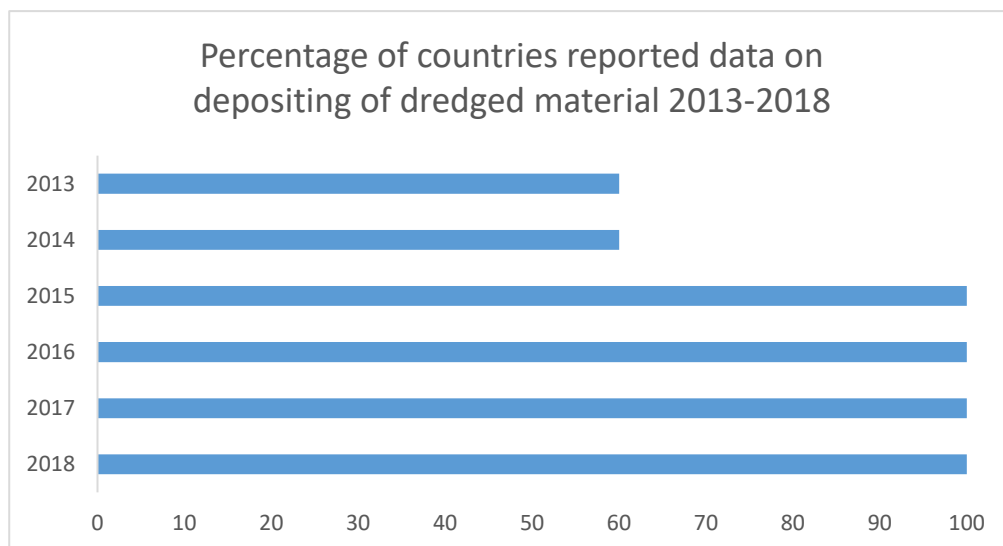


Figure 7. Completeness of reporting by the Contracting Parties in 2013-2018.

Spatial distribution of depositing sites is illustrated by Figures 8 and 9. The density of depositing sites is higher in the south-west part of the Sea. The vast amount of dredged material deposited at sites in the eastern parts of the Sea indicates that dredging operations are also rather intensive in these parts, but the depositing practices might differ. Such a character of spatial distribution is valid either for the total depositing in the period 2013-2018 or specifically for 2018 though a number of sites with large amount of material deposited in 2018 are also in the south-western Baltic Sea.

Total amount of dredged material deposited in 2013-2018

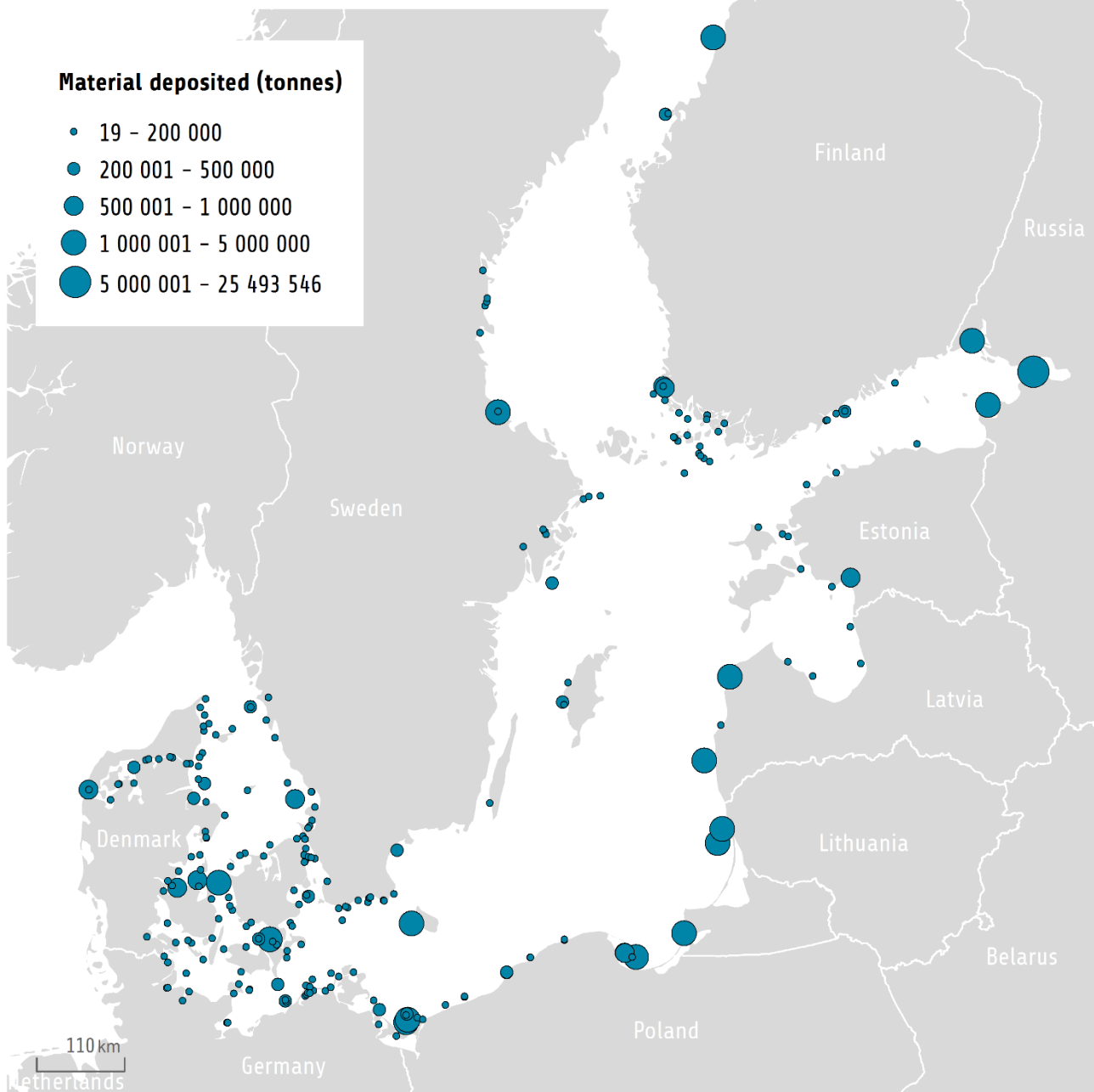


Figure 8. Total amount of dredged material deposited in 2013-2018.

Total amount of dredged material deposited in 2018

Material deposited (tonnes)

- 180 – 50 000
- 50 001 – 200 000
- 200 001 – 500 000
- 500 001 – 1 000 000
- 1 000 001 – 1 955 027

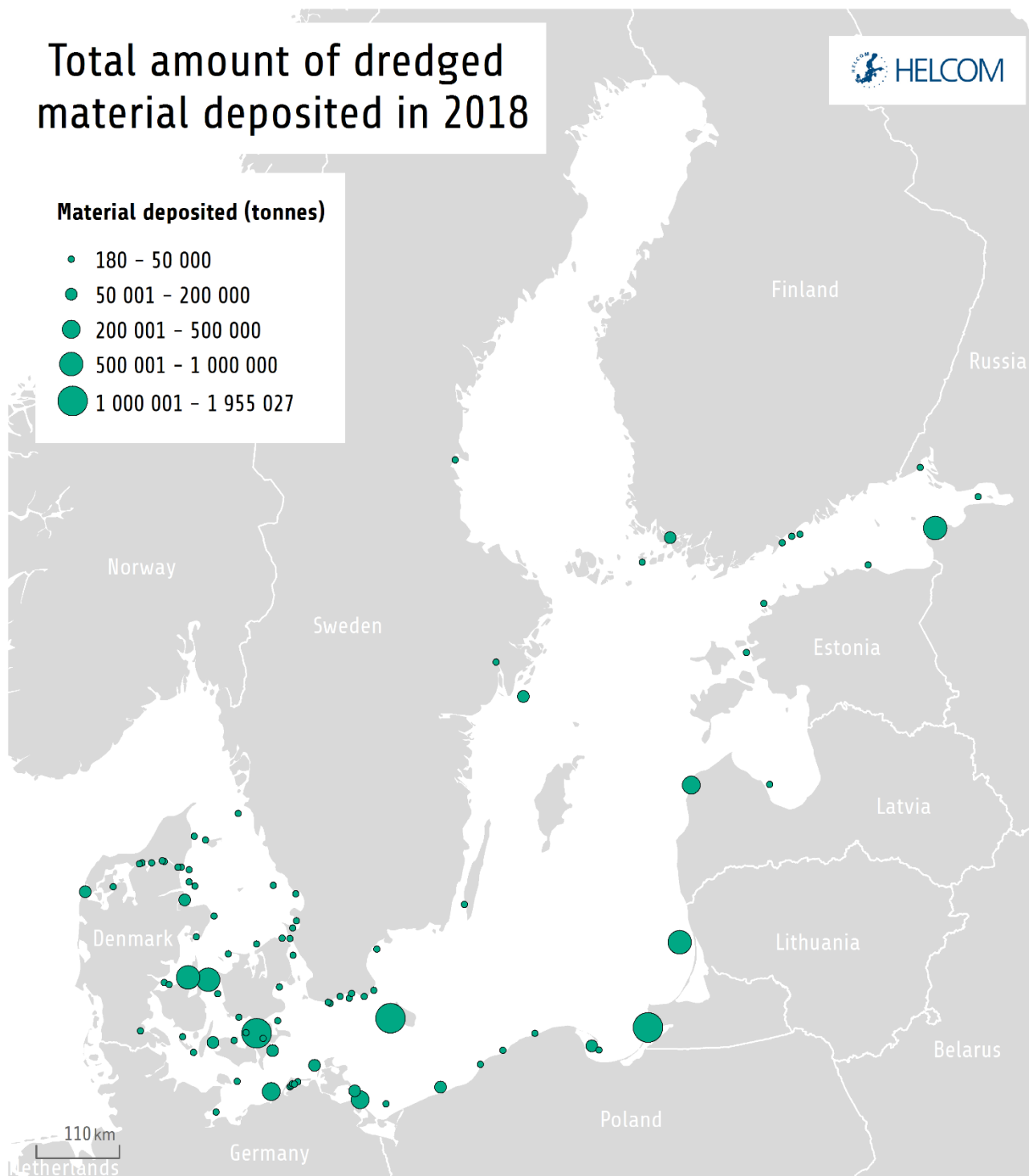


Figure 9. Total amount of dredged material deposited in 2018.

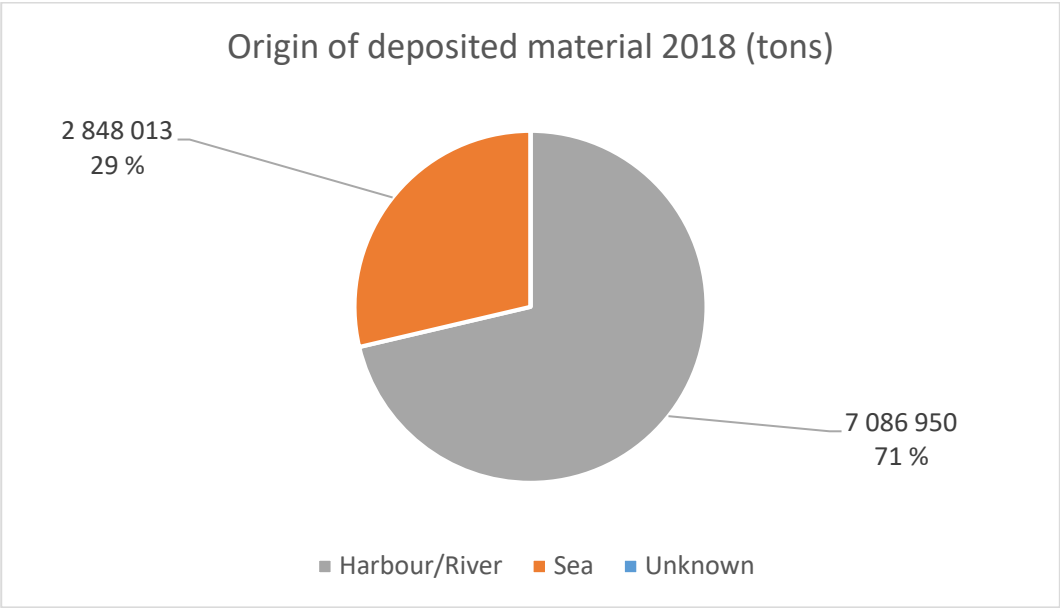


Figure 10. Proportions of the material originating from harbour/river, sea and unknown sources in total amount of dredged material deposited at the Baltic Sea in 2018.

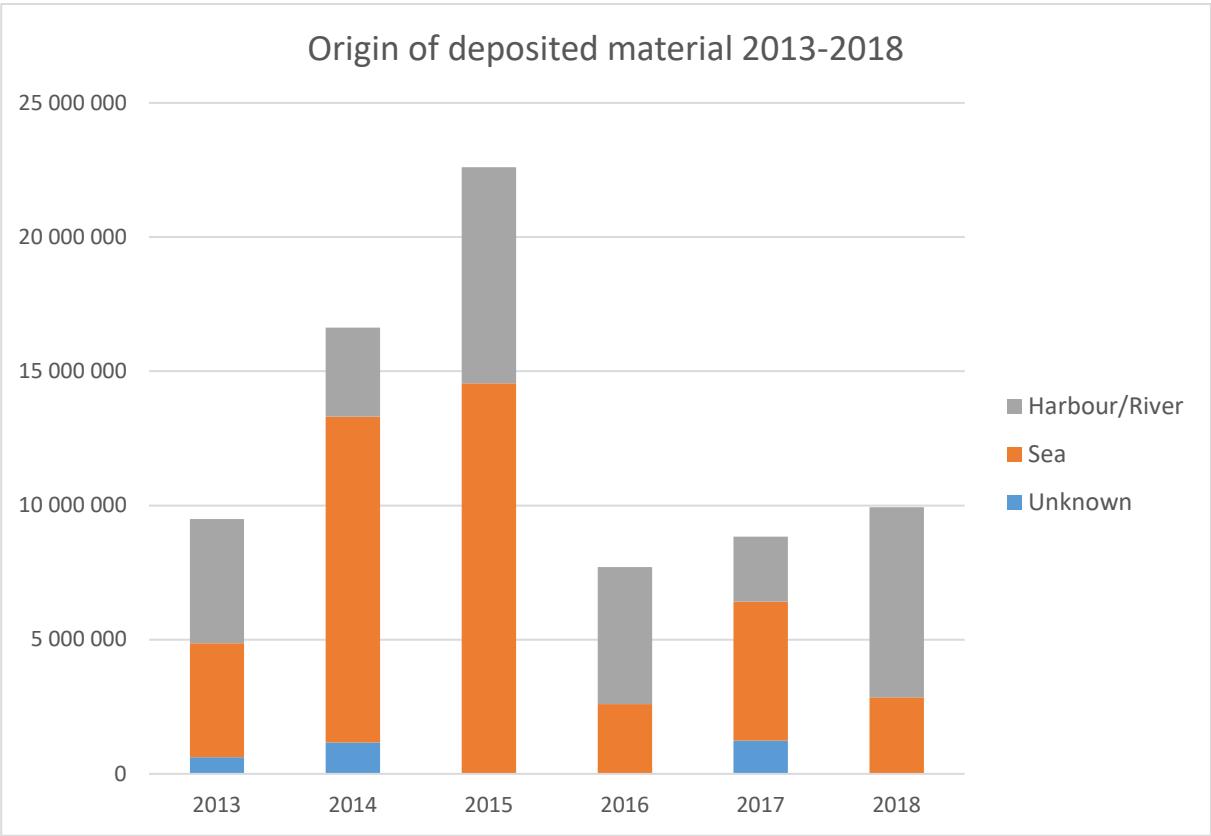


Figure 11. Proportions of the material originating from harbour/river, Sea and unknown locations in total amount of dredged material deposited at the Baltic Sea in the period from 2013 to 2018.

Figures 10 and 11 illustrate the amount of deposited material originating from sea and harbour/river environments in the last reported year and in the entire reporting period, respectively. The term “harbour/river” includes all dredged material which was transported to the sea from harbors, estuaries and inland waterways. The term “sea” includes all areas outside harbours, i.e. in open, coastal and offshore areas.

Almost three quarters of dredged material deposited in the Baltic Sea in 2018 were transported to the sea from dredging at harbors and rivers. Slightly more than a quarter of the reported amounts originate from sea. The distribution repeats one in 2016 but differ from the pattern observed in 2013-2015 and 2017 when most of the deposited material was from sea.

Figures 12 and 13 illustrate the amount of material deposited at sea originating from sea and harbour/river environments for the whole reporting period per country.

Most of the material of sea origin was reported by Russia in 2018. Russia remains the main country reporting depositing of the material with sea origin since 2014. Denmark, Lithuania and Germany are the main contributors to the deposition of the material originating from rivers and harbors in 2018. In 2018 Denmark is the main contributor to deposition of dredge material originating from harbors.

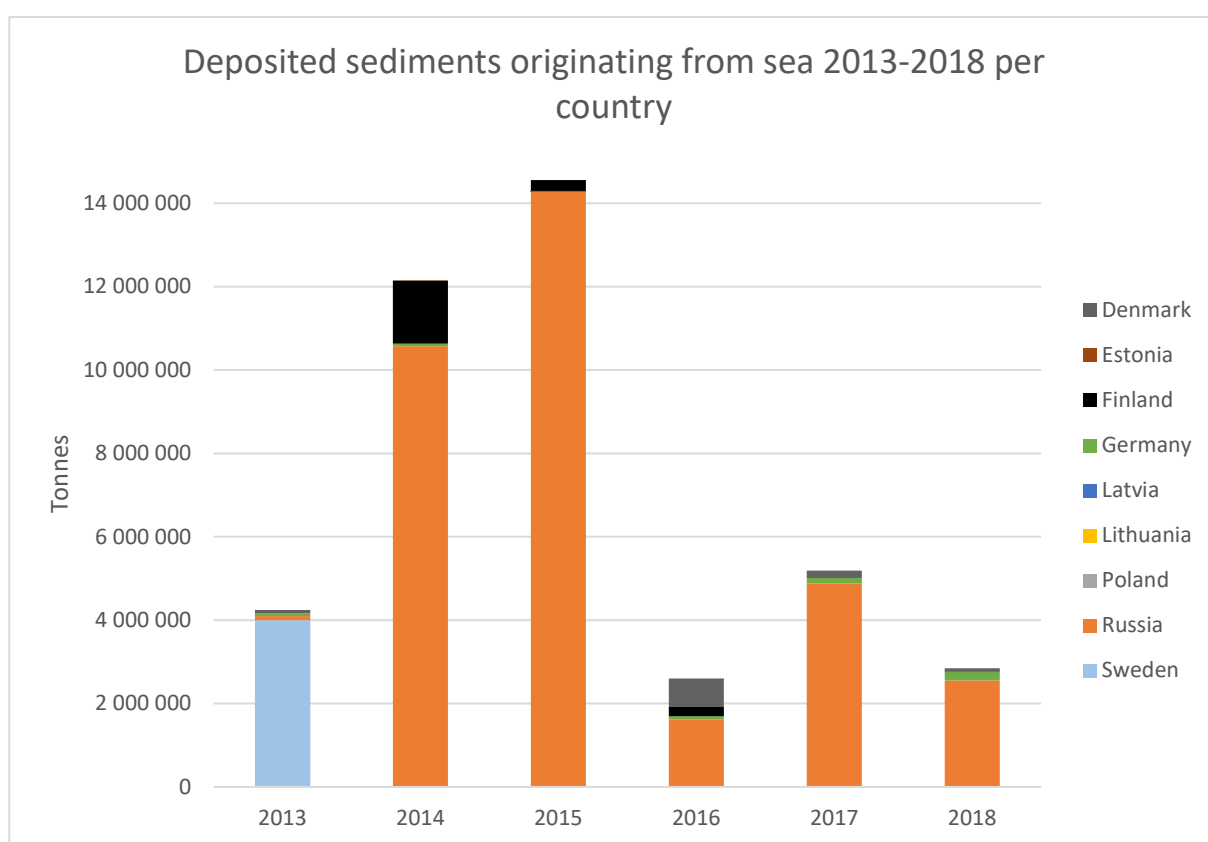


Figure 12. Amount of material originating from sea by country for the period 2013-2018.

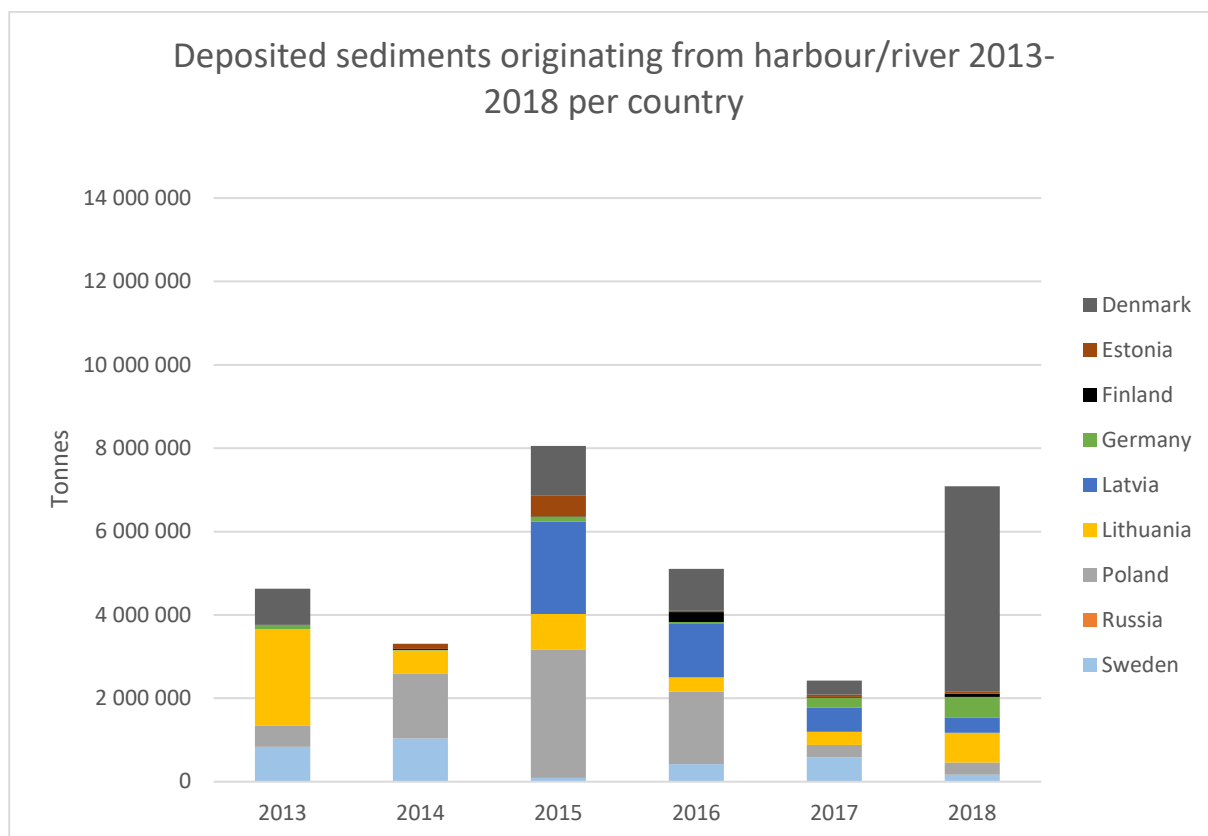


Figure 13. Amount of material originating from harbour/river environments by country for the period 2013-2018.

Country-specific values

Figures 14-31 illustrate the character of dredged material deposited in 2013-2018 per country. The upper figure illustrates the amount of material originating from different dredging operations and the lower figure illustrates sources of deposited material. Please note that the scale on the y-axis (amount material deposited in tonnes) is different for each country.

Denmark

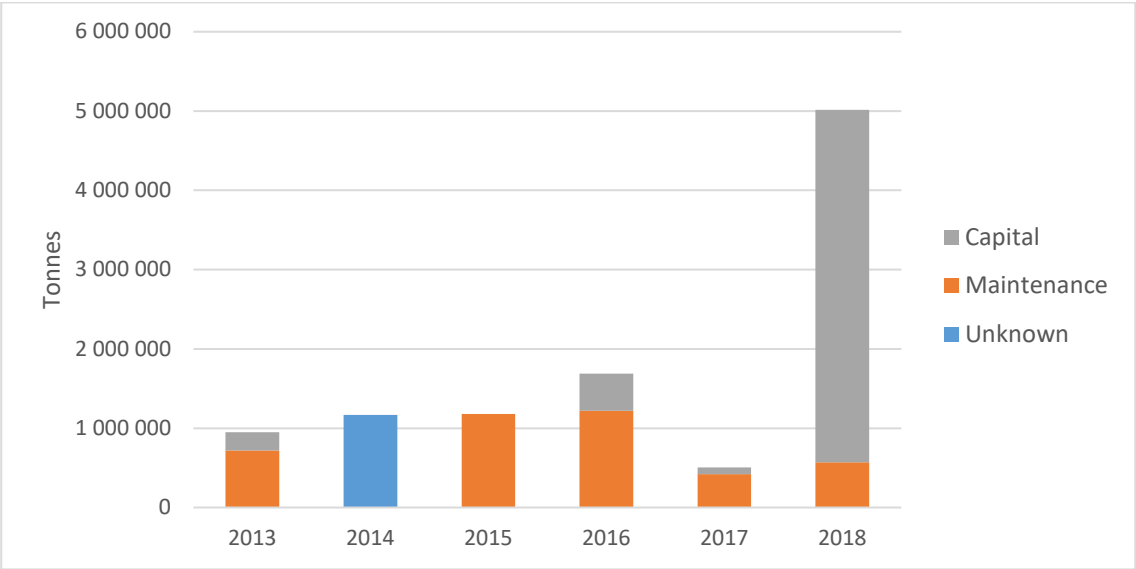


Figure 14.

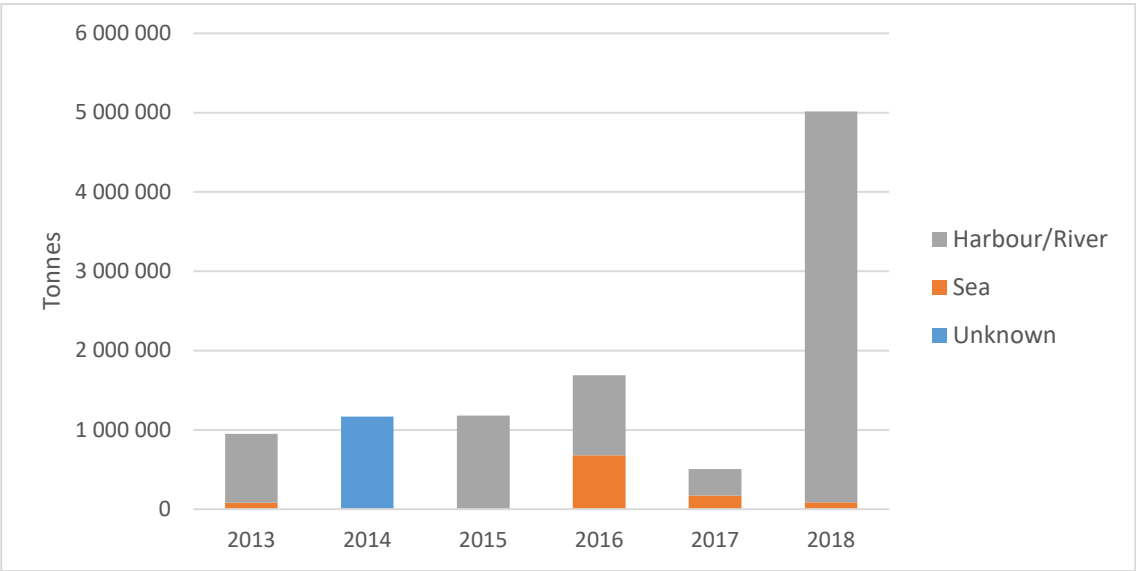


Figure 15.

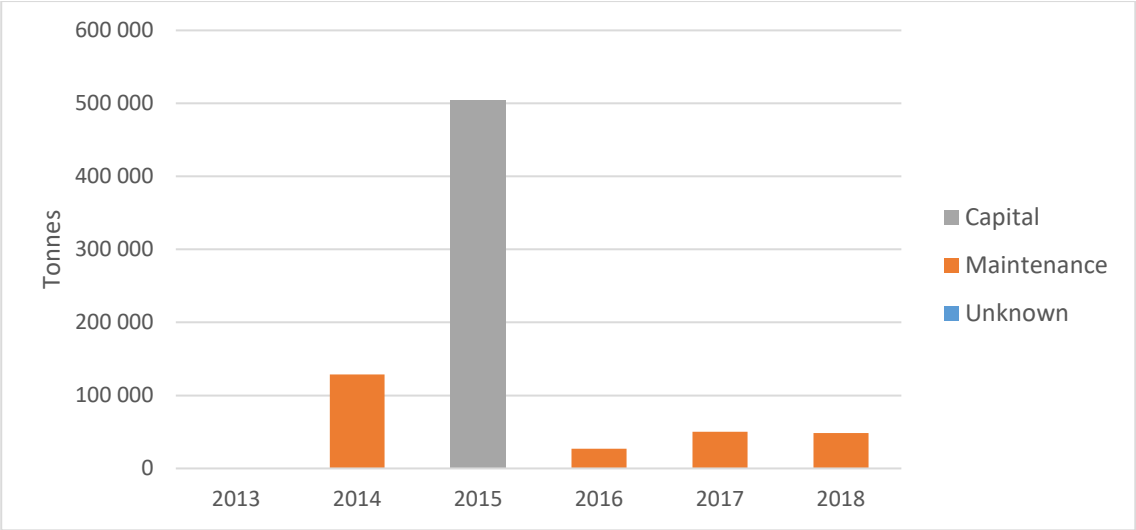


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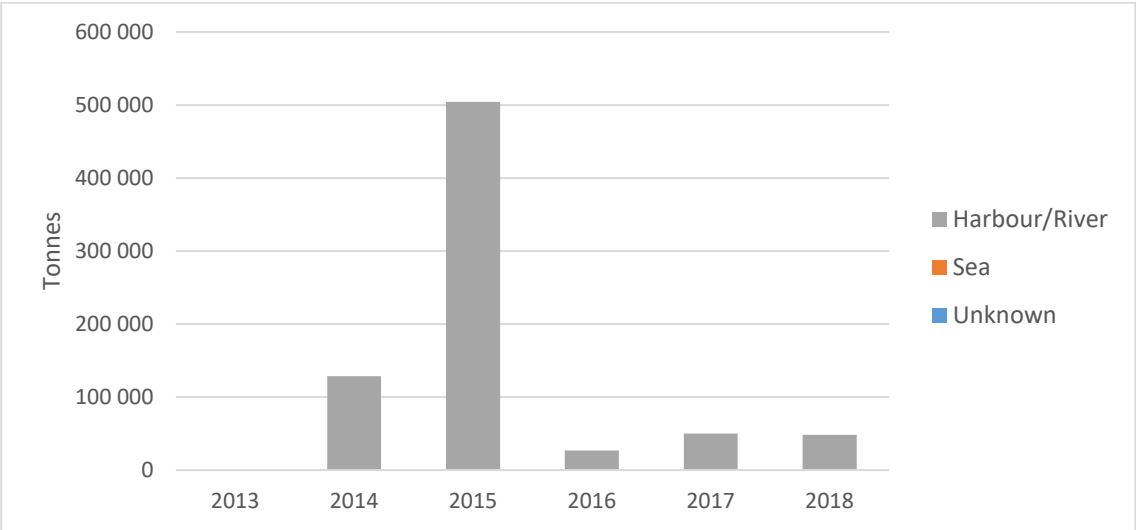


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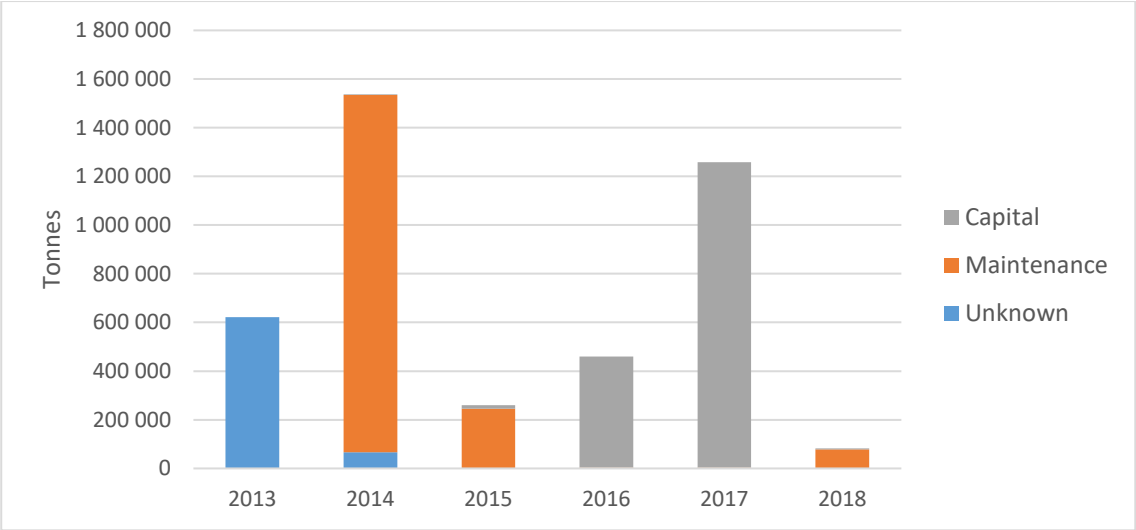


Figure 18.

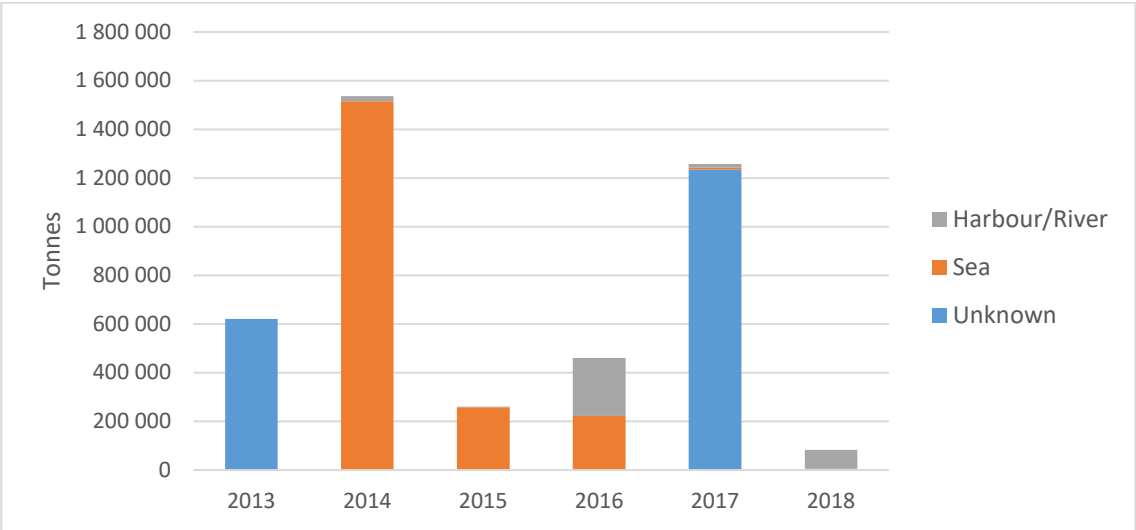


Figure 19.

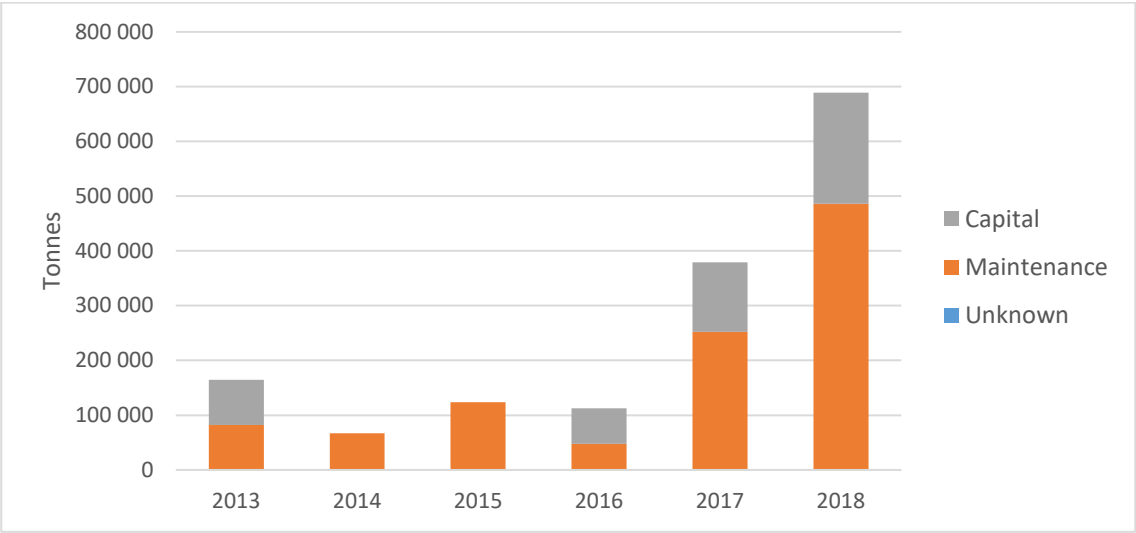


Figure 20.

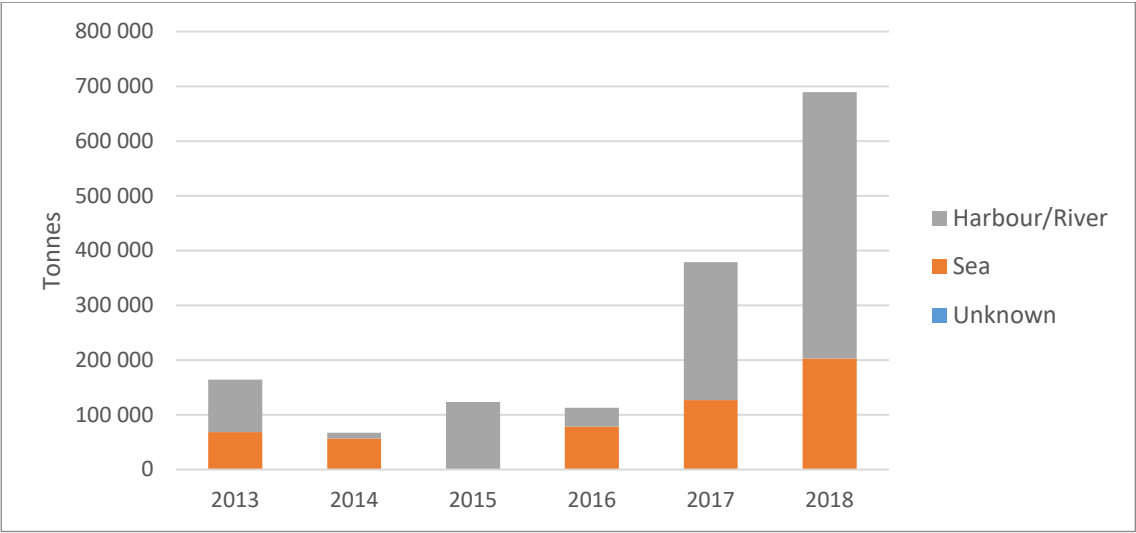


Figure 21.

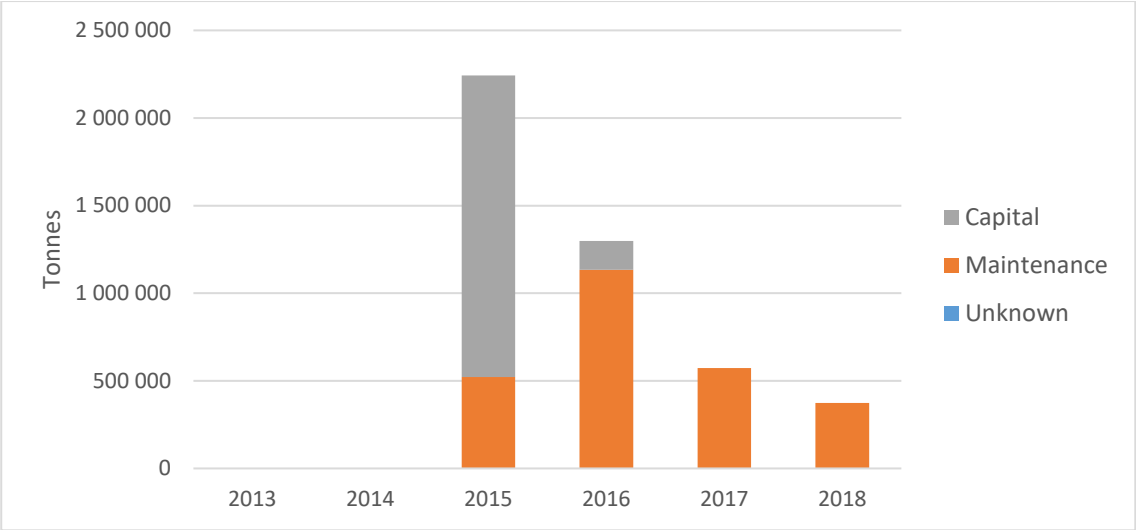


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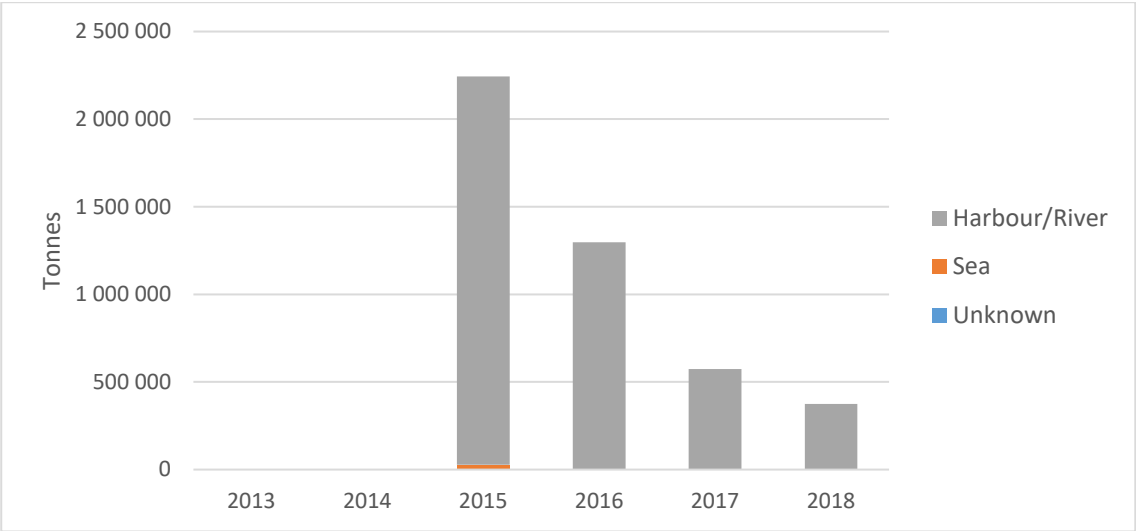


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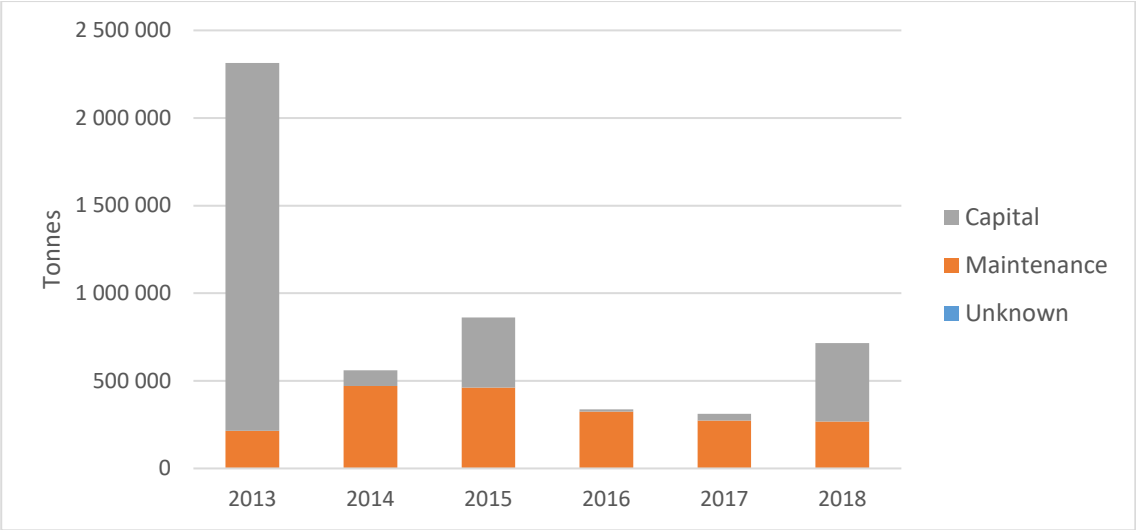


Figure 24.

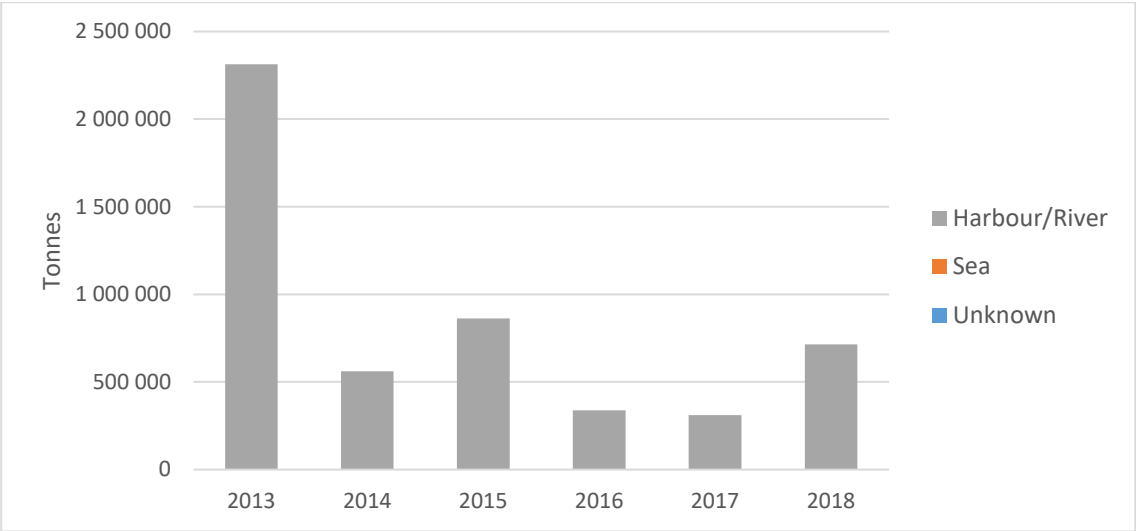


Figure 25.

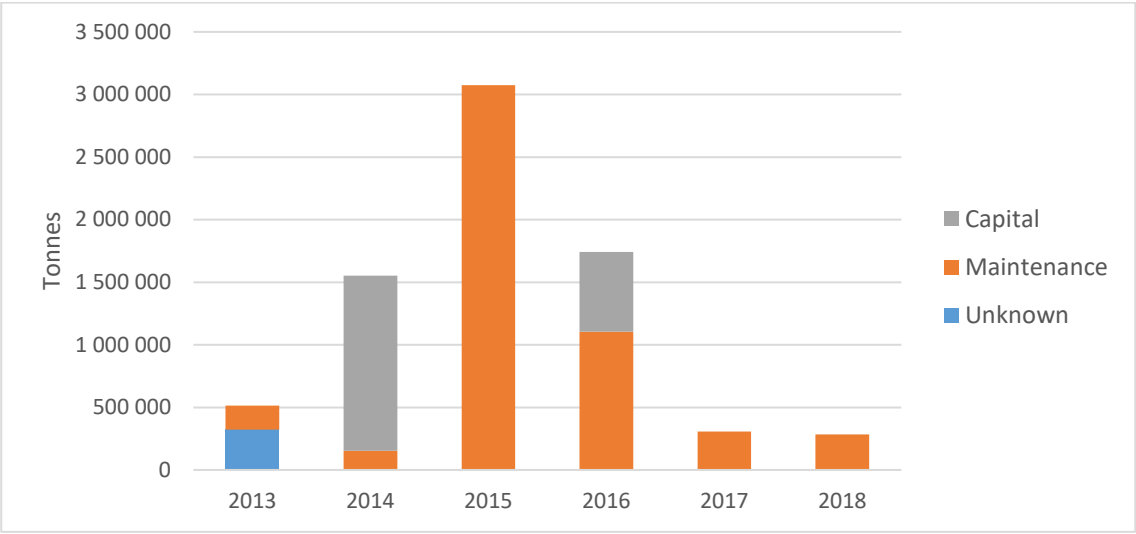


Figure 26 .

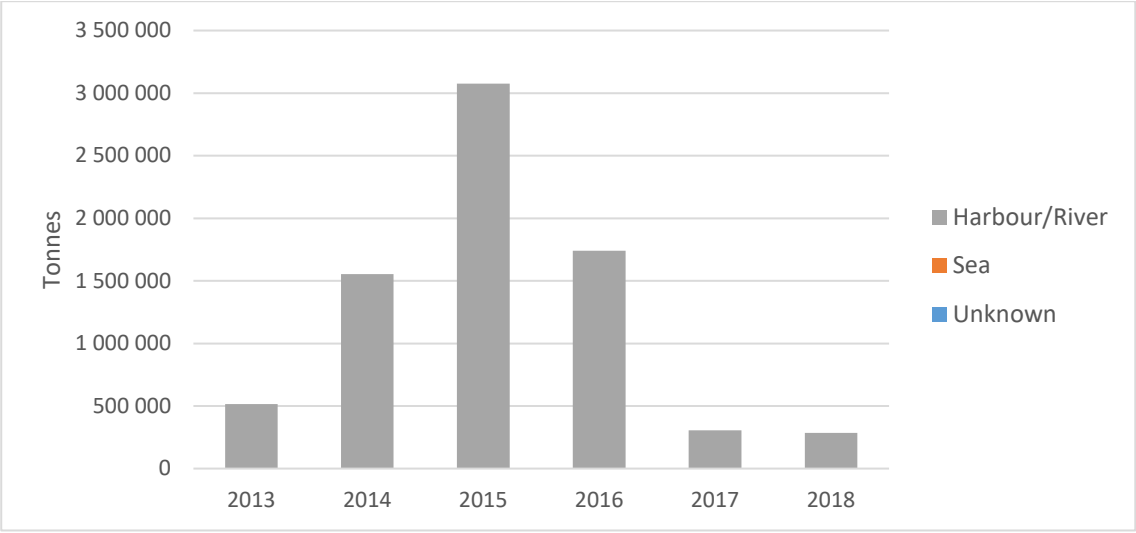


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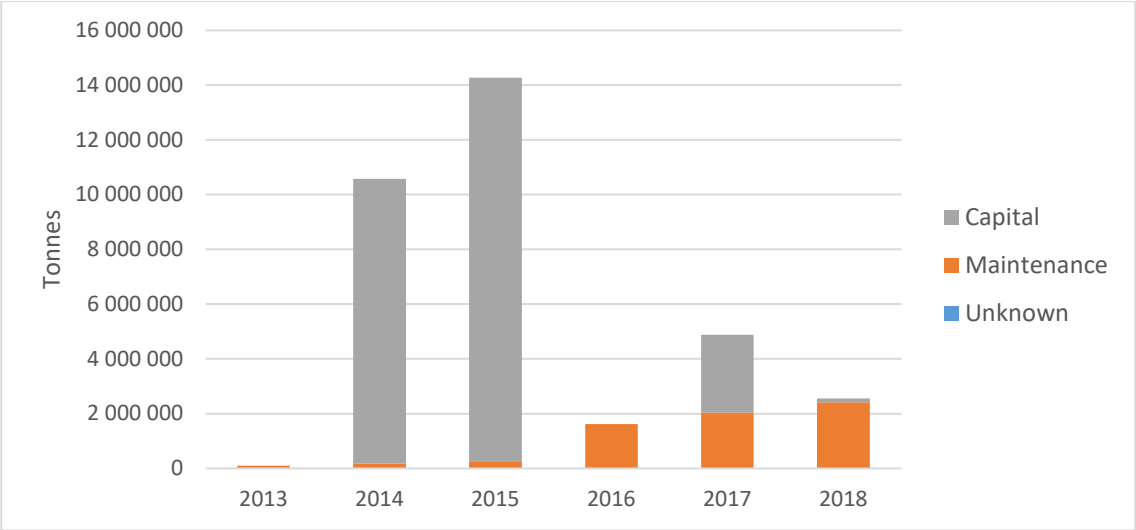


Figure 28.

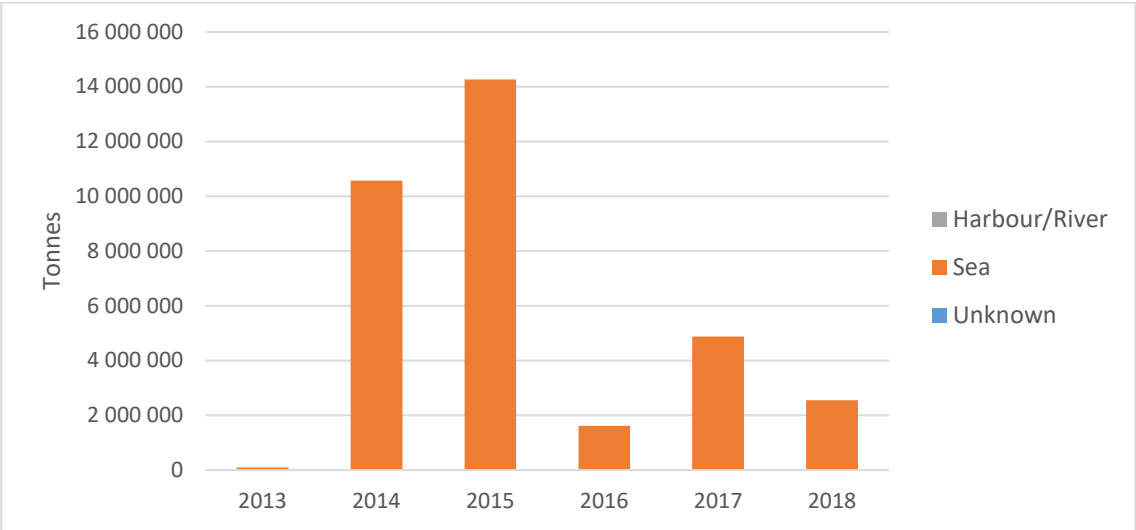


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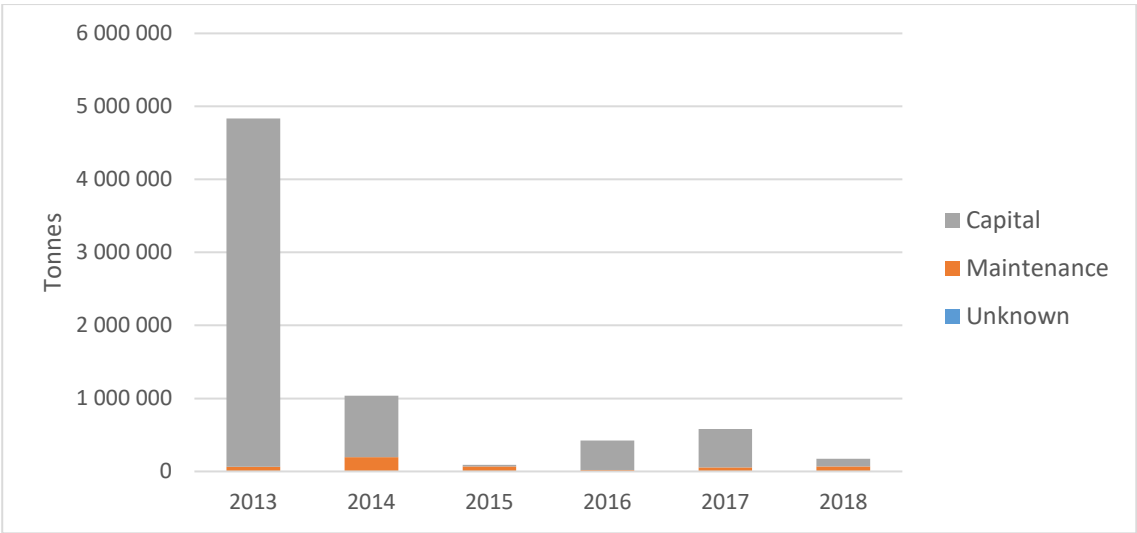


Figure 30.

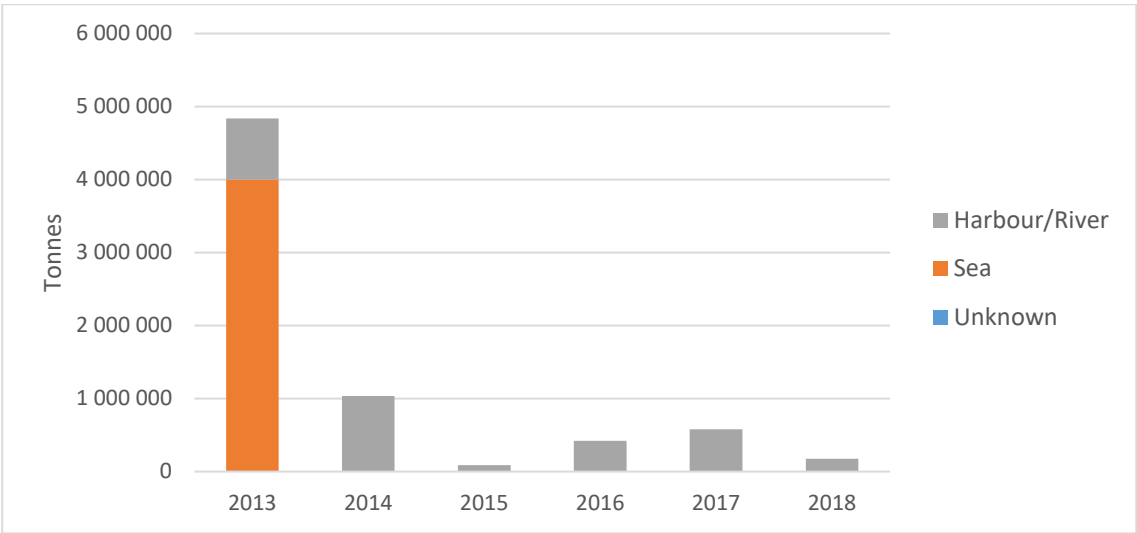


Figure 31.

Contaminant loads

In accordance with the definitions proposed in the methodology for analyses of environmental impact caused by depositing of dredged material at sea, the input of pollutants into the marine environment is the transportation of them with dredged material originating from coastal areas. In case the dredged material originates from sea, the pollutants contained by this material are only relocated elsewhere within the marine environment.

Table 1 and Figure 32 illustrate the amount and percentage of priority pollutants in the marine environment in 2018, originating from harbor/river and sea sediments and Figure 33 illustrates the proportions of pollutants in the dredged material of different origin averaged for the period 2013-2018. Cd and Hg are the heavy metals identified as priority pollutants by HELCOM Recommendation 31E/1. Origin of heavy metals relocated in the marine environment with dredged material in 2018 slightly differ from what was observed in 2017. Though, most of copper still transported with sediments originated from sea while cadmium comes from harbors and rivers the same way as in previous years. The main source of mercury and lead in 2018 is sediments transported from harbors and rivers which is typical for lead but dramatically differs from the previously reported data on mercury. In 2017 most of mercury originated from sea sediments. Actually, only for the 2018 year only copper originates from sea sediments all other assessed contaminants have main source in harbors and rivers. Nonetheless, on average for the last 5 years sea sediments remain the main source for Cu, Hg and Pb while Cd originates mainly from harbor/river sediments.

Harbors/river remain dominating source of TB and PAH in 2018 which is typical for the whole reported period.

Figures 34-39 illustrate the total amount of priority pollutants contained by deposited material in 2013-2018 per country, including loads originating from both harbour/river and sea environments. Figures 40-45 illustrate the spatial distribution of input of contaminants (harbour/river origin) in 2017.

Table 1. Total input of contaminants in the Baltic Sea in 2018, originating from harbour/river and sea environments.

Contaminant	Harbour/river	Sea	Harbour/river (%)	Sea (%)
PAH (t)	1,5002	0,0296	98,1	1,9
TBT (kg)	40,2060	0,2845	99,3	0,7
Pb (t)	58,8255	43,4775	57,5	42,5
Cu (t)	53,3718	54,4648	49,5	50,5
Hg (t)	0,6253	0,1174	84,2	15,8
Cd (t)	1,3140	0,2220	85,5	14,5

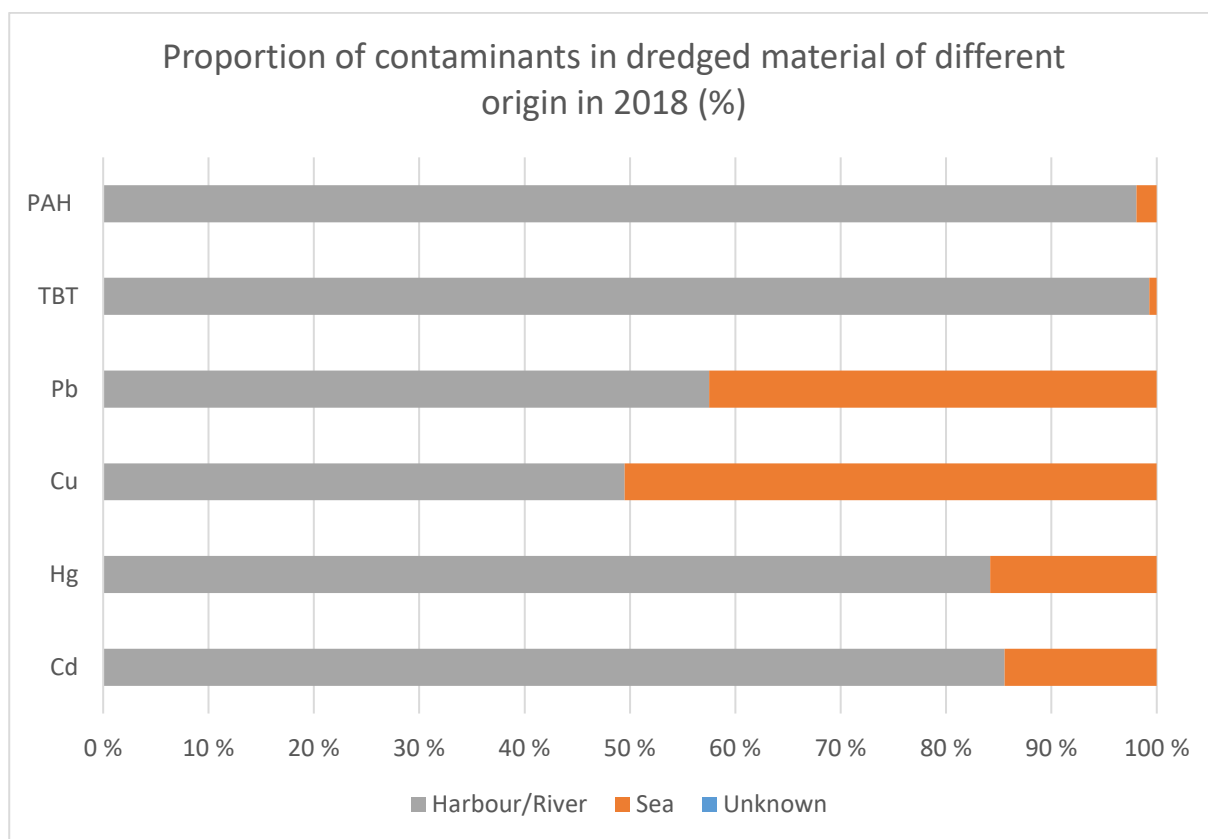


Figure 32. Proportion of contaminants originating from harbor/river and sea areas in 2018.

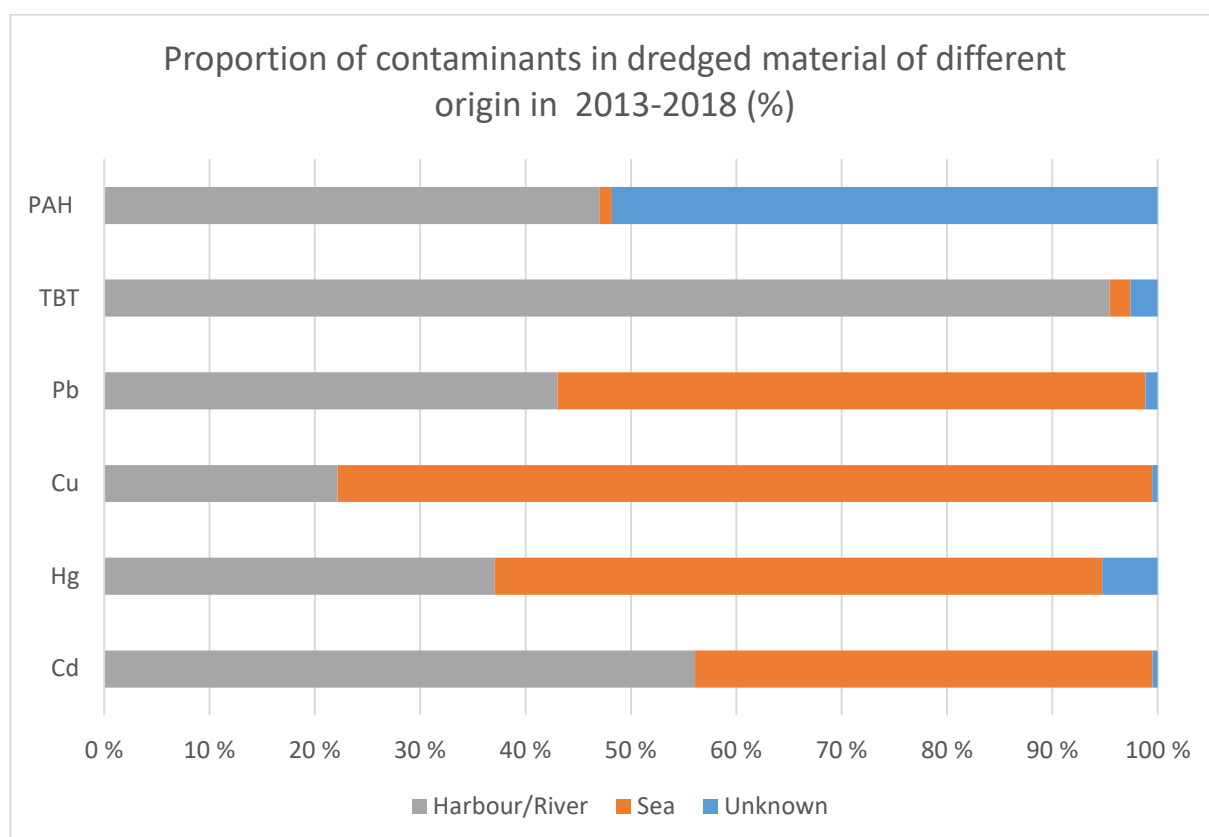


Figure 33. Proportion of contaminants originating from harbour/river, sea and unknown locations for the period 2013-2018.

Figures 34-39 illustrate total amount of priority pollutants in deposited material of all origins for 2013-2018 per country in tonnes (TBT in kilograms).

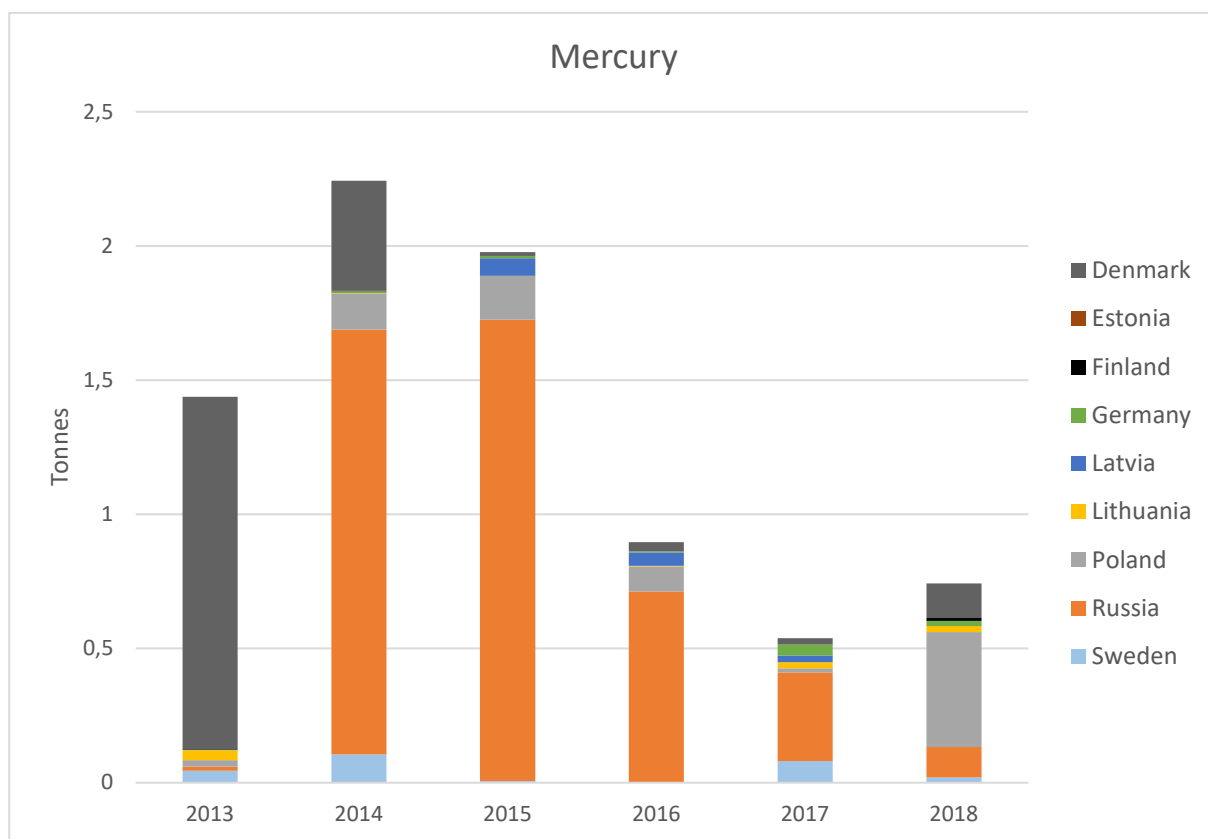


Figure 34.

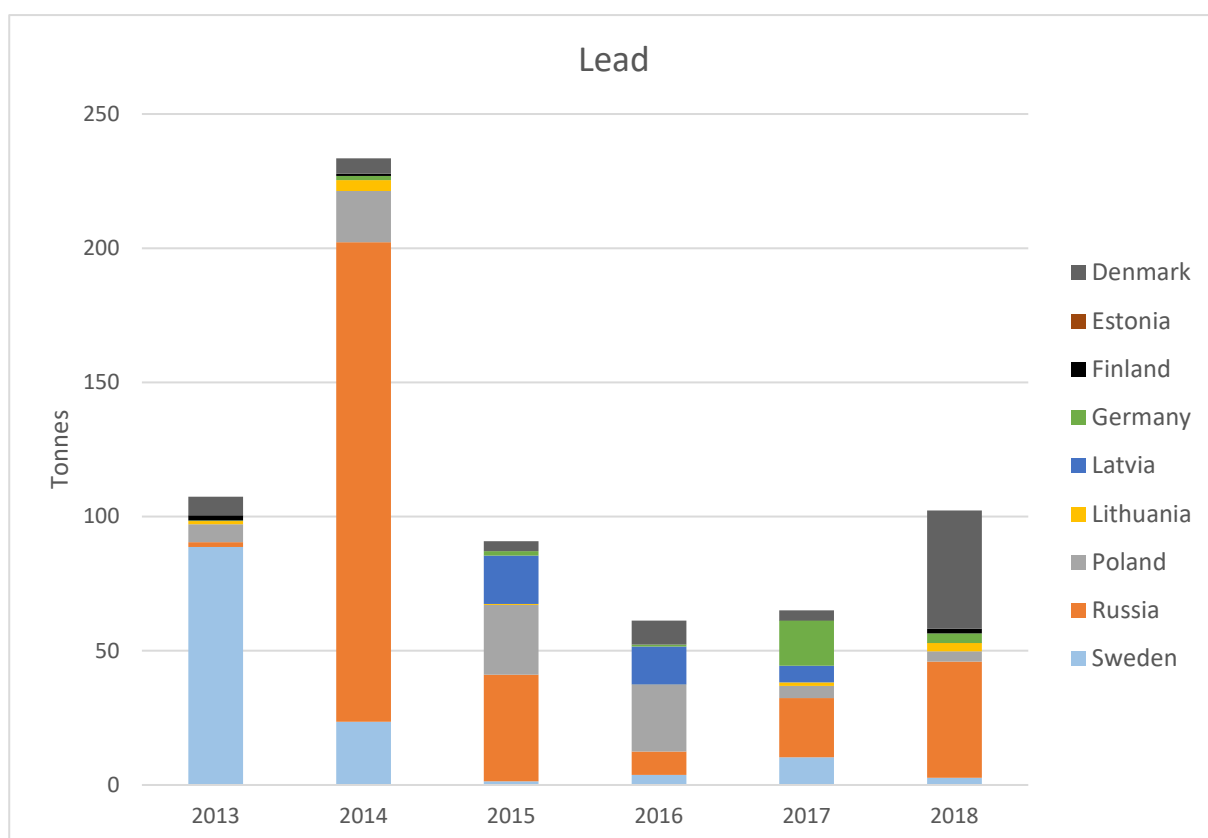


Figure 35.

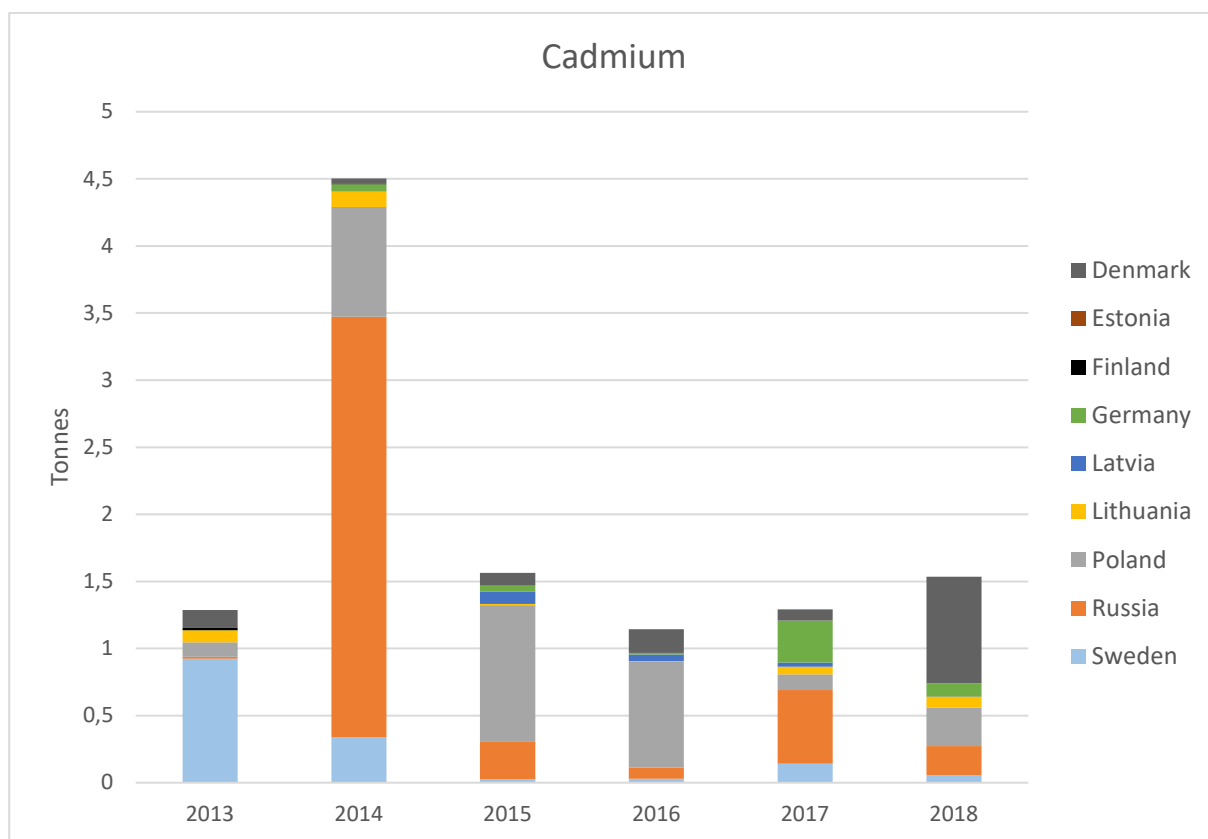


Figure 36.

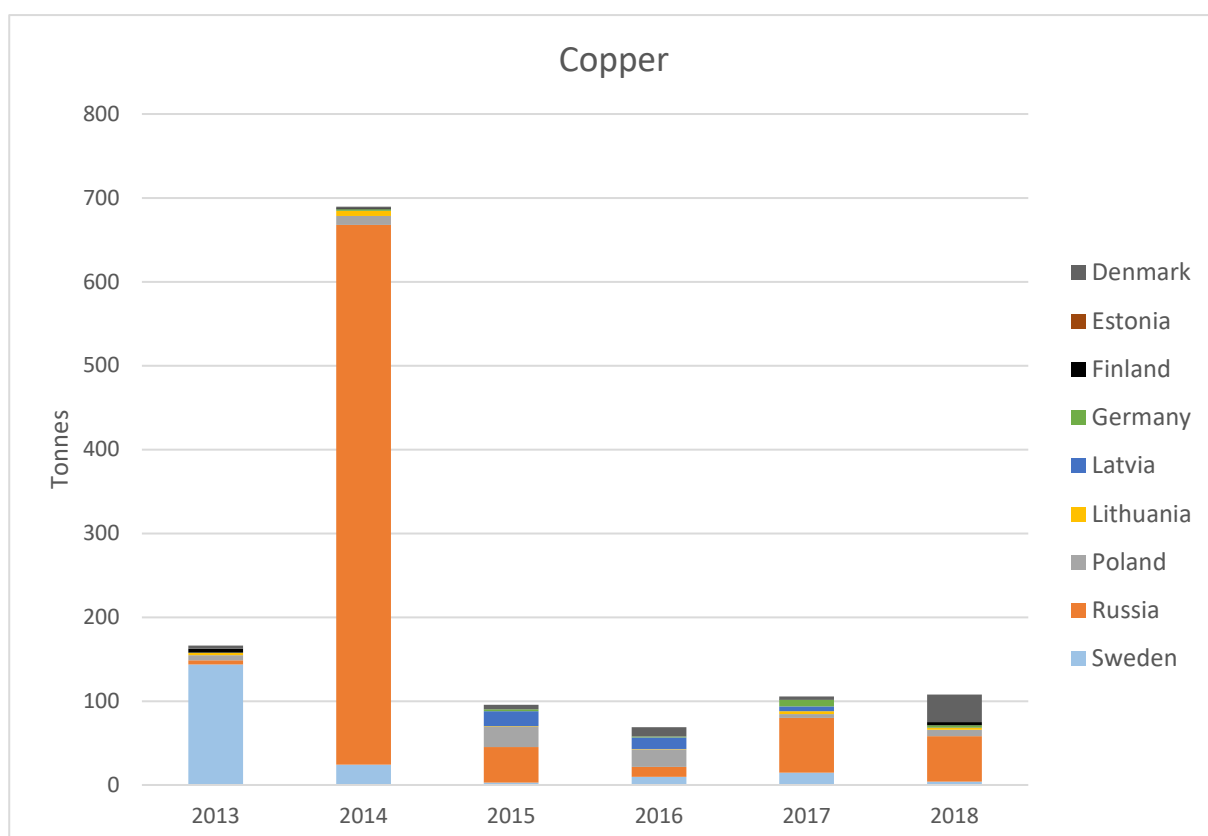


Figure 37.

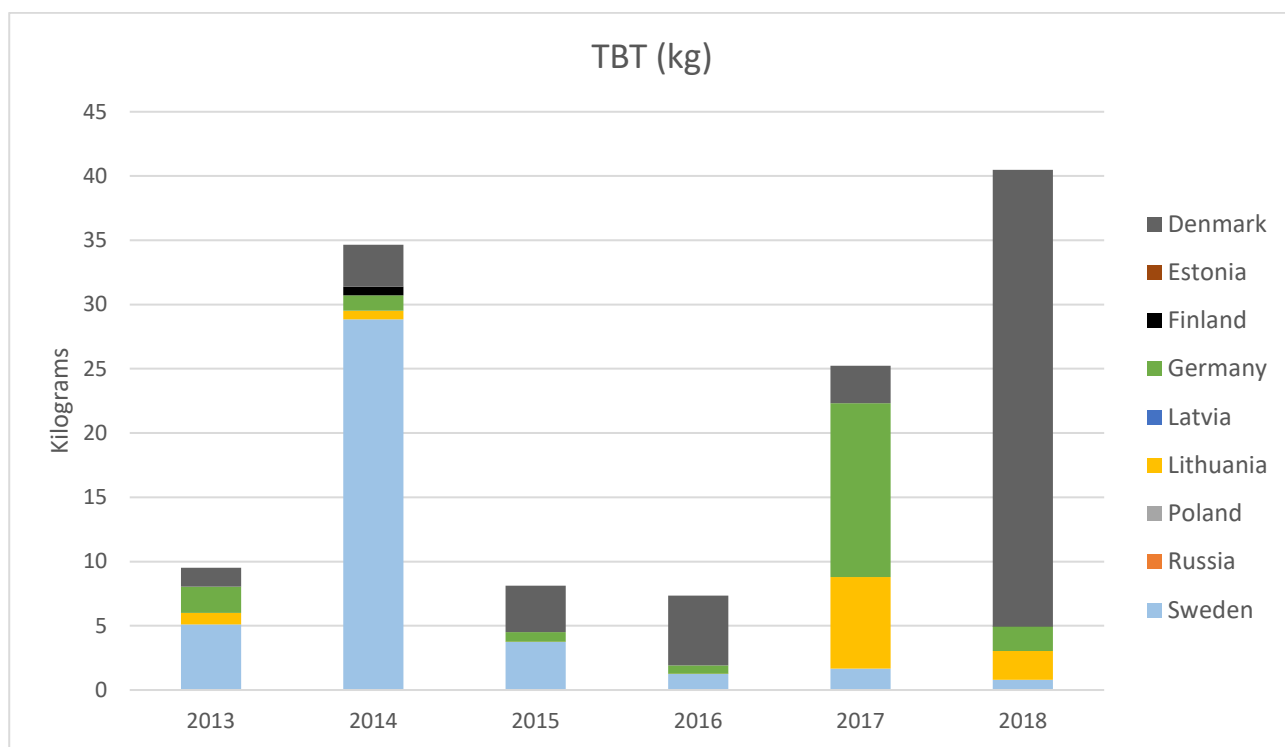


Figure 38.

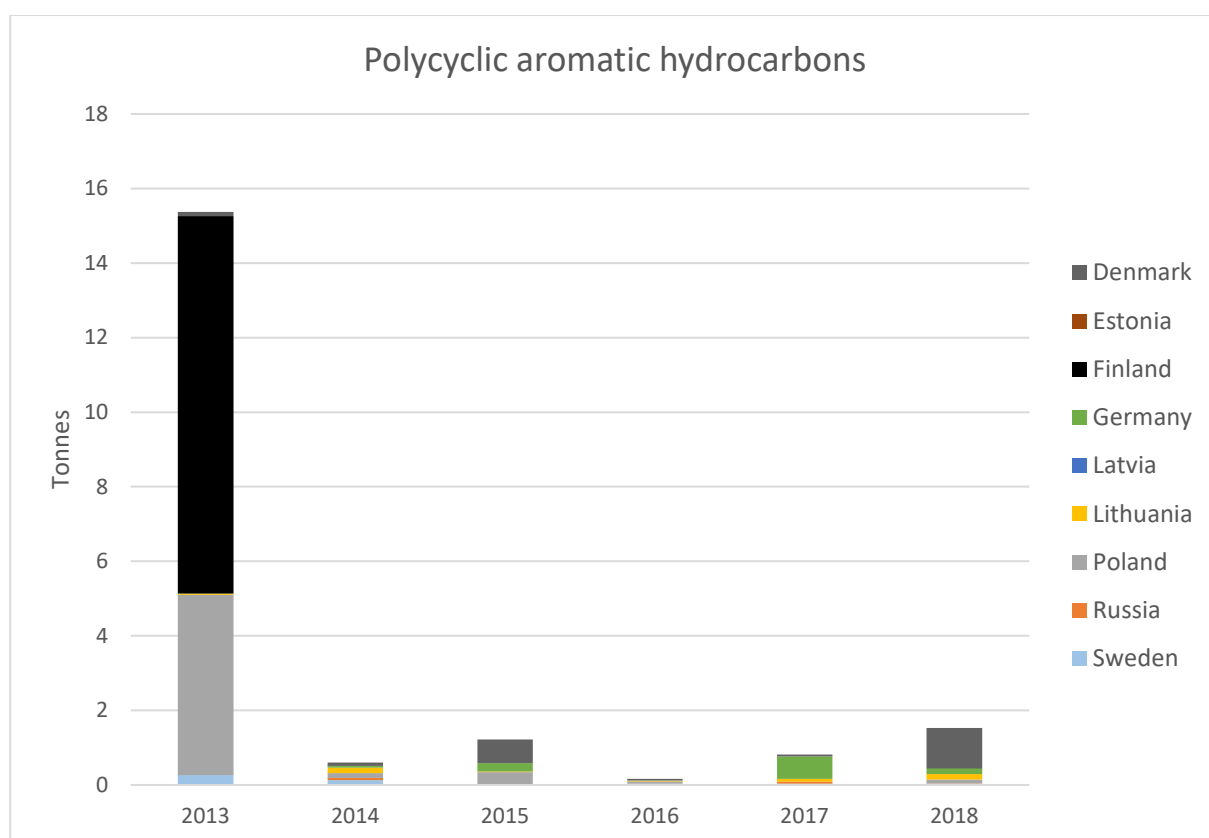


Figure 39.

Input of contaminants in 2018

Figures 40-45 illustrate the spatial distribution of priority pollutants' input to the sea with dredged material originating from harbors/rivers in 2018. Contaminant load originating from sea is not included. "No data" category in figures 40-45 indicates either not reported data or concentrations below detection limit.

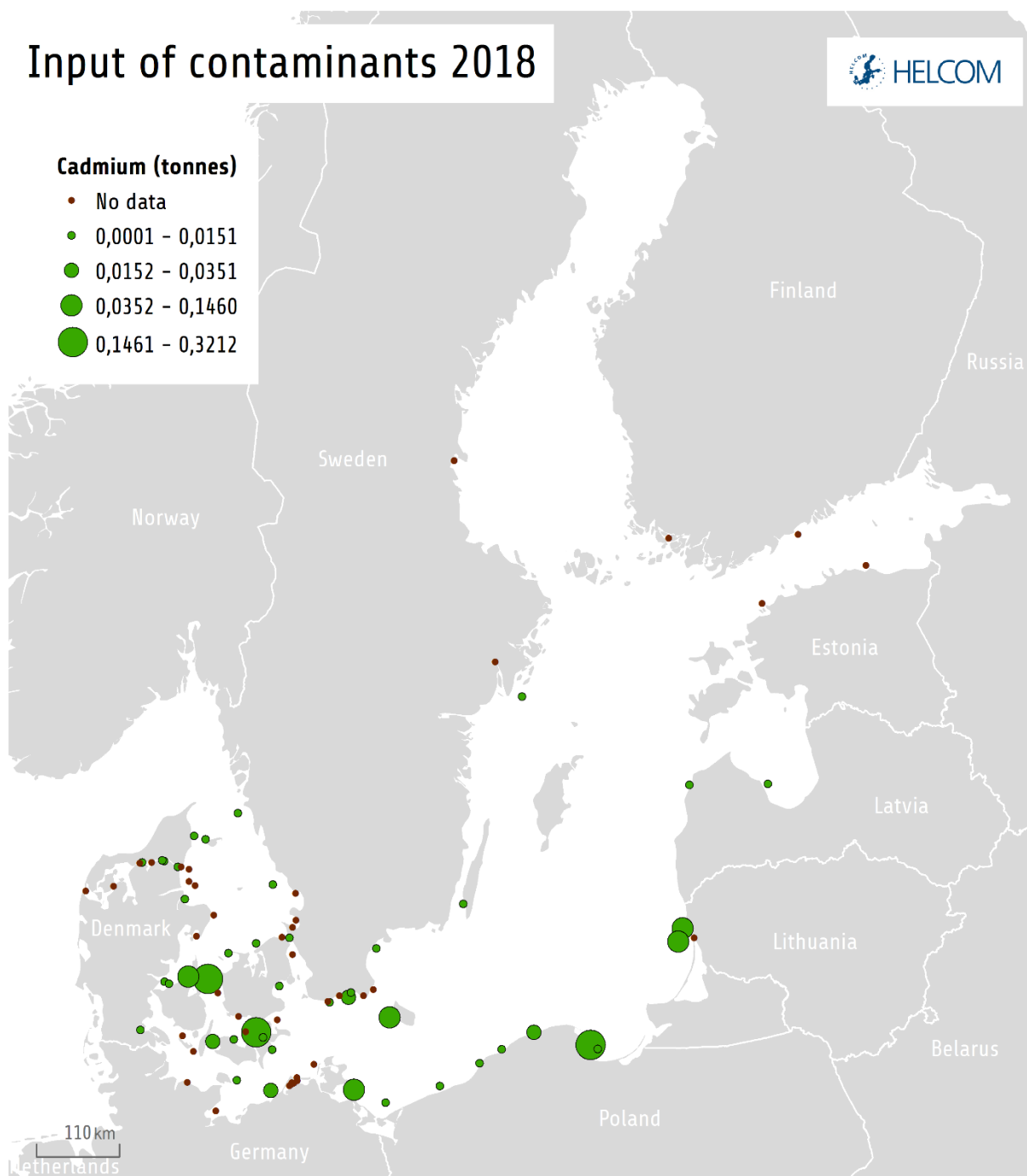


Figure 40.

Input of contaminants 2018

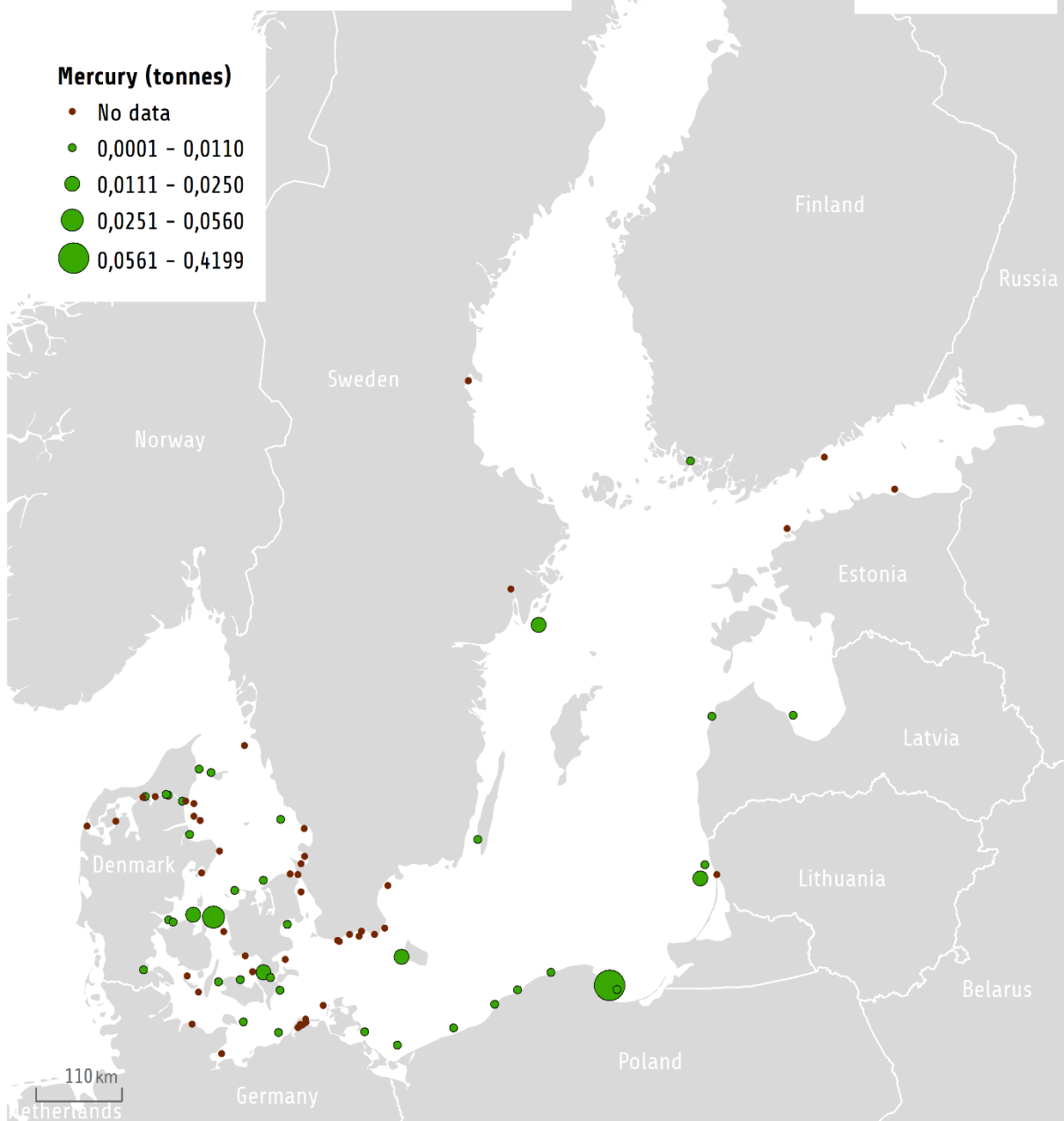


Figure 41.

Input of contaminants 2018

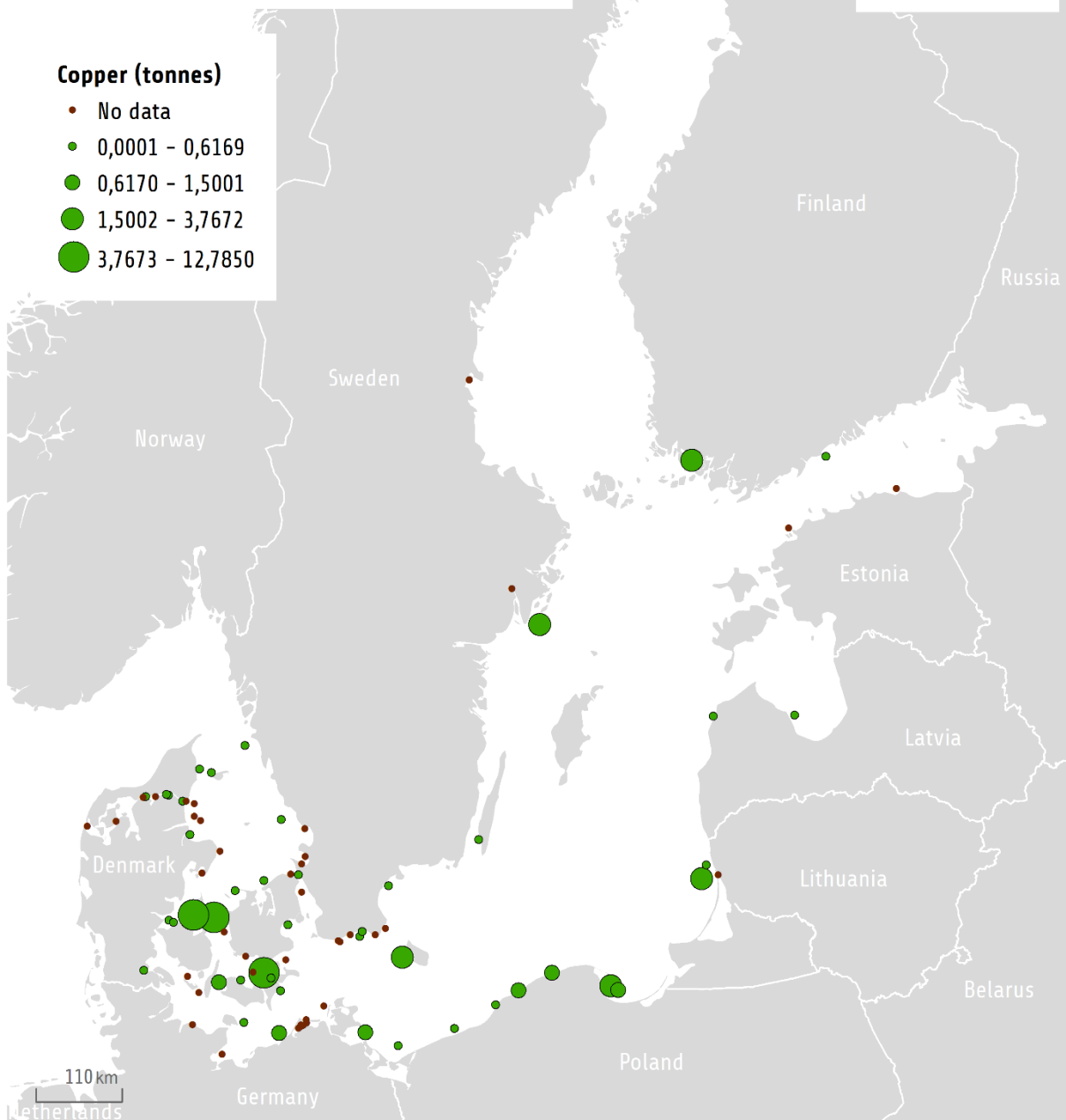


Figure 42.

Input of contaminants 2018

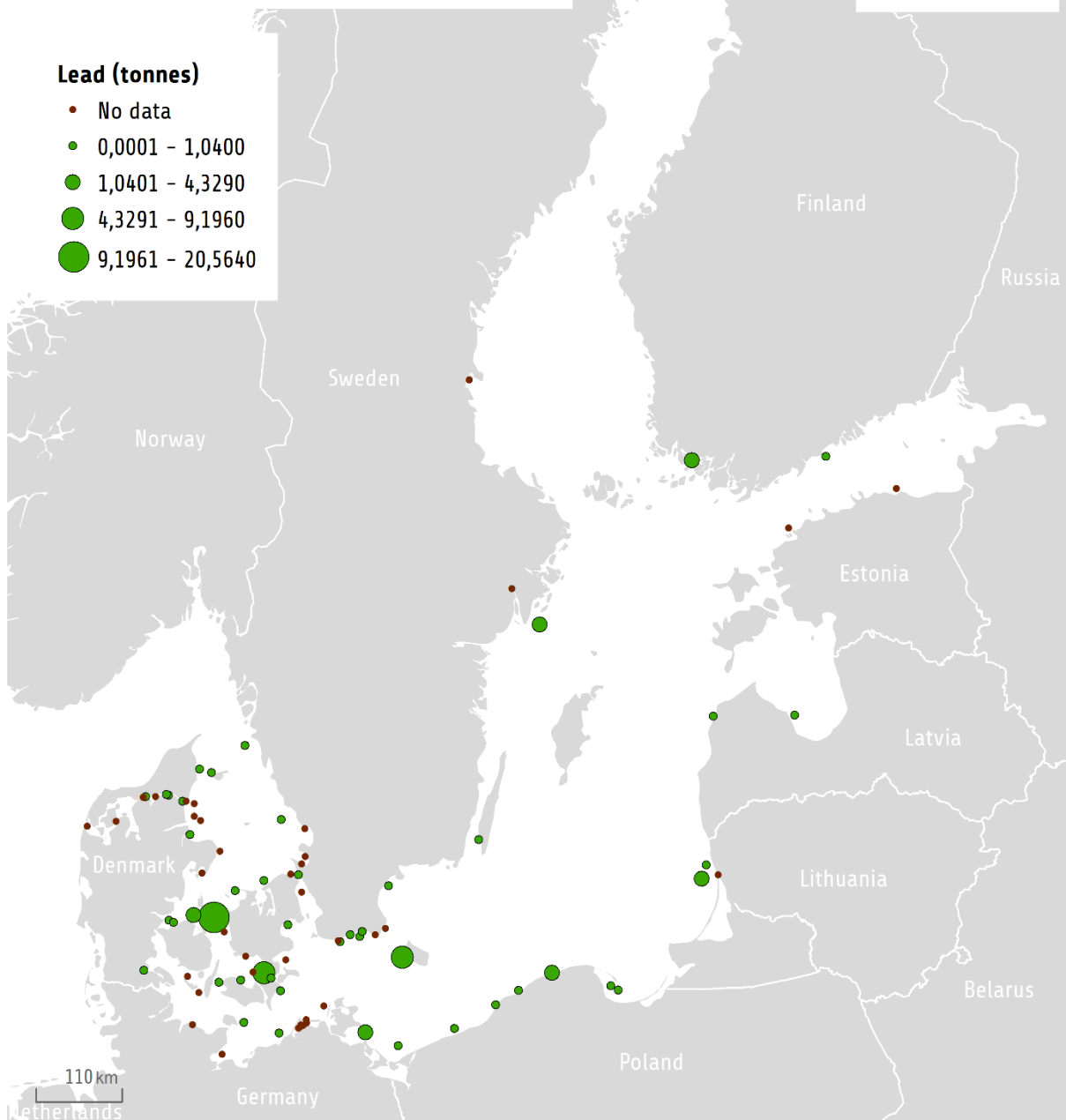


Figure 43.

Input of contaminants 2018

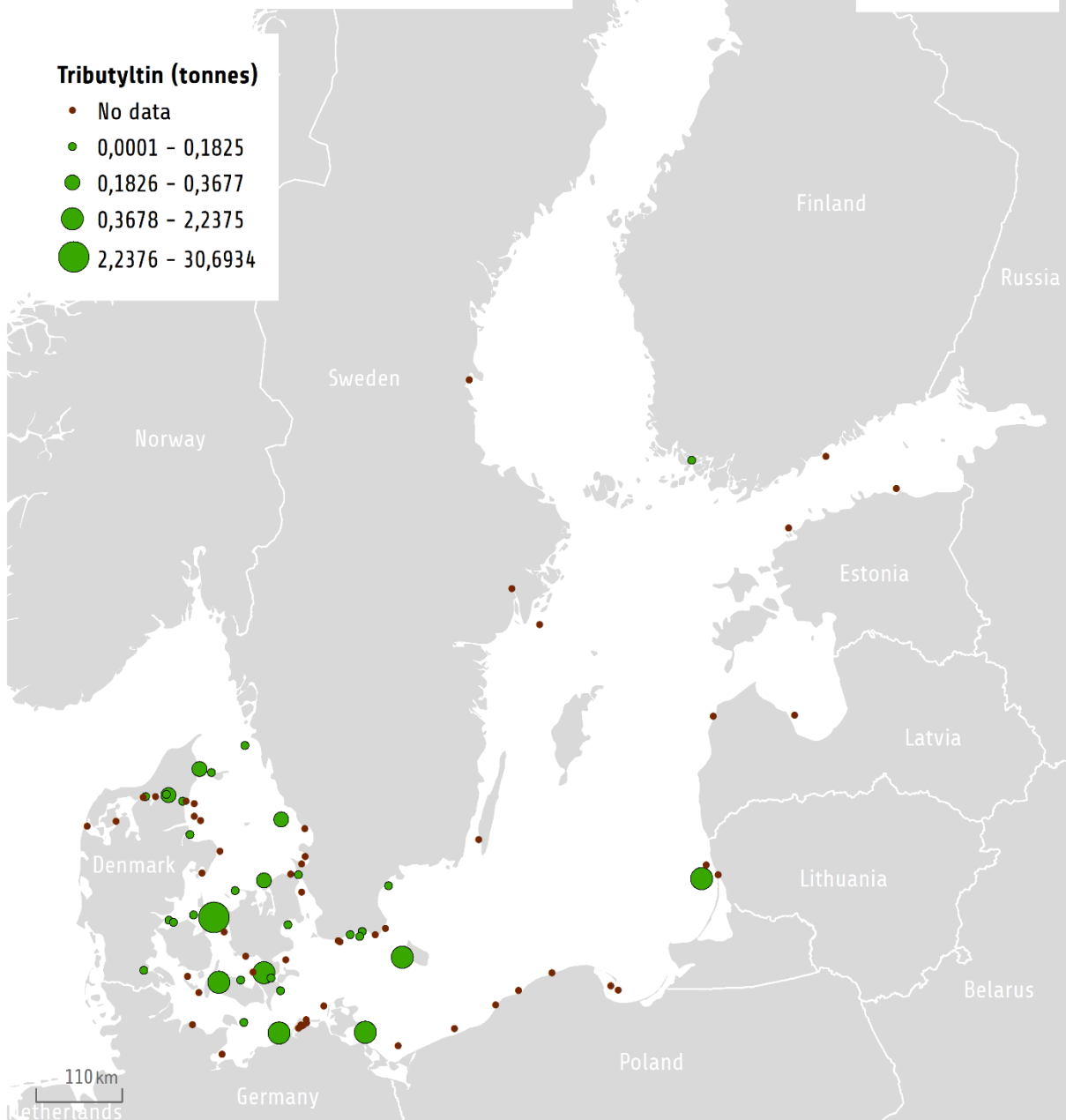


Figure 44.

Input of contaminants 2018

Polycyclic aromatic hydrocarbons (tonnes)

- No data
- 0,0001 - 0,0096
- 0,0097 - 0,0159
- 0,0160 - 0,1473
- 0,1474 - 0,6369

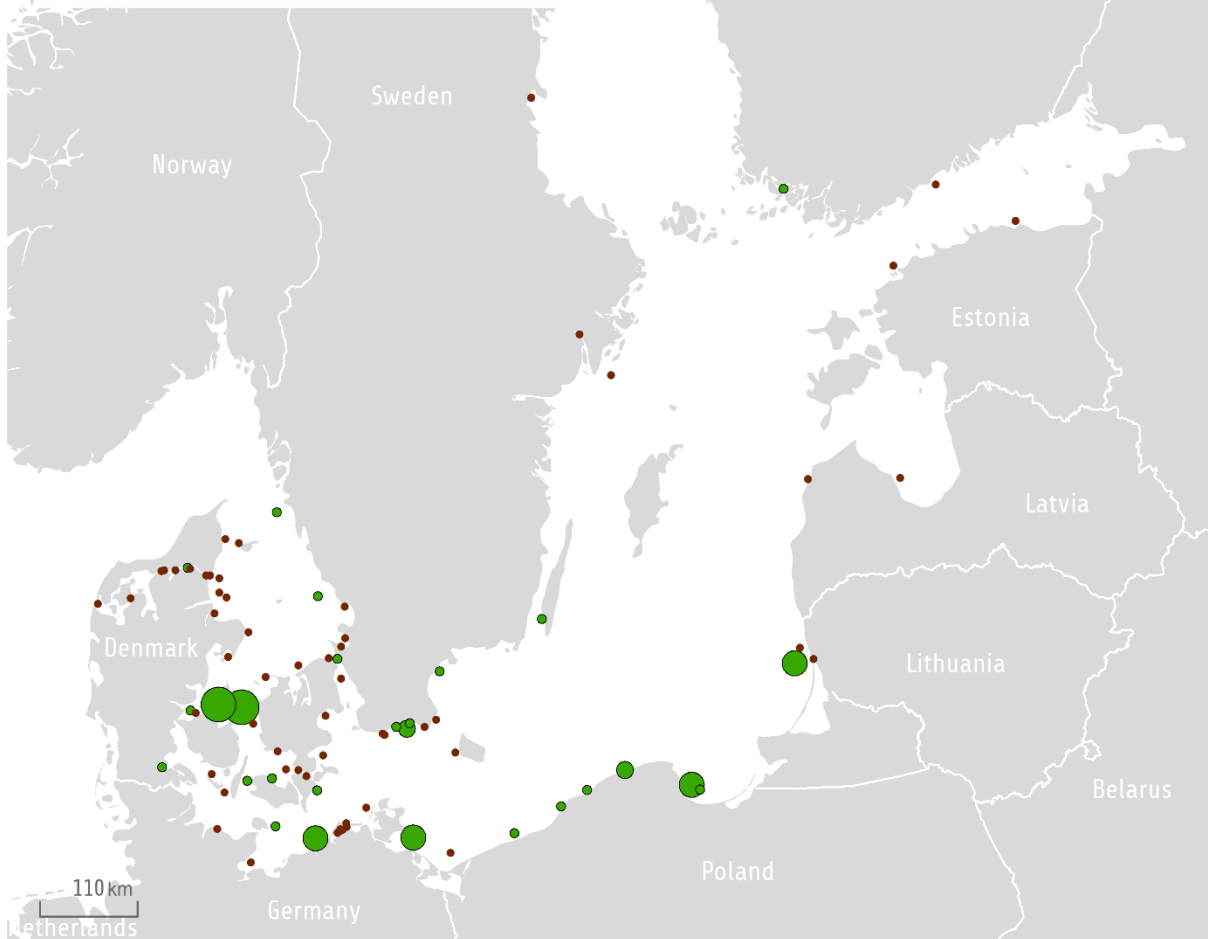


Figure 45.

Metadata

The data used in this assessment is originating from the reporting by Contracting Parties under HELCOM Recommendation 36/2 and the HELCOM Guidelines for Management of Dredged Material at Sea. The Contracting Parties report annually on the national data on management of dredged material according to the Reporting Format of the HELCOM Guidelines.

HELCOM compiles the nationally reported data, sends the harmonized datasets back to the Contracting Parties for verification, and publishes the data in HELCOM Map and Data Service (MADS). The underlying data for this assessment can be viewed and downloaded from HELCOM MADS.