Discharges to the sea from Baltic Sea shipping in 2023

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Key Messages

1. **The total volume of discharge water from Exhaust Gas Cleaning Systems (EGCSs or scrubbers) was about 294 (2022:315) million cubic meters. This was almost completely (99.99%) from open loop scrubbers.** During the year 2023, there were 815 (2022:773; +5.6%) vessels operating the Baltic Sea area using scrubbers.

2. Bilge water releases from the Baltic Sea fleet were estimated as 413 000 cubic meters (+2.4%)

3. Estimated ballast water volume release to the Baltic Sea was 494 million tonnes (2022: 486 million tonnes; +1.7%). This volume contains both untreated and treated ballast water discharge.

4. **Sewage discharge to the sea was predicted to be 1.4 million cubic meters (-4.6%)**. Sewage volumes are lower than in 2019 (1.6 million m^3). Since June 2021, it is prohibited to release untreated sewage to the Baltic Sea from passenger ships, unless visiting St. Petersburg from outside the Baltic Sea area. In 2023, very limited cruise ship traffic between Vyborg and St Petersburg was observed.

5. Grey water discharge was estimated to be 5.4 million cubic meters(-6.8%), which is still less than in 2019, before the pandemic (2019: 6.4 million m^3). **Passenger ships are responsible for over 80% of grey water discharges.**

6. **The total amount of Phosphorus released to the sea was estimated as 125 tonnes. These were discharged as sewage (38 tonnes), food waste (23 tonnes) and grey water (64 tonnes).** Here, it was assumed that the phosphorus removal of wastewater treatment plants used in passenger ships was 80%, as required by IMO 2012 guidelines, and in constant use.

7. **Total Nitrogen discharge was estimated as 456 tonnes, which were from food waste (83 tonnes), sewage water (225 tonnes) and grey water (148 tonnes)**. Here, it was assumed that the nitrogen removal of wastewater treatment plants used in passenger ships was 70%, as required by IMO 2012 guidelines, and in constant use.

8. **Stern tube oil leakage was assumed to be about 4837 cubic meters**. This is an order of magnitude estimate because experimental data concerning leakages are scarce.

9. Release of six anti-fouling paints were modeled. The wet surface area of large vessels is about 54 million square meters and the contribution of the 500 000 small boats around the Baltic Sea coastline is estimated at about 7 million square meters. **About 598 tonnes of anti-fouling paint residues are released from ships' hulls to the sea**, which does not include the contribution from small boats. Of the estimated amount of antifouling paint released for ships, about 82% is Copper(II)oxide (CuO).

Harmful discharges from ships in the Baltic Sea area

This short summary includes a report of modeled discharges from Baltic Sea shipping during the year 2023 and their development over the period of 2006-2023. The totals reported here include the effects of sea currents, wind, waves, and sea ice. Additional resistance due to biofouling is treated with a simplistic manner, by adding 5% to vessel resistance (Munk et al., 2009).

1. Discharges from ships to water

The parameters used in modeling discharges from ships are listed in Table 1.

Table 1 The parameters used in discharge modelling of water pollutants

Modeled quantity	Main contribution	Quantity
Open loop scrubber discharge water	Used engine kWh, equipment type	Volume
Closed loop scrubber discharge water	Used engine kWh, equipment type	Volume
Bilge water release	Vessel type, engine kW, time	Volume
Ballast water	Vessel type, DWT	Volume
Sewage release	Vessel type, person days, capacity utilization, time	Volume
Sewage Nitrogen	Vessel type, person days, capacity utilization, time	Mass
Sewge Phosphorus	Vessel type, person days, capacity utilization, time	Mass
Grey water release	Vessel type, person days, capacity utilization, time	Volume
Food waste	Vessel type, person days, capacity utilization, time	Mass
Food waste Nitrogen	Vessel type, person days, capacity utilization, time	Mass
Food waste Phosphorus	Vessel type, person days, capacity utilization, time	Mass

Stern tube oil	Vessel type, time	Mass
Release of antifouling paint (Cuprous Oxide)	Vessel wetted surface, operation area, paint type, time	Mass
Release of antifouling paint (Copper Pyrithione)	Vessel wetted surface, operation area, paint type, time	Mass
Release of antifouling paint (Zinc Oxide)	Vessel wetted surface, operation area, paint type, time	Mass
Release of antifouling paint (Zinc pyrithione)	Vessel wetted surface, operation area, paint type, time	Mass
Release of antifouling paint (DCOIT, 4,5-Dichloro-2-octyl-4-isothiazolin-3-one)	Vessel wetted surface, operation area, paint type, time	Mass
Release of antifouling paint (ZINEB, zinc ethane-1,2-diylbis(dithiocarbamate))	Vessel wetted surface, operation area, paint type, time	Mass

Some of the discharged quantities are reported in volumes instead of mass. For example, determining the copper release from open loop scrubber discharge water to the sea requires water analysis results (copper concentration in effluent). Discharges of contaminants can be derived for dozens of different compounds this way, instead of generating a map for each of them. Summary of discharges from various kinds of ships is indicated in Table 2, and nutrients are listed in Table 3. Appendix includes similar tables for all the studied years.

Table 2. Discharged water pollutants and contaminants from ships during 2023 in the Baltic Sea area.

2023	Ballast [million m3]	STO* [m3]	Bilge [10^3 m3]	Scrubber (Open) [10^3 m3]	Scrubber (Closed) [10^3 m3]	Grey Water [10^3 m3]	Sewage [10^3 m3]
RoPax_vessels	51.2	417.2	106.0	118371.4	31.5	3766.8	794.1
Vehicle_carriers	3.2	5.4	0.5	3550.1	0.0	2.9	2.1
RoRo_vessels	44.7	51.2	6.8	66642.7	1.8	104.9	75.7
Bulk_carriers	89.6	350.1	15.6	13229.0	0.2	127.1	91.8
General_cargo	50.2	1093.2	29.2	6500.5	4.9	195.3	141.0
Container_ships	57.0	119.8	10.4	24811.0	6.1	52.5	37.9
Reefers	1.8	26.6	1.9	2667.4	0.0	10.3	7.5
Tankers	175.1	0.4	25.2	34775.7	0.0	145.5	50.9
LNG_tankers	12.0	5.6	2.6	0.0	0.0	6.1	2.1
Gas_tankers	3.1	16.1	1.1	80.4	0.0	6.0	2.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	6.4	7.0	9.8	21857.3	2.2	589.5	124.3
Fishing_vessels	0.0	249.7	15.8	23.2	0.0	38.4	3.8
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	1415.8	187.7	1795.3	0.0	93.3	37.8
Total	494	3758	413	294304	47	5139	1371

*STO = Stern Tube Oil

A. Scrubber discharge water

Table 3 Discharge of nutrients from ships ship to the Baltic Sea in 2023.

2023	Sewage Nitrogen [tonne]	Food Waste Nitrogen [tonne]	Grey Water Nitrogen **[tonnes]**	Sewage Phosphorus [tonnes]	Food Waste Phosphorus [tonnes]	Grey Water Phosporus [tonnes]
RoPax_vessels	115.2	40.8	105.6	24.7	14.5	45.6
Vehicle_carriers	0.4	0.0	0.1	0.0	0.0	0.0
RoRo_vessels	14.1	1.5	3.9	1.4	0.5	1.7
Bulk_carriers	17.1	1.8	4.7	1.7	0.6	2.0
General_cargo	26.3	2.8	7.2	2.6	1.0	3.1
Container_ships	7.1	0.8	1.9	0.7	0.3	0.8
Reefers	1.9	0.1	0.3	0.2	0.1	0.1
Tankers	22.2	2.4	6.1	2.1	0.8	2.6
LNG_tankers	0.9	0.1	0.3	0.1	0.0	0.1
Gas_tankers	0.9	0.1	0.3	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	18.0	32.7	16.5	4.0	12.9	7.1
Fishing_vessels	1.0	0.4	1.1	0.1	0.1	0.5
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	9.8	1.0	2.7	0.5	0.4	1.2
Total	225	83	148	38	31	64

Three kinds of scrubbers (open, closed, hybrid loop) were included in the discharge water modeling, which was based on used engine power as a function of time. This allowed modeling of discharge water release based on engine kWh, on top of which additional power requirement (three percent for open loop, 0.5% for closed loop) of pumps was included. Hybrid scrubbers were run in open loop mode whenever possible considering the alkalinity of seawater and regional restrictions.

The link to IMO Global Integrated Shipping Information System (GISIS) was established in this work, to get insight on global EGCS installations. Previously, scrubber installations were collected from scattered online data sources and their numbers were underestimated. The IMO GISIS reports allow the determination of approval date and equipment type in a consistent manner. The data collected for the global fleet represents the situation of February 2024.

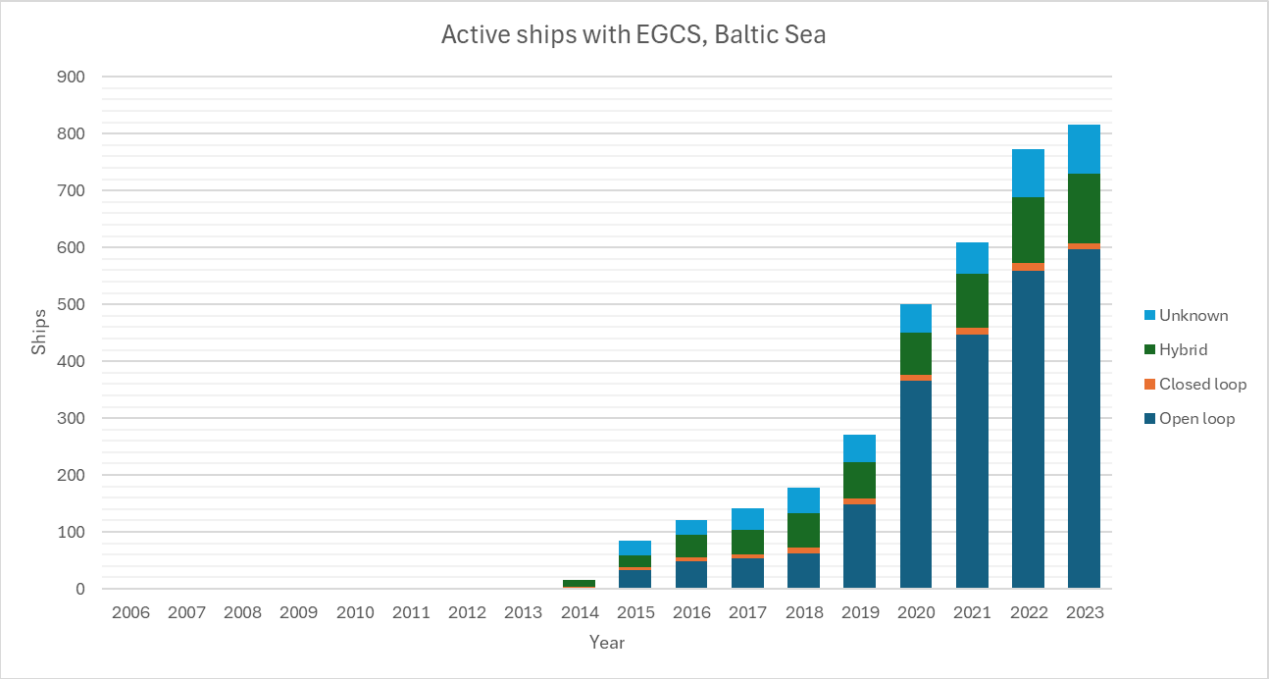


Figure 1 Development of the EGCS equipped fleet in the Baltic Sea area during 2006-2023. Unknown equipment type is listed, but for modeling purposes an Open Loop system is assumed for these cases.

During 2023, 815 (2022: 773) vessels were installed with scrubbers in the Baltic Sea area (Figure 1 and Figure 2, Table 4). In the Baltic Sea region, 132 out of 815 (16%) are either closed or hybrid systems, whereas the share of open loop systems is 84%, if Unknown installations are assumed as Open loop systems. In the Baltic Sea fleet, almost two thirds of the open loop installations are in Crude Oil tankers, Bulk Cargo ships and Containerships.

Table 4 EGCS equipment type in various vessel types. This data is for year 2023 only.

Type	Open	Closed	Hybrid	#N/A
RoPax	10	4	14	2
RoRo cargo	18	0	19	2
Cruise ship	18	3	8	8
Containership	69	1	33	6
Vehicle carrier	7	0	17	3
Crude oil tanker	167	0	4	20
Unknown	6	0	5	3
Chemical tanker	49	0	8	23
Bulk cargo ships	162	1	3	14
General cargo ship	53	1	4	1
Refrigerated cargo ship	8	0	3	0
Oil product tanker	27	0	2	5
Lpg tanker	1	0	2	0
Fishing vessel	1	0	0	0
Total	596	10	122	87

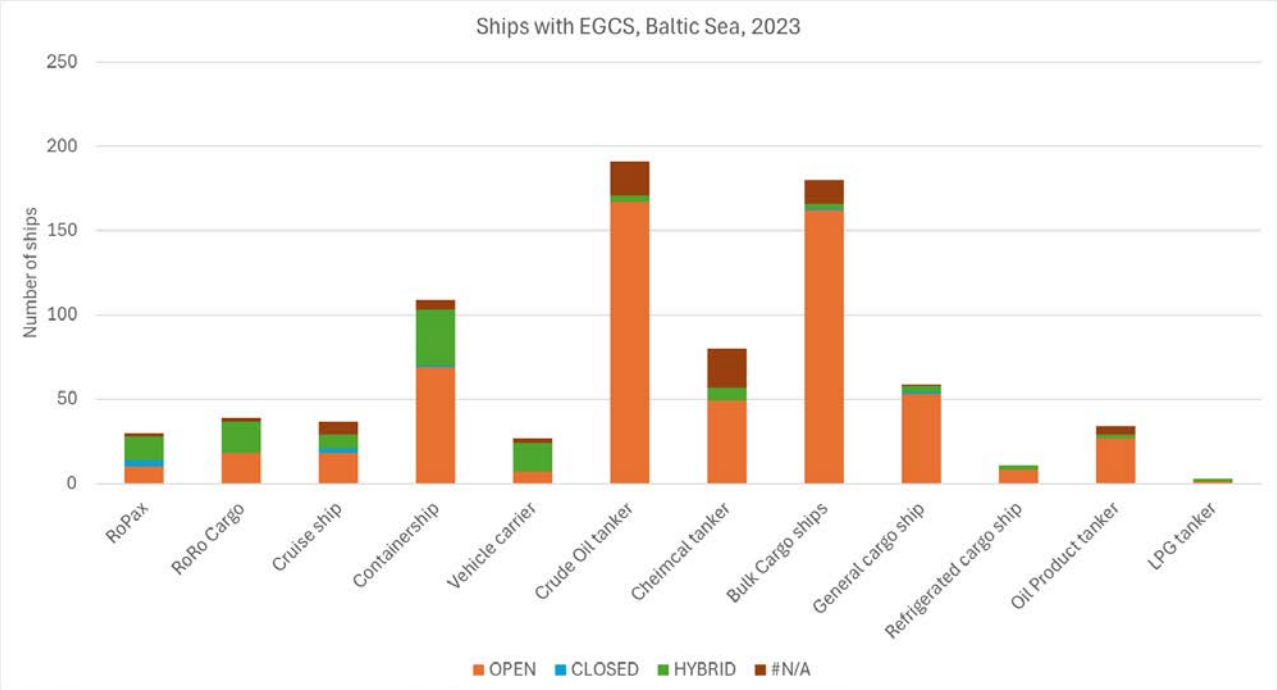


Figure 2 EGCS equipment type of various vessel types in the Baltic Sea area during year 2022. The N/A entry indicates a scrubber of unknown type, which is assumed to be Open Loop during STEAM runs.

The vessels equipped with EGCS operating in the Baltic Sea area released about 294 million cubic meters (2022: 315 million m^3) of discharge water into the sea. Over 99.99% of this release came from vessels using open loop scrubbers (Figure 3).

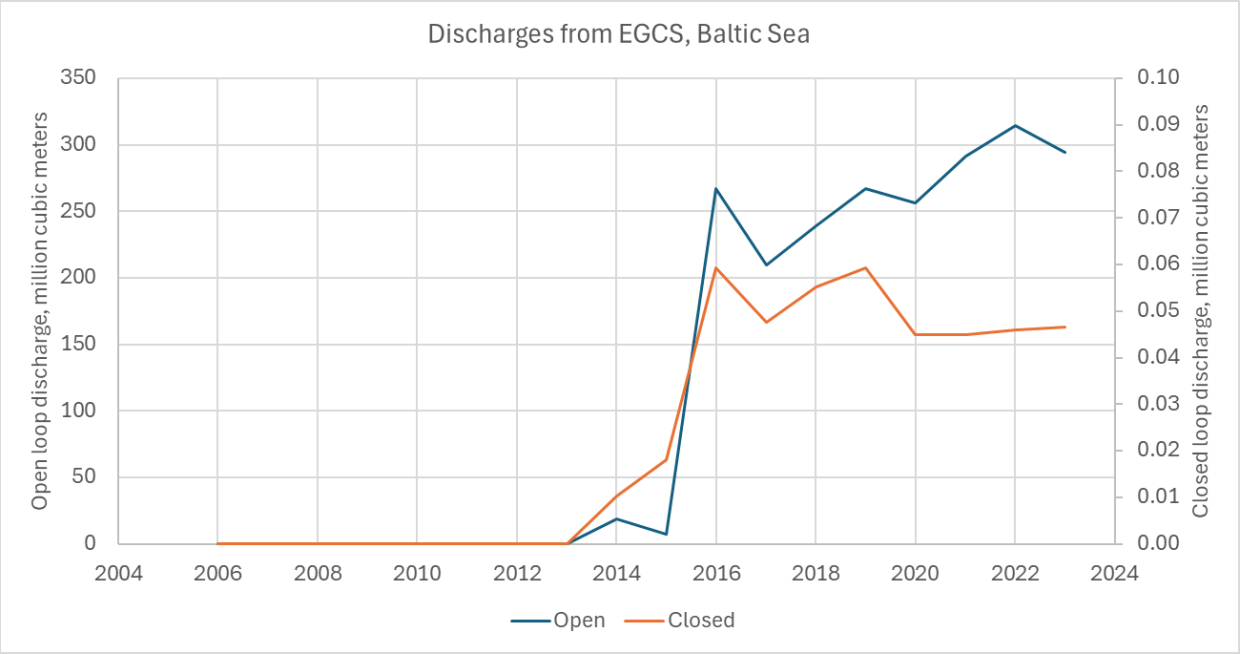


Figure 3 EGCS effluent discharges in the Baltic Sea area during 2006-2023. The blue line represents the Open loop discharge volumes (left vertical axis) and the orange line indicates the Closed loop effluent discharge volume (right side vertical axis). Note the difference of units between the axis.

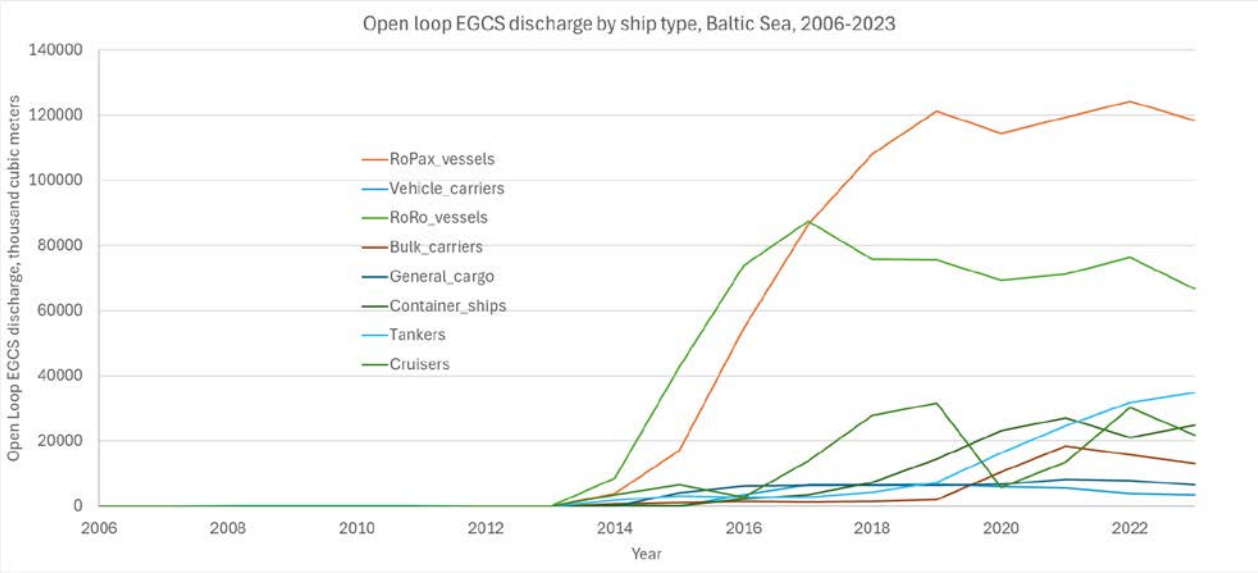
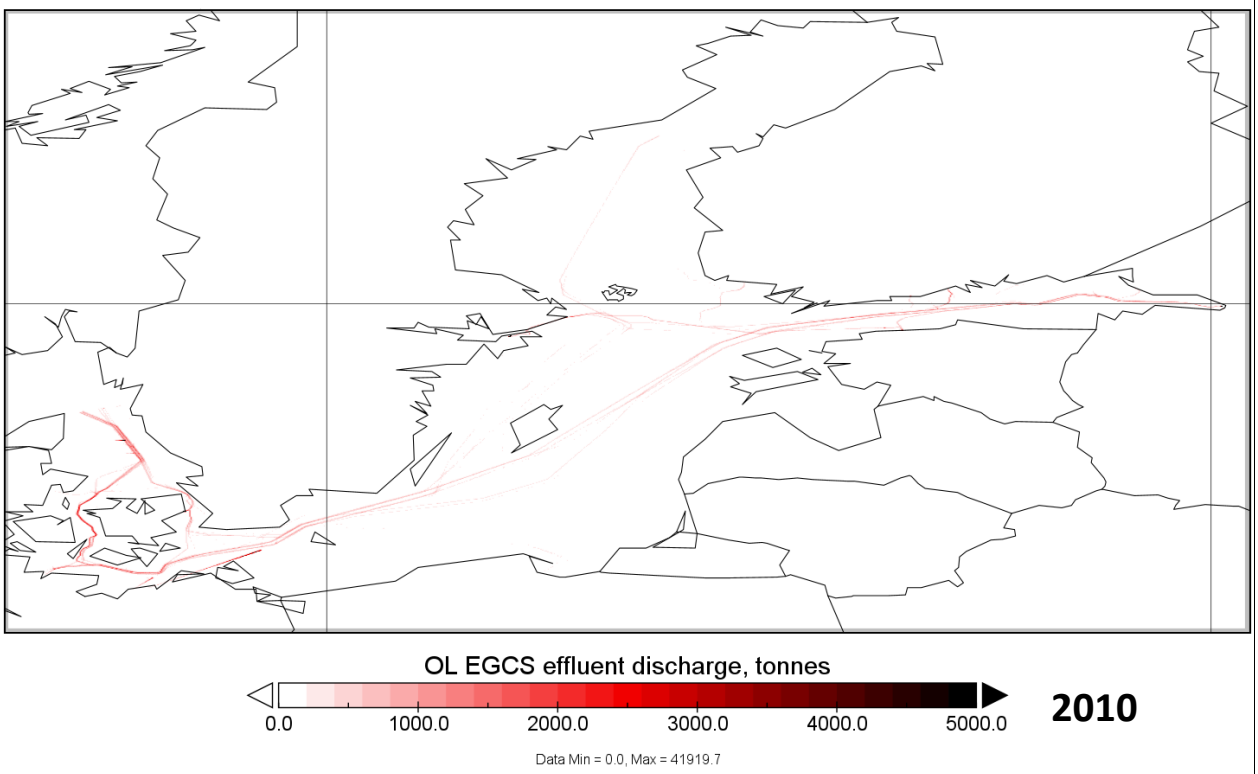
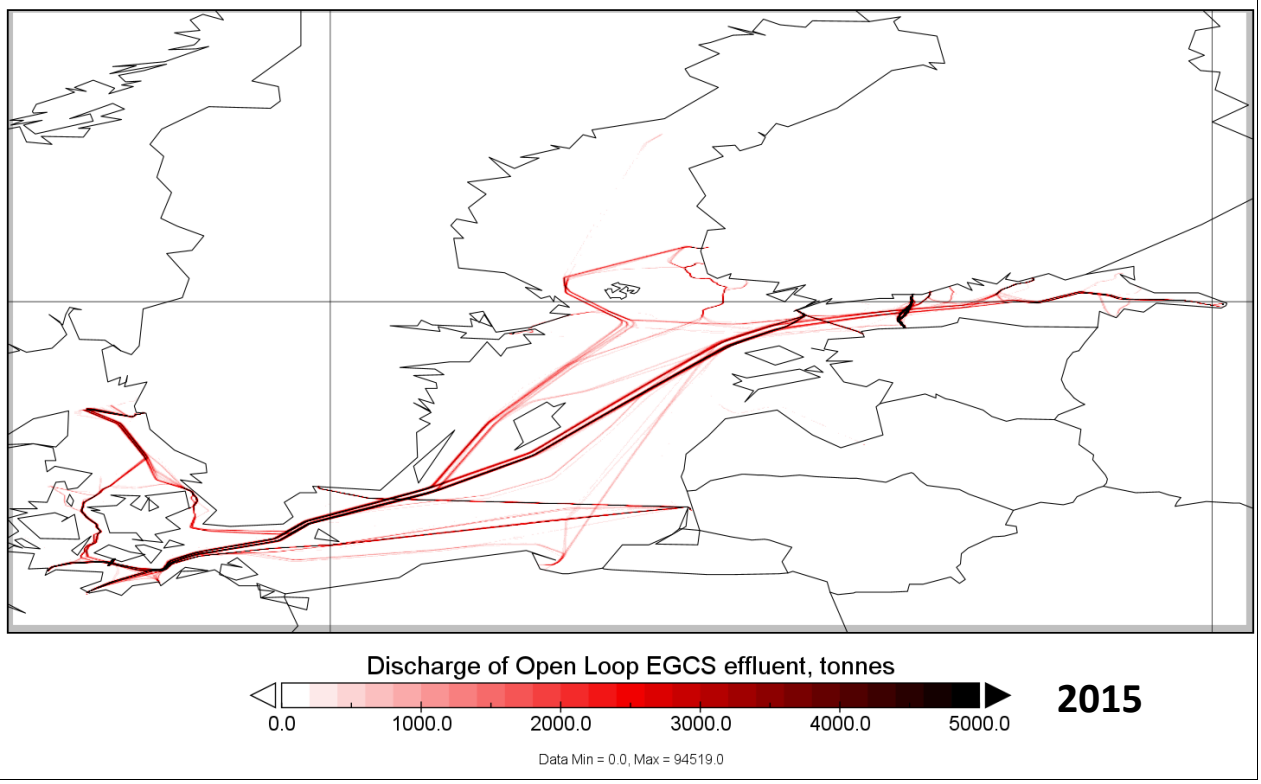


Figure 4 Effluent discharge from Open loop and Hybrid EGCS in the Baltic Sea area during 2006-2023. Largest releases come from EGCS in ro-ro cargo ships, ro-ro passenger ships and vehicle carrier types. Cruise passenger ship traffic in the area is still recovering from Covid19 pandemic and has not yet returned to pre-pandemic levels

Discharge from Open Loop EGCS, 2010



Discharges from Open Loop EGCS, 2015



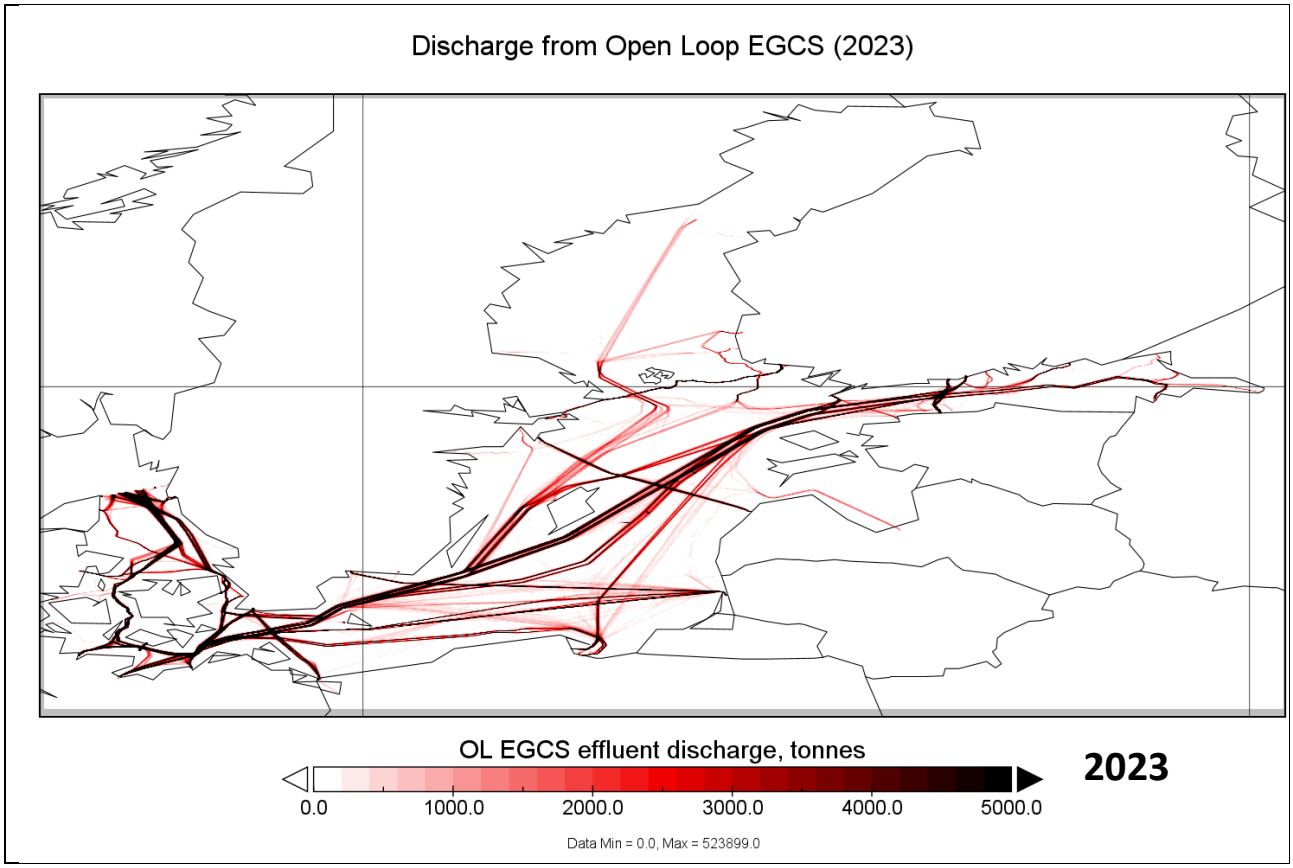


Figure 5 Discharge patterns of EGCS effluent release from Open loop systems in 2010, 2015 and 2023.Corresponding volumes were 66 thousand tonnes (2010), 75 million tonnes (2015) and 294 million tonnes (2023).

The current modelling setup assumes that the effluent discharge from open loop is 90 m^3 kWh^{-1} and 0.45 m^3 kWh^{-1} from closed loop systems, in accordance with existing measurements for 48 scrubber systems (Kjølholt et al., 2012; Teuchies et al., 2020).

Majority of EGCS discharge comes from ships operating a regular schedule in the Baltic Sea area (Figure 4-Figure 5). In 2010, most of the discharge was from an oil tanker, but current studies suggest largest discharges from ro-ro and ropax ship traffic.

B. Bilge water

According to the IMO MARPOL Annex I, the release of oily water to the sea requires meeting several criteria, for example vessel must be *en route* and the oil content must not exceed 15 ppm. Bilge water can practically contain any number of substances available onboard a vessel, which makes bilge water modeling very complicated if done on pollutant level. Further, the release of bilge water may be random discharge, depending on e.g. tank capacity. The approach of this report is to model the discharge as a continuous release instead, because actual areas of bilge water release could not be determined. The values reported here are bilge water release volumes, which need to be complemented with water analysis results to obtain final quantities of desired pollutants. Regional rules and restrictions have been applied and the modeled bilge water release follows the rules set in MARPOL Annex I and includes stricter rules in cases where national legislation (Finland, Act on Environmental Protection in Maritime Transport Chapter 2, §1) exceeds the IMO regulation (Figure 6). The total release of bilge water was estimated to be 0.4 million cubic meters.

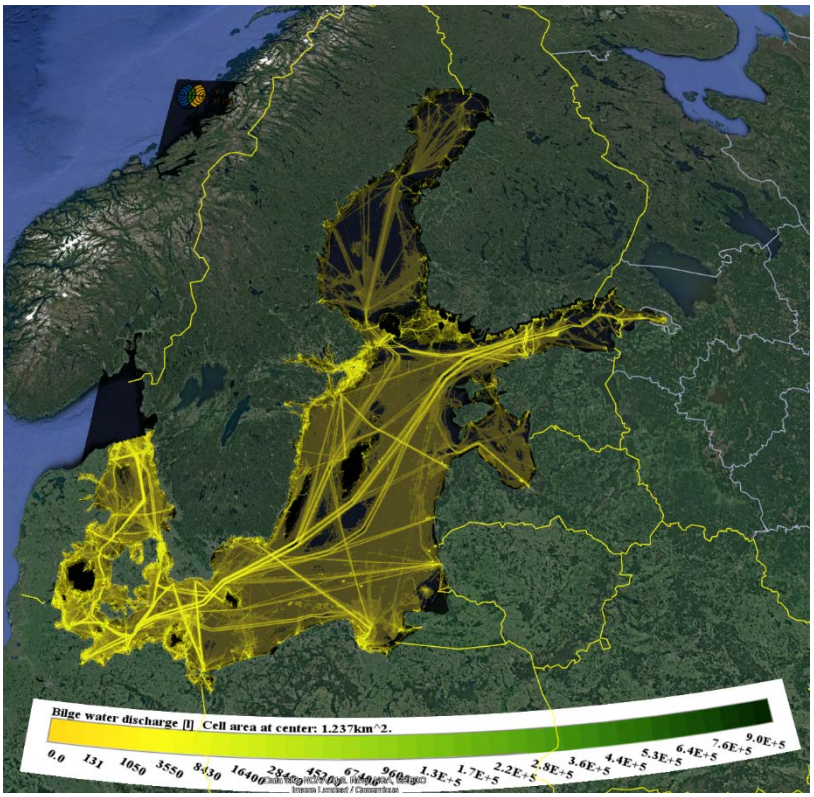


Figure 6 Estimated release of bilge water in the Baltic Sea during 2022. The release is reported in liters.

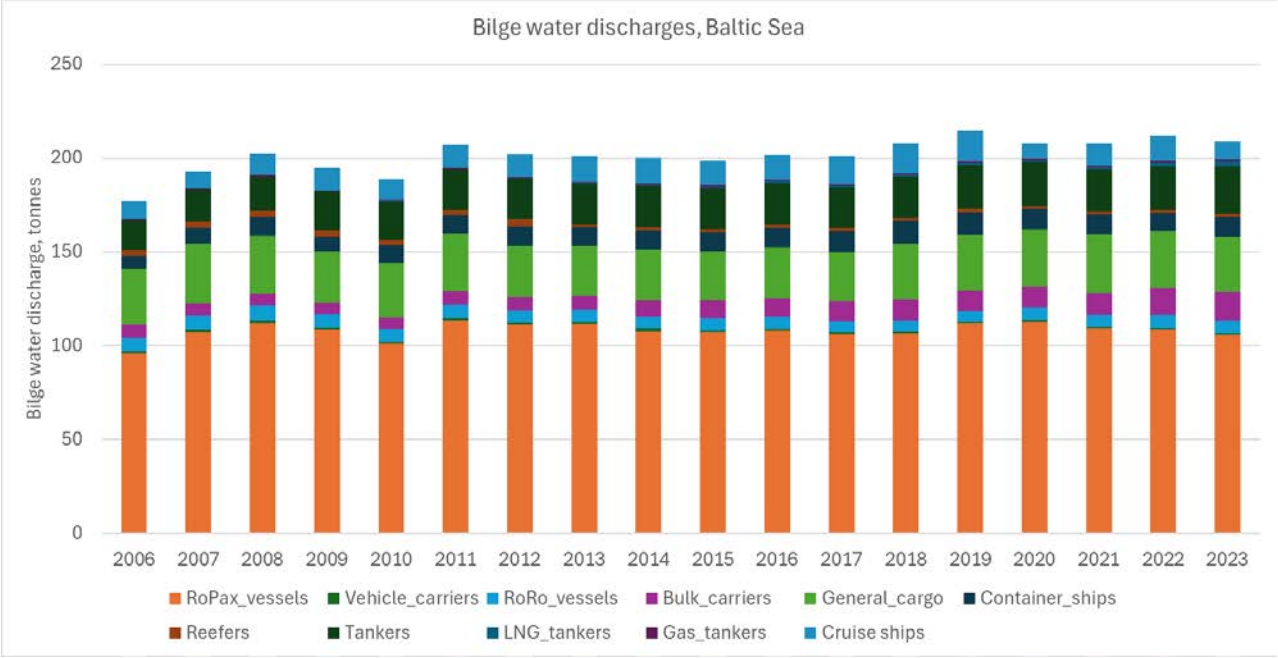


Figure 7 Discharges of Bilge water in the Baltic Sea area during 2006-2023. Totals are given in tonnes of bilge water released from various types of ships.

Bilge water releases were not affected by Covid19, because they do not depend on the number of people onboard the vessel (Figure 7).

C. Ballast water

As per Sep 2024, the IMO Ballast Water Management convention has been ratified by 97 out of 197 member states representing over 93.7% of the world's gross tonnage of ships. Regulation D-2 of the convention defines the necessary technological systems for effective treatment on board to minimise the spread of invasive species within ballast water discharges. Even if a member state has not ratified the convention, it does not mean that it allows untreated ballast discharges. For example, the United States has not ratified the convention but has its own regulation concerning ballast water and requires vessels to be equipped with US Coast Guard approved systems for ballast water treatment.

For accurate modelling of the volumes of treated and untreated ballast water discharges it is necessary to know which ships have D-2 approved systems installed and which have not. In the S&P Global database of ships used by STEAM, this information is available only for a fraction of the global fleet because the whole database is not updated every year. Thus, it is very probable that the amount of treated ballast water reported in this document is an underestimation and it will not include all the ships with ballast water treatment systems.

Regardless, an attempt was made to provide an estimate of the share of treated ballast water in the Baltic Sea area. This estimate is divided in two parts; the first describes the discharge volume of treated ballast water from vessels which are known to have treatment systems based on IHS data. The second part is based on an estimate of newbuilds and retrofits of existing vessels with treatment systems.

Total ballast water discharges

Total ballast water releases were estimated as 494 (2022:486) million tonnes (+1.7% when compared to 2022). Most of this is carried by tankers and bulk cargo ships, but also released from other vessels (Figure 8). The estimated ballast water discharge at global level is consistent with David and Gollasch (2015), but significantly higher than those estimated by (Endresen et al., 2004), which is in the range of Ballast Water/DWT ratio of previous work of others (David and Gollasch, 2015). Ballast water releases are geographically distributed to areas where cargo operations are conducted. Ballast water releases are modeled as a function of water mass carried and it highlights ports where liquid or dry bulk cargo is transferred. Assumptions which have been used in the activity-based modeling work do not take partial cargo deliveries into account, total discharge of all ballast water is assumed at each harbor, which may overestimate the released quantities. This leads to an order of magnitude estimate which is 494 million tonnes of ballast water for the Baltic Sea fleet during 2023.

Share of treated ballast water discharge, based on IHS data

The share of treated ballast water is also estimated based on existing S&P Global entries of known ballast water management systems in STEAM data. In this estimate, tankers have the highest volume of treated ballast water discharge. However, it is likely that this estimate is too low since not all installations of treatment systems are known. For the Baltic Sea fleet, 706 entries specifically mentioned that a treatment system exists, and ballast water discharge from these ships is 90 million tonnes (18% from total ballast discharge). Further, 77 entries indicated that ballast water will be exchanged during the voyage, and this would correspond to 11.6 million tonnes (2.4% from total), but the exchange of ballast water in the Baltic Sea is not allowed. In addition, 1189 ships were constructed after September 2017 and are assumed to carry a treatment system, which combined with the known installations represents 30% from total discharge Figure 9.

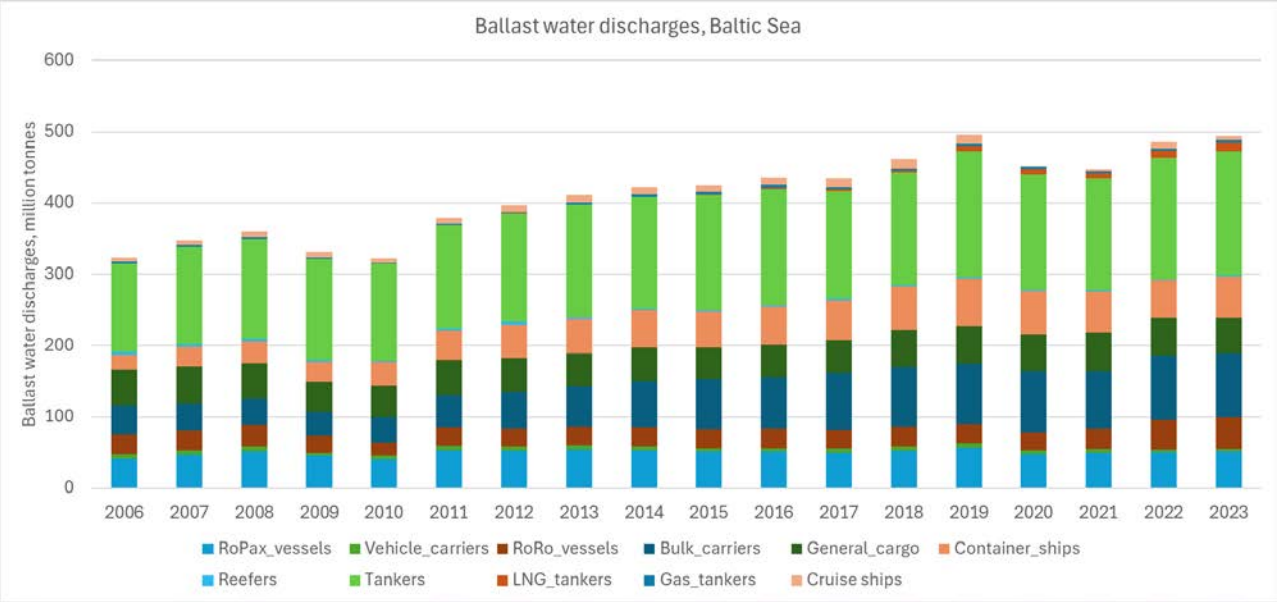


Figure 8 Estimated discharge of ballast water from different types of ships, Baltic Sea, 2006-2023. Both treated and untreated ballast water are included in these totals.

Based on the existing installations and the number of ships built since September 2017, about 30% of the ballast water is treated. However, the knowledge of retrofits of the existing fleet is incomplete.

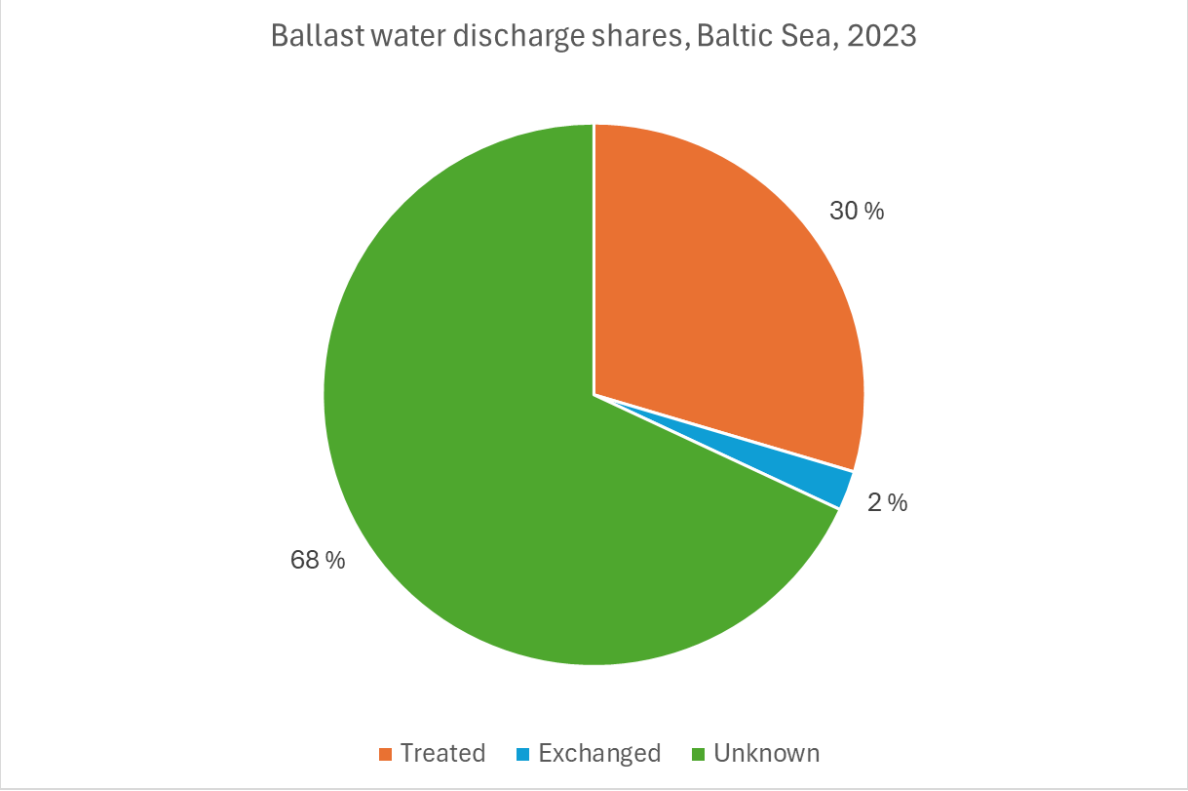


Figure 9 Estimated shares of treated and untreated ballast water discharges in the Baltic Sea area during 2023. Note, the exchange of ballast water is not allowed in the Baltic Sea area.

D. Sewage and grey water

The sewage release ban for discharge of untreated sewage from passenger ships sailing in the Baltic Sea, regulated by the MARPOL convention Annex IV, entered into force on 1st June 2019 for newbuilds, 1st June 2021 for existing vessels with an exemption granted until 1st June 2023 for single voyages from outside of the Baltic Sea to Russian territorial waters and back. Compliance can be achieved by either discharging sewage to Port Reception Facilities (PRF) or using a type approved sewage treatment plant (MEPC.227(64). During 2023, no international passenger traffic going/leaving St Petersburg was observed, but some national cruise activity was recorded between Vyborg and St Petersburg.

As per the regulation, passenger vessels that do not carry approved and certified treatment systems are required to discharge their sewage to PRFs. It is worth noting that the regulation only applies to sewage. Grey water, which is wastewater from showers, sinks and galleys, is not regulated and thus can be legally discharged into the Baltic Sea.

To accurately model the volumes of treated sewage discharges into the Baltic Sea, information on MEPC.227(64) specified approved sewage treatment systems installations onboard should be known. Unfortunately, this information is not available because the type of sewage treatment plant onboard cannot be determined based on the IHS vessel database used for STEAM.

Discharges of black and grey water are directly connected to number of people carried onboard (Figure 10). During the Covid19 pandemic, tight travel restrictions reduced the number of passengers carried significantly, and only a slow recovery of passenger traffic was observed in 2021. The current estimates of number of passengers carried are done by adjusting the passenger and crew capacity utilization. Passenger capacity utilization of pre-pandemic levels was used, 45% for RoPax traffic and 90% rate was used for cruise ships.

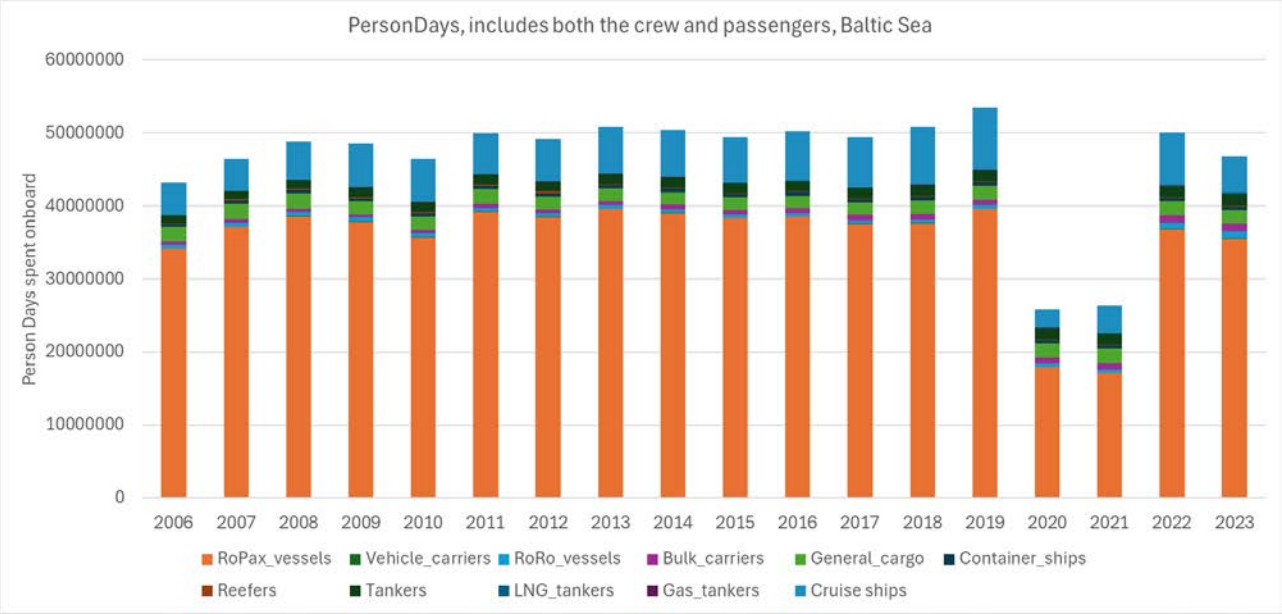


Figure 10 Estimated person days for each vessel type. Note, that both the number of passengers and crew size are included.

The discharge of untreated sewage to the Baltic Sea from all passenger ships will be stopped by June 2023 (MARPOL Annex IV). Overall sewage release volume (treated + untreated) from passenger ships to the sea was not changed, but sewage treatment plants were estimated to remove most nutrients from the discharge, in accordance with MEPC.227(64). There is some uncertainty concerning whether all sewage is left in port reception facilities or treated onboard with advanced sewage treatment systems with significant nutrient removal.

In 2023 there were 85 cruise vessels observed in the Baltic Sea area, which were estimated to produce 124,000 tonnes of sewage during normal operation during 2023. Similarly, RoPax vessels were estimated to produce 794,000 tonnes of sewage. The estimated total sewage release was 1.37 million tonnes and sewage nitrogen was 225 tonnes. It should be noted that significant uncertainty is involved in these estimates since it is not known which ships treat their sewage with nutrient removal and how much was left at ports.

The estimates of sewage and grey water are based on vessel passenger counts, capacity utilization, crew size, time spent onboard, sewage plant treatment efficiency and share of sewage left in port reception facilities (Wilewska-Bien et al., 2019). It should be noted that the modeling approach chosen applies to all ships, not just passenger vessels, since it depends on the number of crew and passengers onboard.

Discharge volumes of grey water were relatively stable during the period 2006-2019, but a sharp decline was predicted for 2020, which reflects the Covid19 effect on passenger traffic (Figure 11). Grey water releases were predicted as 5.1 (2022: 5.6) million tonnes, which is -8.3% less than in 2022. Estimates concerning the grey water release are based on similar methodology as the estimates of sewage, i.e. passenger counts, size of the crew and time spent onboard.

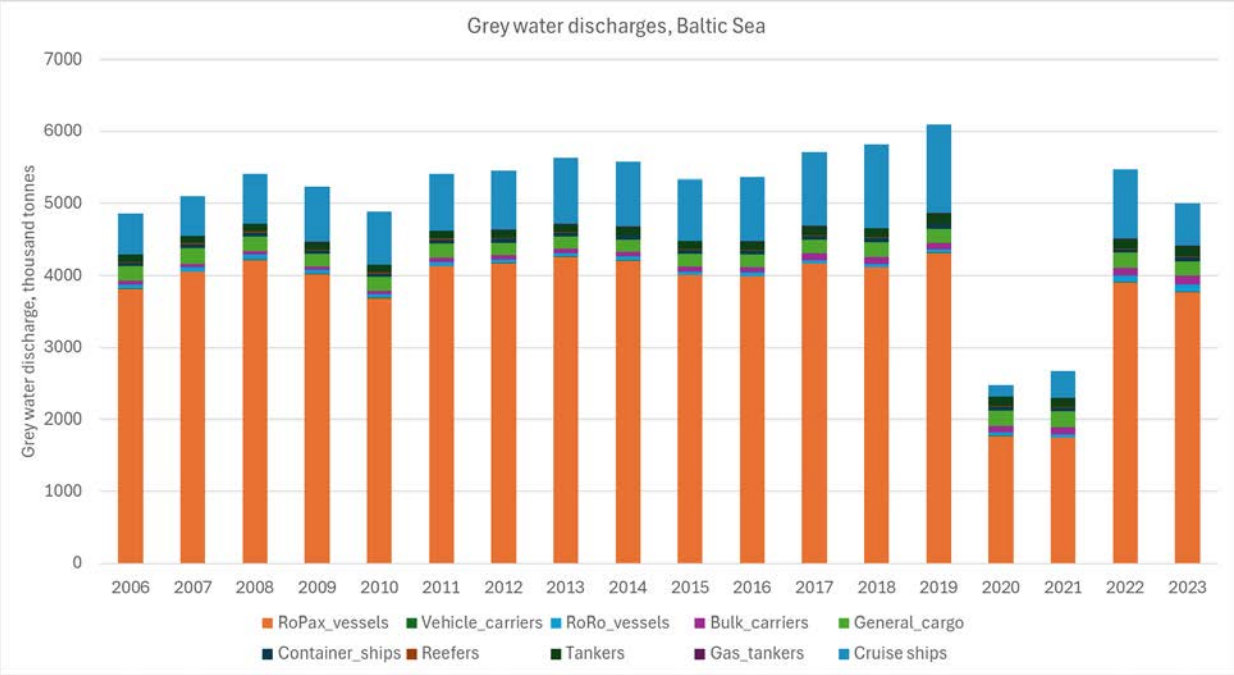


Figure 11 Discharges of Grey Water from ships in the Baltic Sea area during 2006-2023.

Geographical distribution of estimated grey water discharge is depicted in Figure 12. Grey water releases are not currently regulated in the model.

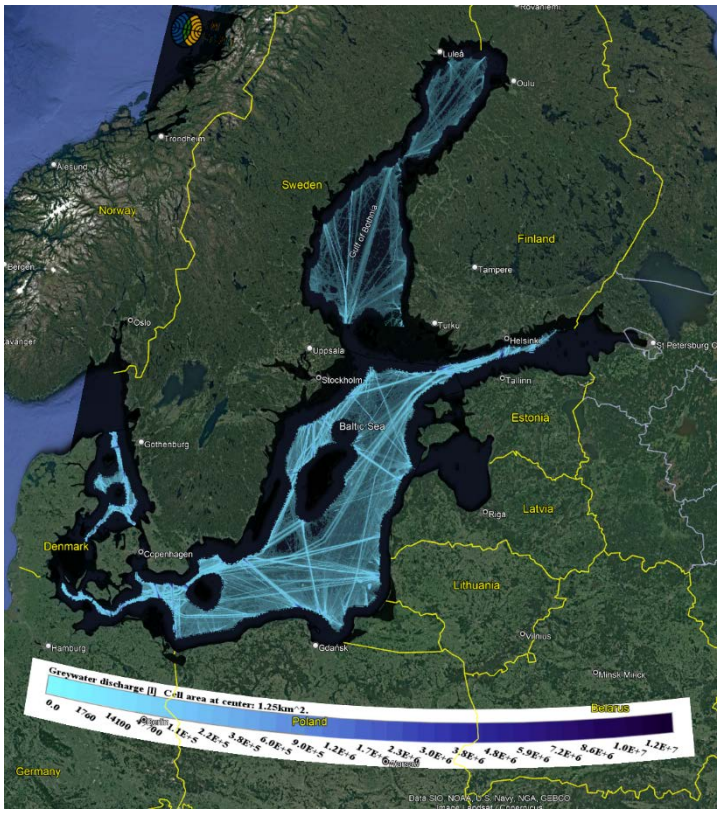


Figure 12 Estimated grey water discharges from ships sailing the Baltic Sea in 2022. Discharge volume is in liters per area of a map grid cell.

Figure 13 illustrates the trend for sewage releases during the period 2006-2023. A challenge for sewage and nutrient discharge modeling is the lack of data for advanced sewage treatment plant installations, and nutrient content modeling has been applied according to the required reduction for N and P described in Chapter 4.2 of MEPC.227(64).

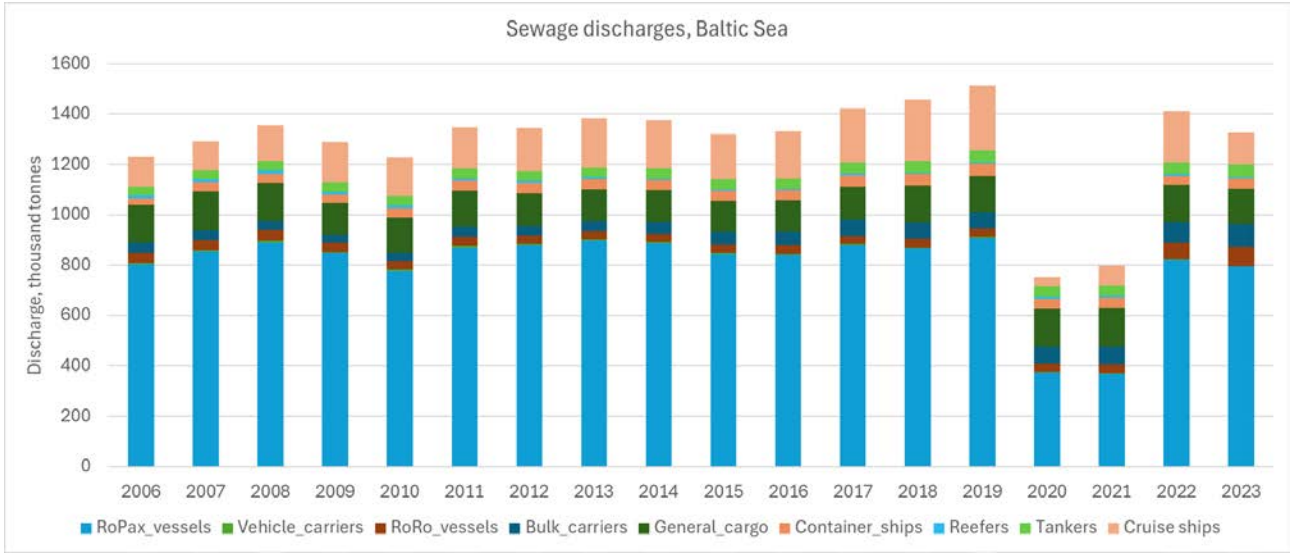


Figure 13 Discharge of sewage from ships sailing the Baltic Sea area during 2006-2023.

E. Predicted nutrient releases with sewage, grey water and food waste discharges

Both nitrogen (N) and Phosphorus (P) flows with ship sewage, grey water and food waste releases were estimated based on person days. The nutrient reduction required by MEPC227.(64) were applied to the sewage discharges, but they were not applied to grey water or food waste. The nutrient release in comminuted food waste mainly comes from passenger traffic, due to many passengers and crew onboard. According to the IMO MARPOL Annex V, 12 nautical mile distance is applied in special areas like the Baltic Sea. Total reduced nitrogen release to the Baltic Sea from food waste, grey water and sewage in 2023 was estimated as 456 (-9% decrease from 2022 total) tonnes Figure 14,Figure 15 and Figure 16.

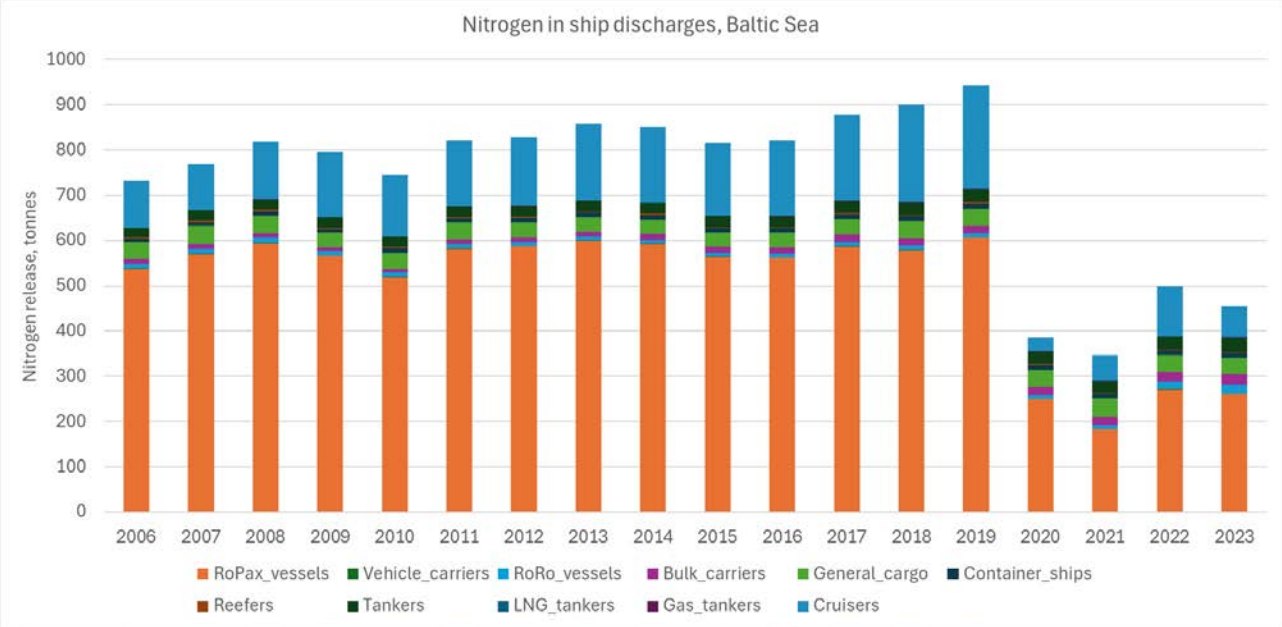


Figure 14 Predicted nitrogen discharges in sewage, grey water and food waste from ships in the Baltic Sea area during 2006-2023.

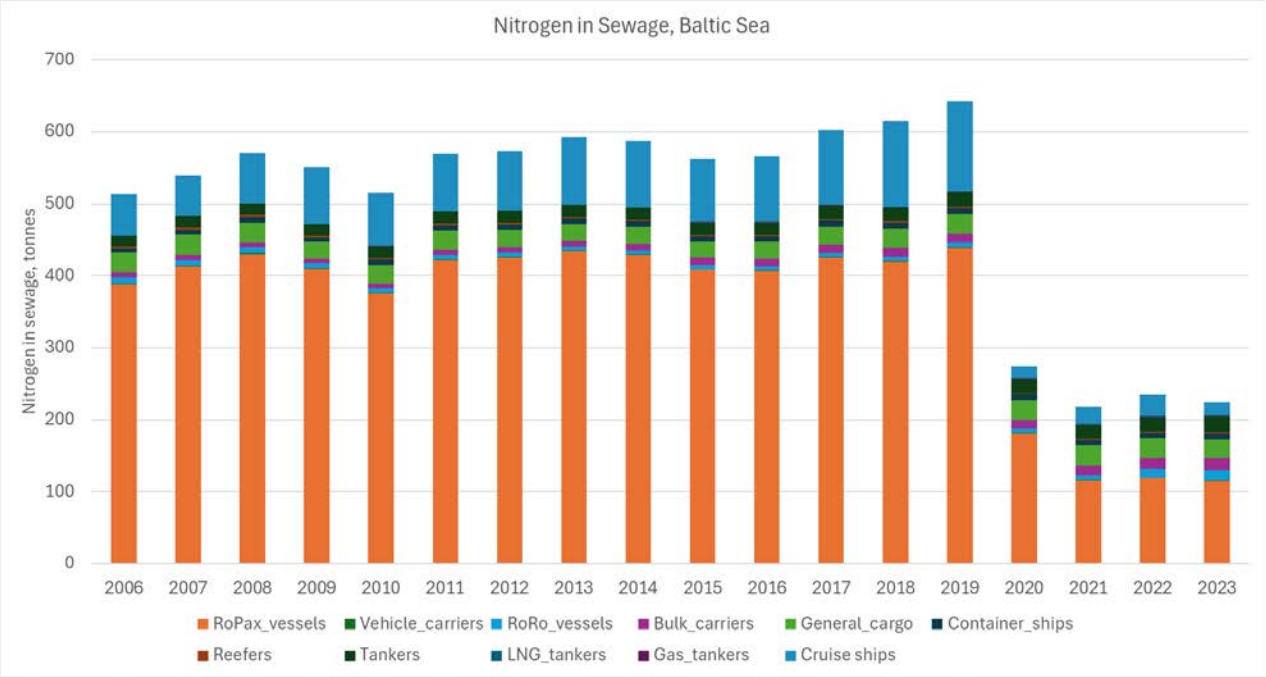


Figure 15 Nitrogen discharge through sewage from ships in the Baltic Sea area during 2006-2023.

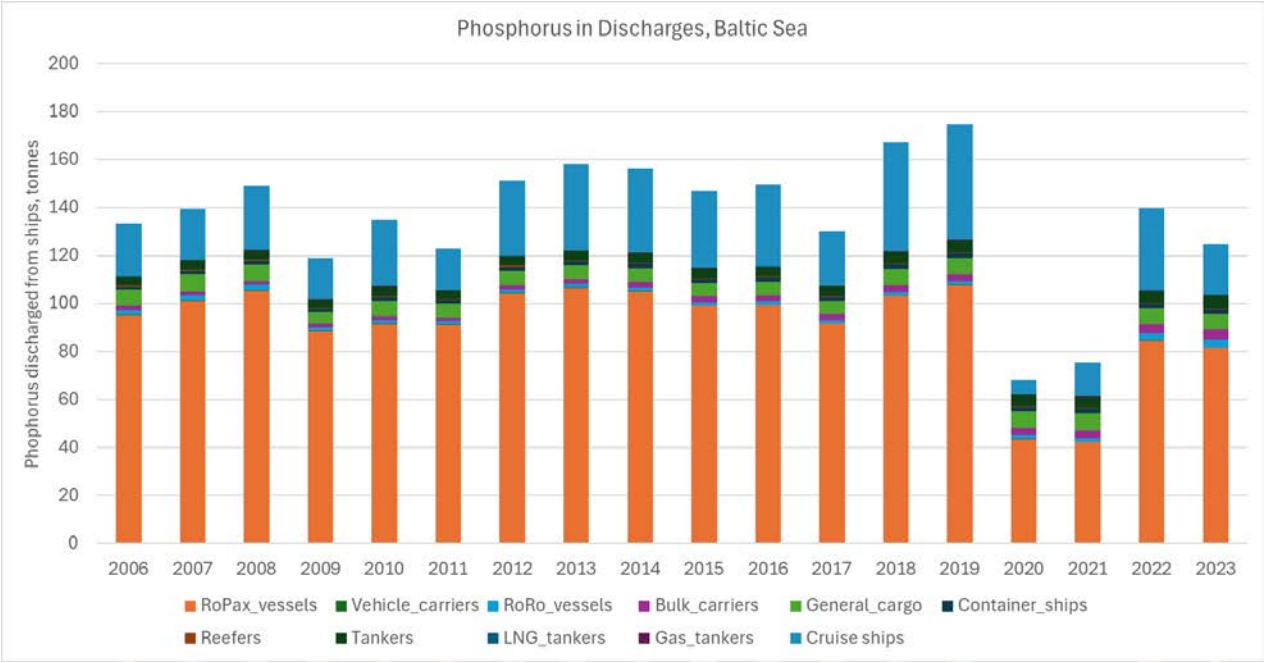


Figure 16 Total estimated Phosphorus discharges from sewage, grey water and food waste from the Baltic Sea shipping during 2006-2023.

The nutrient removal requirement changed the nitrogen flow balance of discharges. In 2019, over two thirds of nitrogen were from sewage. In 2023, less than half of the nitrogen was from sewage, about one third from grey water and the rest was from food waste (Figure 17).

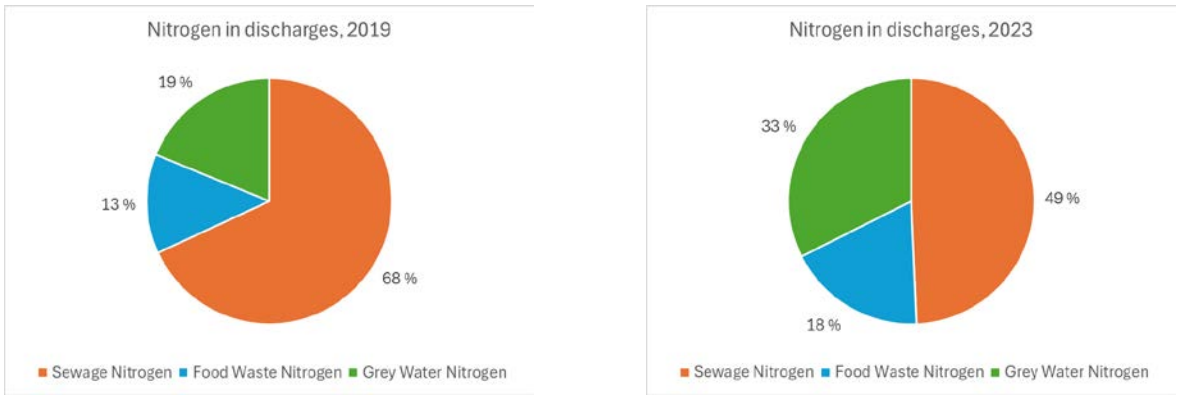


Figure 17 Nitrogen contribution of various discharge streams in 2019 and 2023, before and after the reduction requirements were introduced to the passenger vessels.

F. Stern tube oil leaks

The propeller shaft connects the main engine to a propeller through a stern tube, which goes through the ship's hull. This connection uses white metal bearings which are lubricated either by sea water or, in most cases, by oil. Small amounts of oil leakage is allowed (six liters/day is normal according to Lloyds Register seal type approval) and up to 80 million liters/year is leaked to the sea globally (Sengottuvel and Jagadale, 2017). In the Baltic Sea area, the estimated stern tube oil leak is 3.8 (+2%) million liters (Figure 18).

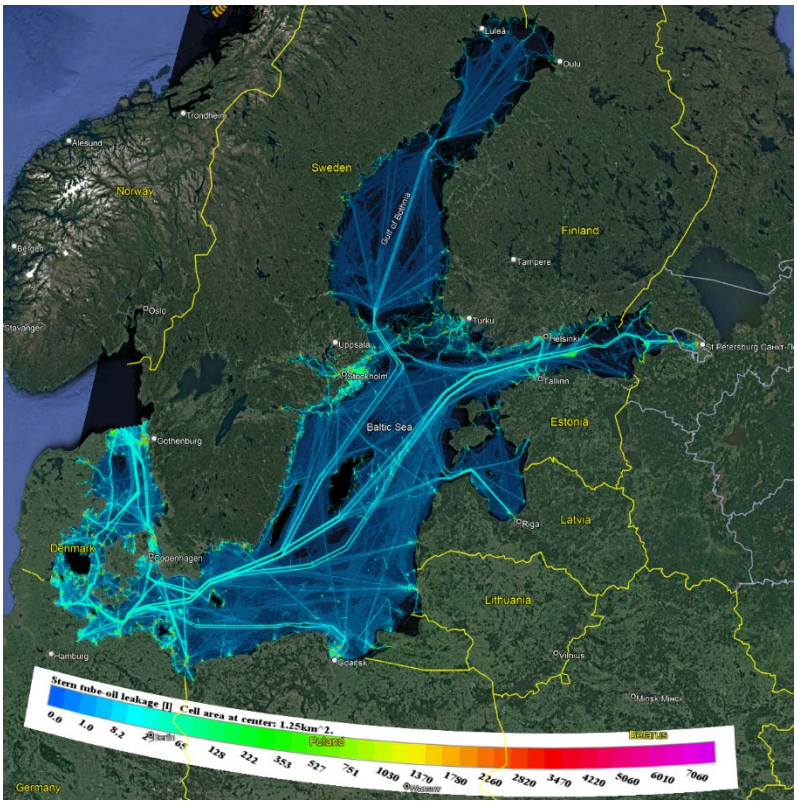


Figure 18 Estimated stern tube oil leakage during 2023 (in liters)

G. Anti-fouling paint release

The anti-fouling convention (AFC) regulates the use and contents of hull paints used to protect underwater surfaces of ships from unwanted fouling. The modeling approach is based on the calculation of the wetted surface area of each vessel, considering the uptake of various paints in the different regions in the Baltic Sea. Specific leaching rates for different compounds are applied. Hull anti-fouling paint (AFP) coatings are not necessarily used in areas where vessels frequently navigate in ice conditions, because abrasion of ice may reduce the effectiveness of hull paints and frequent cleaning of hull is more effective. Vessels are tracked throughout the year and the highest leaching rate is selected based on where the ship has sailed. High AFP application is assumed for vessels which frequently operate outside the Baltic Sea area.

Six different compounds were considered (Table 5), discharges and their temporal trends in 2006-2023 were estimated (Table 5 andTable 6; Figure 19 andFigure 20).

Table 5 Anti-fouling paints considered in this report. Molecular mass of each compound is indicated as well as the CAS registry number

Biocide	Molecular mass (g/mol)	CAS number
Cu(I)Oxide	143.09	1317-39-1
Cu Pyrithione	315.86	154592-20-8
Zinc Oxide	81.38	1314-13-2
Zinc Pyrithione	317.7	13463-41-7
DCOIT	282.2	64359-81-5
Zineb	275.8	12122-67-7

Table 6 Estimated anti-fouling paint release from ship in the Baltic Sea during 2023. All discharges are given in tonnes of compound released. Values in parenthesis indicate the change (%) compared to previous year.

	CUO [TONNES]	CUPYR [TONNES]	ZNO [TONNES]	ZNPYR [TONNES]	DCOIT [TONNES]	ZINEB [TONNES]
TOTAL	494.1 (+4.8%)	1.0 (+5.0%)	98.1 (+5.2%)	1.9 (+5.3%)	0.7 (+5.2%)	1.9 (+5.0%)
BALTIC PROPER	218.2 (+5.7%)	0.5 (+6.5%)	43.8 (+7.2%)	0.9 (+7.5%)	0.3 (+7.2%)	0.8 (+6.6%)
KATTEGAT	126.7 (+2.1%)	0.3 (+1.9%)	25.7 (+1.8%)	0.5 (+1.7%)	0.2 (+1.8%)	0.5 (+1.9%)
GULF OF FINLAND	117.5 (+12.9%)	0.2 (+12.5%)	22.2 (+12.2%)	0.4 (+12.1%)	0.1 (+12.2%)	0.4 (+12.5%)
GULF OF BOTHNIA	23.7 (-8.6%)	0.0 (-8.4%)	4.8 (-8.1%)	0.1 (-8.2%)	0.0 (-8.3%)	0.1 (-8.3%)
GULF OF RIGA	0.1 (+108.5%)	0.0 (-26.9%)	1.6 (-26.1%)	0.0 (-25.7%)	0.0 (-26.1%)	0.0 (-26.9%)
VESSEL TYPE						
ROPAX_VESSELS	16.4 (+4.0%)	0.0 (+2.3%)	4.5 (+1.6%)	0.1 (+1.2%)	0.0 (+1.5%)	0.1 (+2.4%)
VEHICLE_CARRIERS	1.9 (-15.1%)	0.0 (-15.3%)	0.3 (-15.5%)	0.0 (-15.6%)	0.0 (-15.5%)	0.0 (-15.3%)
RORO_VESSELS	12.7 (-26.3%)	0.0 (-20.9%)	2.8 (-16.7%)	0.1 (-14.7%)	0.0 (-16.5%)	0.1 (-20.7%)
BULK_CARRIERS	112.5 (+8.4%)	0.2 (+8.5%)	20.6 (+8.6%)	0.4 (+8.7%)	0.1 (+8.6%)	0.4 (+8.5%)
GENERAL_CARGO	75.5 (-5.0%)	0.2 (-5.1%)	14.5 (-5.1%)	0.3 (-5.1%)	0.1 (-5.1%)	0.3 (-5.1%)
CONTAINER_SHIPS	36.8 (+9.4%)	0.1 (+9.9%)	7.0 (+10.4%)	0.1 (+10.6%)	0.0 (+10.4%)	0.1 (+10.0%)
REEFERS	5.4 (+24.6%)	0.0 (+24.3%)	1.0 (+24.0%)	0.0 (+23.9%)	0.0 (+24.0%)	0.0 (+24.3%)
TANKERS	150.8 (+15.6%)	0.3 (+16.0%)	27.8 (+16.4%)	0.5 (+16.6%)	0.2 (+16.4%)	0.6 (+16.0%)
LNG_TANKERS	8.4 (+21.9%)	0.0 (+26.0%)	1.7 (+28.9%)	0.0 (+30.3%)	0.0 (+29.0%)	0.0 (+26.0%)
GAS_TANKERS	3.8 (-6.9%)	0.0 (-5.8%)	0.7 (-4.9%)	0.0 (-4.4%)	0.0 (-4.8%)	0.0 (-5.7%)
PASSENGER_SHIPS	2.5 (-29.0%)	0.0 (-25.6%)	0.7 (-24.7%)	0.0 (-24.4%)	0.0 (-24.8%)	0.0 (-26.2%)
CRUISERS	4.0 (-34.2%)	0.0 (-35.3%)	0.7 (-36.4%)	0.0 (-36.8%)	0.0 (-36.4%)	0.0 (-35.5%)
FISHING_VESSELS	4.0 (+7.1%)	0.0 (+5.8%)	0.8 (+4.9%)	0.0 (+4.6%)	0.0 (+4.9%)	0.0 (+5.8%)
SERVICE_SHIPS	3.1 (-9.3%)	0.0 (-9.2%)	0.7 (-9.2%)	0.0 (-9.3%)	0.0 (-9.3%)	0.0 (-9.3%)
UNKNOWN	36.4 (+6.0%)	0.1 (+6.6%)	9.6 (+6.9%)	0.2 (+7.0%)	0.1 (+6.9%)	0.2 (+6.6%)
MISC	17.0 (-14.4%)	0.0 (-12.8%)	4.1 (-11.8%)	0.1 (-11.5%)	0.0 (-11.9%)	0.1 (-12.8%)

The largest AFP releases occur in the Baltic Proper, which is largest of the considered sub-regions. It should be noted that the wet surface area of IMO registered vessels is estimated to be about 83% of the total wet surface area of all waterborne vessels, the remaining 17% roughly represents the contribution from small boats. It is very likely that the quantities listed in Table 6 are underestimated, because small boat AFP releases are not included in these results.

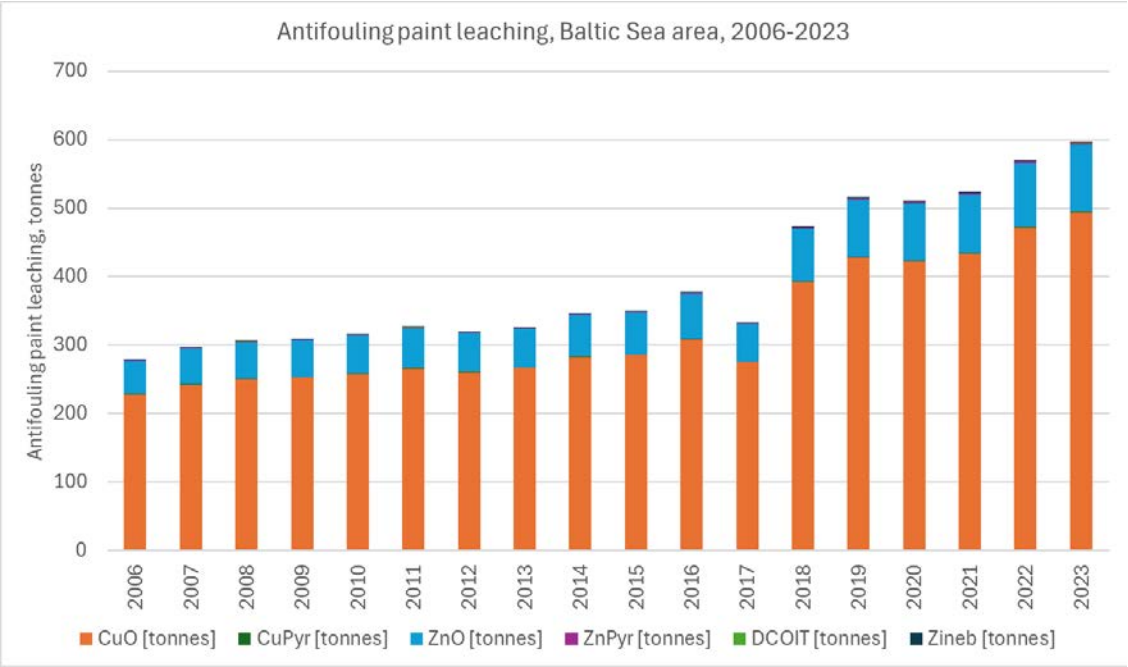


Figure 19 Antifouling paint release from ships in the Baltic Sea area during 2006-2023. Six compounds are reported; Cu(II)Oxide, (orange), Cu-Pyrithione (dark green), Zn Oxide (blue), Zn-Pyrithione (magenta), DCOIT (light green), Zineb(dark blue).

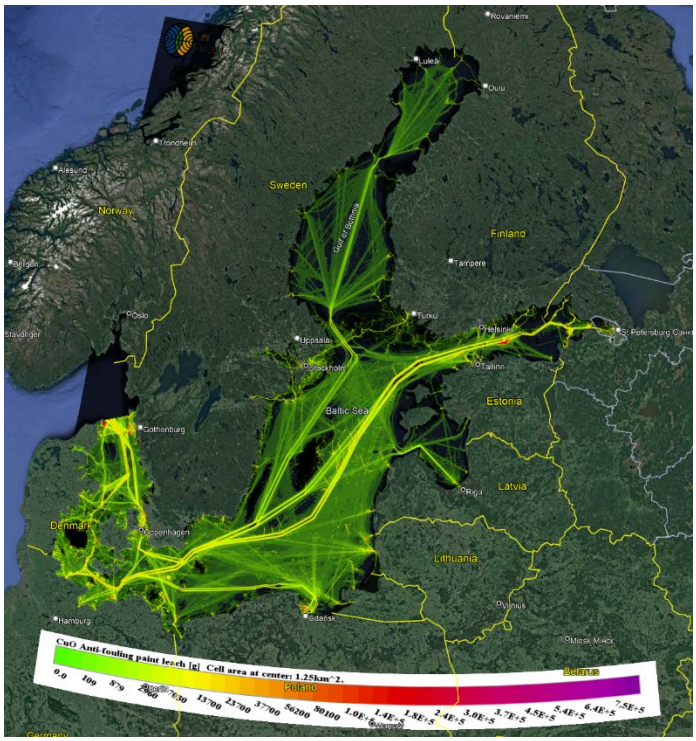


Figure 20 Antifouling paint releases from the Baltic Sea fleet in 2022. Only CuO is presented here, but similar maps are available for other antifouling releases, too. Unit is mass in grams per grid cell area.

The estimated wet surface area of all AIS equipped vessels was about 54.8 million square meters. This mostly describes large ships, for which AIS is mandatory. This estimate, however, does not include contribution from small boats, the number of which exceeds half a million around the Baltic Sea coastline. The estimated surface area of small boat fleet is about 7.1 million square meters, considering the number of boats of each type and their average size (Johansson et al., 2020). The boating contribution to overall wet surface is around 12%, considering the length of boating season, which mainly concerns May-September period of each year, the contribution of small boats to antifouling releases was estimated as 106 tonnes of Zn and Cu. Antifouling release from points has a very different spatial pattern than that of ships (ships: Figure 20, boats: Figure 21).

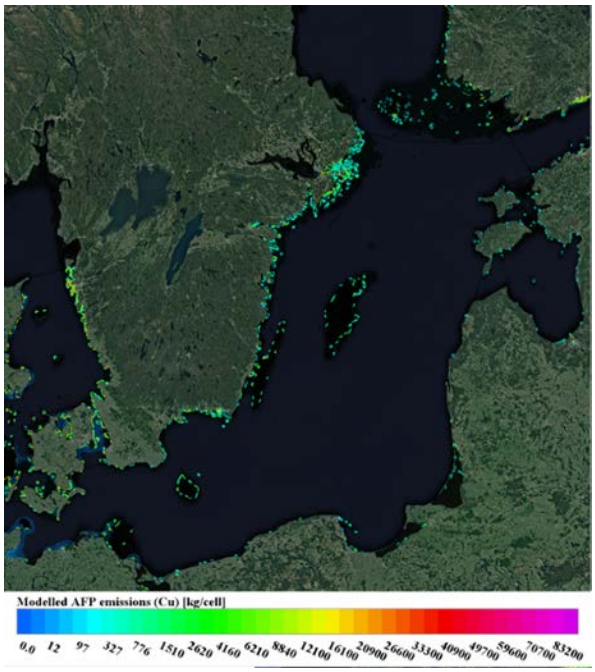


Figure 21. Release of Copper from antifouling paints used in boats in the Baltic Sea area. Image from (Johansson et al., 2020).

Large ships travel along the shipping lanes, whereas small boat traffic occurs close to the shore, extending tens of kilometers to the open sea, but no further.

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Data

The emission estimates for the year 2023 are based on over 789 million AIS-messages sent by 39,238 different ships, of which 9,587 had an IMO registry number indicating commercial marine traffic. The AIS position reports were received by terrestrial base stations in the Baltic Sea countries and collected to regional HELCOM AIS data server. Emissions are generated using the Ship Traffic Emission Assessment Model, version 4.3.1 (STEAM; (Jalkanen et al., 2009, 2012, 2018, 2021; Johansson et al., 2013, 2017).

The AIS data for year 2023 had no temporal gaps, AIS data was available throughout the year and the temporal coverage was 100%. This is the second time for HELCOM AIS service with a perfect service record. Most of the messages originate from South-Western region of the Baltic Sea near the Danish and southern Swedish sea areas (Figure 22). On average, data flow was around 90,000 messages per hour.

The uncertainty evaluation and comparison to EU MRV fuel reporting was made using global AIS data for 2023 from Orbcomm Ltd. This global dataset includes both terrestrial and satellite AIS position reports and includes over 8.9 billion (10^9) position reports. STEAM also uses the technical details of the global fleet based on S&P Global database.

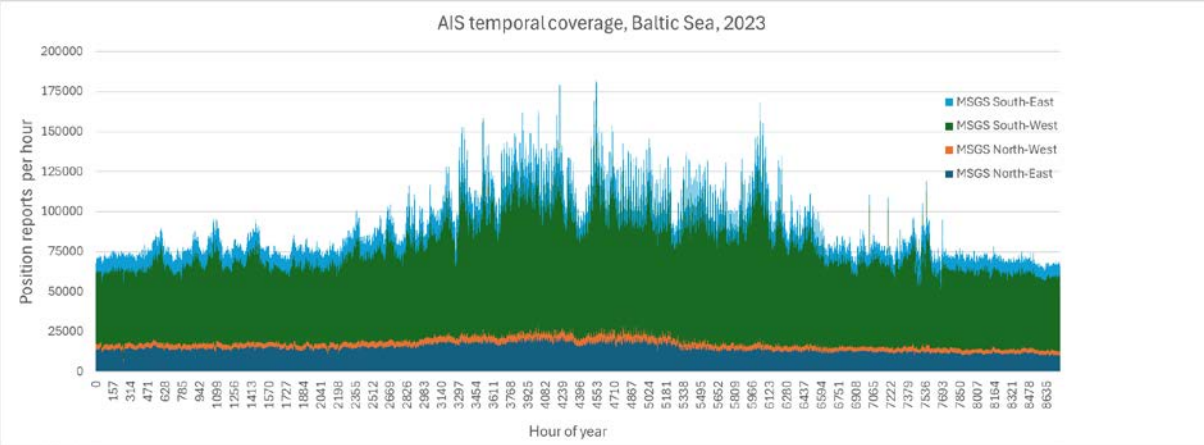

Figure 22 AIS-data hourly coverage in different parts of the Baltic Sea region for 2023.

Metadata

It should be noted that current estimates do not include contributions from vessels without active AIS equipment.

All calculations were made including the effects of sea currents, winds, waves and ice cover thickness. Impact of biofouling to vessel resistance was modeled with a simplified scaling approach, and impact of squat was neglected entirely.

Appendix – Annual data tables for discharge volumes, nutrients and antifouling paint releases.

2006	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	41.8	350.5	96.1	0	0	3812.6	803.8
Vehicle_carriers	5.4	10.6	1.0	0	0	5.6	4.0
RoRo_vessels	27.6	67.8	7.2	0	0	58.1	42.0
Bulk_carriers	41.2	176.2	7.1	0	0	53.8	38.9
General_cargo	49.7	1169.4	29.8	0	0	207.1	149.5
Container_ships	21.6	119.3	6.9	0	0	39.0	28.1
Reefers	3.1	49.8	2.9	0	0	15.0	10.8
Tankers	124.9	0.3	16.2	0	0	97.1	33.9
LNG_tankers	0.0	0.0	0.0	0	0	0.0	0.0
Gas_tankers	2.1	9.7	0.6	0	0	3.2	1.1
Passenger_ships	0.0	0.0	0.0	0	0	0.0	0.0
Cruisers	6.0	7.8	9.5	0	0	563.2	118.7
Fishing_vessels	0.0	20.6	1.7	0	0	9.4	0.9
Service_ships	0.0	0.0	0.0	0	0	0.0	0.0
Unknown	0.0	38.5	5.0	0	0	1.7	0.7
Total	323	2021	184	0	0	4866	1232

2006	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	388.5	41.3	106.9	37.7	11.4	46.1
Vehicle_carriers	0.8	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	7.8	0.8	2.1	0.8	0.2	0.9
Bulk_carriers	7.2	0.8	2.0	0.7	0.2	0.9
General_cargo	27.8	3.0	7.7	2.7	0.8	3.3
Container_ships	5.2	0.6	1.4	0.5	0.2	0.6
Reefers	2.8	0.2	0.4	0.3	0.1	0.2
Tankers	14.8	1.6	4.1	1.4	0.4	1.8
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.5	0.1	0.1	0.0	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0

Cruisers	57.4	31.2	15.8	5.5	9.5	6.8
Fishing_vessels	0.2	0.1	0.3	0.0	0.0	0.1
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.2	0.0	0.0	0.0	0.0	0.0
Total	513	80	141	50	23	61

2006	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	227.8 (-10.0% %)	0.9 (9.2%)	83.5 (9.8%)	1.6 (10.%)	0.6 (9.8%)	1.6 (9.2%)
Baltic Proper	206. (14.7%)	0.4 (13.4%)	40.7 (12.5%)	0.8 (12.1%)	0.3 (12.5%)	0.8 (13.4%)
Kattegat	123.7 (9.1%)	0.3 (9.%)	25.2 (8.9%)	0.5 (8.9%)	0.2 (8.9%)	0.5 (9.%)
Gulf of Finland	104. (11.9%)	0.2 (11.6%)	19.7 (11.4%)	0.4 (11.3%)	0.1 (11.4%)	0.4 (11.6%)
Gulf of Bothnia	25.9 (6.6%)	0.1 (6.9%)	5.2 (6.8%)	0.1 (7.4%)	0. (7.3%)	0.1 (6.9%)
Gulf of Riga	11.2 (40.3%)	0. (40.6%)	2.2 (41.%)	0. (41.2%)	0. (41.%)	0. (40.7%)
Vessel type						
Ropax_vessels	14.2 (-6.%)	0. (-4.3%)	4. (-3.5%)	0.1 (-3.1%)	0. (-3.4%)	0.1 (-4.3%)
Vehicle_carriers	2.3 (-21.1%)	0. (-21.1%)	0.4 (-21.1%)	0. (-21.1%)	0. (-21.1%)	0. (-21.1%)
Roro_vessels	18.7 (23.7%)	0. (19.%)	3.7 (15.4%)	0.1 (13.9%)	0. (15.3%)	0.1 (18.6%)
Bulk_carriers	103.8 (29.4%)	0.2 (29.5%)	19. (29.6%)	0.4 (29.7%)	0.1 (29.6%)	0.4 (29.5%)
General_cargo	79.3 (0.4%)	0.2 (1.2%)	15.3 (1.8%)	0.3 (2.%)	0.1 (1.8%)	0.3 (1.2%)
Container_ships	33.7 (1.6%)	0.1 (-0.2%)	6.3 (-1.7%)	0.1 (-2.3%)	0. (-1.7%)	0.1 (-0.3%)
Reefers	4.3 (13.3%)	0. (13.3%)	0.8 (13.2%)	0. (13.1%)	0. (13.2%)	0. (13.2%)
Tankers	130. (16.5%)	0.3 (16.4%)	23.8 (16.4%)	0.5 (16.4%)	0.2 (16.4%)	0.5 (16.5%)
Lng_tankers	6.9 (73.%)	0. (62.7%)	1.3 (54.8%)	0. (51.6%)	0. (54.6%)	0. (62.%)
Gas_tankers	5.8 (75.%)	0. (75.1%)	1.1 (75.1%)	0. (75.1%)	0. (75.1%)	0. (75.1%)
Passenger_ships	3.5 (27.%)	0. (35.4%)	1. (40.7%)	0. (43.4%)	0. (41.4%)	0. (36.%)
Cruisers	6. (11.9%)	0. (10.1%)	1.2 (8.3%)	0. (8.1%)	0. (8.7%)	0. (9.9%)
Fishing_vessels	3.7 (-3.%)	0. (-1.6%)	0.8 (-0.5%)	0. (-0.2%)	0. (-0.6%)	0. (-1.5%)
Service_ships	3.6 (-27.8%)	0. (-27.8%)	0.8 (-27.9%)	0. (-28.%)	0. (-28.%)	0. (-27.9%)
Unknown	32.5 (6.2%)	0.1 (6.3%)	8.6 (6.5%)	0.2 (6.6%)	0.1 (6.5%)	0.1 (6.4%)
Misc	22.5 (-0.2%)	0. (-1.1%)	5.1 (-1.8%)	0.1 (-2.%)	0. (-1.8%)	0.1 (-1.2%)

2007	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	46.0	393.9	107.5	0	0	4050.1	853.9
Vehicle_carriers	7.2	12.8	1.2	0	0	6.6	4.7
RoRo_vessels	28.1	69.1	7.5	0	0	58.8	42.5
Bulk_carriers	36.7	166.0	6.5	0	0	50.0	36.1
General_cargo	52.6	1245.3	31.5	0	0	216.9	156.6
Container_ships	27.7	141.9	8.4	0	0	47.8	34.5
Reefers	3.7	59.2	3.5	0	0	18.1	13.0
Tankers	136.5	0.3	17.4	0	0	102.2	35.7
LNG_tankers	0.0	0.0	0.0	0	0	0.0	0.0
Gas_tankers	2.3	10.0	0.6	0	0	3.4	1.2
Passenger_ships	0.0	0.0	0.0	0	0	0.0	0.0
Cruisers	6.4	8.1	8.7	0	0	544.9	114.9
Fishing_vessels	0.0	41.2	3.0	0	0	13.0	1.3
Service_ships	0.0	0.0	0.0	0	0	0.0	0.0
Unknown	0.0	59.5	7.7	0	0	3.3	1.3
Total	347	2207	204	0	0	5115	1296

2007	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	412.7	43.9	113.5	40.0	12.1	49.0
Vehicle_carriers	0.9	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	7.9	0.8	2.2	0.8	0.2	0.9
Bulk_carriers	6.7	0.7	1.8	0.6	0.2	0.8
General_cargo	29.2	3.1	8.0	2.8	0.9	3.5
Container_ships	6.4	0.7	1.8	0.6	0.2	0.8
Reefers	3.4	0.2	0.5	0.3	0.1	0.2
Tankers	15.6	1.7	4.3	1.5	0.5	1.8
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.5	0.1	0.1	0.0	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	55.5	30.2	15.3	5.4	9.2	6.6
Fishing_vessels	0.3	0.1	0.4	0.0	0.0	0.2
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.3	0.0	0.1	0.0	0.0	0.0

Total	539	82	148	52	23	64

2007	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	242.1 (+6.3%)	0.5 (+6.5%)	51.7 (+6.6%)	1.0 (+6.7%)	0.3 (+6.6%)	1.0 (+6.5%)
Baltic Proper	107.9 (+5.6%)	0.2 (+5.8%)	23.3 (+5.9%)	0.5 (+5.9%)	0.2 (+5.9%)	0.4 (+5.8%)
Kattegat	62.5 (+8.9%)	0.1 (+9.3%)	13.0 (+9.6%)	0.3 (+9.8%)	0.1 (+9.6%)	0.2 (+9.3%)
Gulf of Finland	52.1 (+7.3%)	0.1 (+7.3%)	11.0 (+7.3%)	0.2 (+7.3%)	0.1 (+7.3%)	0.2 (+7.3%)
Gulf of Bothnia	14.7 (-.8%)	0.0 (-.3%)	3.3 (+.2%)	0.1 (+.1%)	0.0 (+.0%)	0.1 (-.2%)
Gulf of Riga	4.9 (+1.3%)	0.0 (+2.1%)	1.1 (+2.7%)	0.0 (+3.0%)	0.0 (+2.8%)	0.0 (+2.2%)
Vessel type						
Ropax_vessels	14.4 (+10.3%)	0.0 (+11.0%)	4.1 (+11.4%)	0.1 (+11.6%)	0.0 (+11.4%)	0.1 (+11.1%)
Vehicle_carriers	3.4 (+32.4%)	0.0 (+31.6%)	0.7 (+30.9%)	0.0 (+30.6%)	0.0 (+30.9%)	0.0 (+31.5%)
Roro_vessels	12.1 (-1.0%)	0.0 (-.3%)	2.8 (+.1%)	0.1 (+.3%)	0.0 (+.1%)	0.1 (-.3%)
Bulk_carriers	33.6 (-9.8%)	0.1 (-9.7%)	6.8 (-9.5%)	0.1 (-9.5%)	0.0 (-9.5%)	0.1 (-9.6%)
General_cargo	57.4 (+4.1%)	0.1 (+4.6%)	12.6 (+5.0%)	0.3 (+5.1%)	0.1 (+5.0%)	0.2 (+4.7%)
Container_ships	19.8 (+25.8%)	0.0 (+24.3%)	4.0 (+23.1%)	0.1 (+22.7%)	0.0 (+23.1%)	0.1 (+24.2%)
Reefers	7.8 (+22.0%)	0.0 (+21.0%)	1.6 (+20.3%)	0.0 (+20.0%)	0.0 (+20.3%)	0.0 (+21.0%)
Tankers	77.5 (+7.8%)	0.2 (+8.0%)	15.1 (+8.2%)	0.3 (+8.3%)	0.1 (+8.3%)	0.3 (+8.1%)
Lng_tankers	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Gas_tankers	1.8 (+1.7%)	0.0 (+2.2%)	0.3 (+2.5%)	0.0 (+2.7%)	0.0 (+2.6%)	0.0 (+2.2%)
Passenger_ships	0.9 (+44.4%)	0.0 (+41.1%)	0.3 (+40.3%)	0.0 (+39.4%)	0.0 (+39.8%)	0.0 (+41.4%)
Cruisers	3.4 (+6.4%)	0.0 (+3.0%)	0.7 (+.8%)	0.0 (-.3%)	0.0 (+.5%)	0.0 (+2.9%)
Fishing_vessels	2.5 (+8.9%)	0.0 (+7.6%)	0.5 (+6.9%)	0.0 (+6.5%)	0.0 (+6.8%)	0.0 (+7.6%)
Service_ships	0.7 (+63.9%)	0.0 (+60.0%)	0.2 (+58.0%)	0.0 (+57.6%)	0.0 (+58.3%)	0.0 (+60.2%)
Unknown	1.1 (+84.9%)	0.0 (+82.7%)	0.3 (+80.9%)	0.0 (+82.0%)	0.0 (+82.4%)	0.0 (+82.7%)
Misc	5.4 (+15.2%)	0.0 (+14.1%)	1.4 (+13.5%)	0.0 (+13.5%)	0.0 (+13.7%)	0.0 (+14.1%)

2008	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	50.7	411.1	111.9	0.0	0.0	4219.3	889.6
Vehicle_carriers	8.2	17.1	1.6	0.0	0.0	8.9	6.5
RoRo_vessels	30.7	71.9	8.0	0.0	0.0	62.5	45.1
Bulk_carriers	35.8	160.1	6.3	0.0	0.0	46.8	33.8
General_cargo	49.3	1227.7	31.0	0.0	0.0	206.4	149.0
Container_ships	30.8	161.3	9.6	0.0	0.0	55.4	40.0
Reefers	3.6	60.5	3.6	0.0	0.0	17.7	12.8
Tankers	140.0	0.3	18.4	45.1	0.0	102.6	35.8
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	2.7	10.6	0.7	0.0	0.0	3.7	1.3
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	7.8	9.1	11.5	0.0	0.0	684.8	144.4
Fishing_vessels	0.0	67.3	4.8	0.0	0.0	16.7	1.7
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	77.5	9.9	0.0	0.0	5.5	2.2
Total	360	2274	217	45	0	5430	1362

2008	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	430.0	45.7	118.2	41.7	12.6	51.1
Vehicle_carriers	1.2	0.1	0.3	0.1	0.0	0.1
RoRo_vessels	8.4	0.9	2.3	0.8	0.2	1.0
Bulk_carriers	6.3	0.7	1.7	0.6	0.2	0.7
General_cargo	27.8	2.9	7.6	2.6	0.8	3.3
Container_ships	7.4	0.8	2.0	0.7	0.2	0.9
Reefers	3.3	0.2	0.5	0.3	0.1	0.2
Tankers	15.6	1.7	4.3	1.5	0.5	1.9
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.6	0.1	0.2	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	69.8	37.9	19.2	6.8	11.6	8.3
Fishing_vessels	0.4	0.2	0.5	0.0	0.0	0.2
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0

Unknown	0.6	0.1	0.2	0.0	0.0	0.1
Total	571	91	157	55	26	68

2008	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	250.3 (+3.4%)	0.5 (+3.3%)	53.4 (+3.2%)	1.1 (+3.2%)	0.4 (+3.2%)	1.0 (+3.3%)
Baltic Proper	111.8 (+3.6%)	0.2 (+3.2%)	24.0 (+2.9%)	0.5 (+2.7%)	0.2 (+2.9%)	0.4 (+3.2%)
Kattegat	64.6 (+3.3%)	0.1 (+3.9%)	13.6 (+4.3%)	0.3 (+4.5%)	0.1 (+4.3%)	0.3 (+3.9%)
Gulf of Finland	52.7 (+1.2%)	0.1 (+1.0%)	11.0 (+.9%)	0.2 (+.8%)	0.1 (+.9%)	0.2 (+1.0%)
Gulf of Bothnia	15.5 (+5.8%)	0.0 (+5.6%)	3.5 (+5.4%)	0.1 (+5.4%)	0.0 (+5.5%)	0.1 (+5.6%)
Gulf of Riga	5.6 (+14.0%)	0.0 (+14.5%)	1.2 (+14.6%)	0.0 (+14.7%)	0.0 (+14.6%)	0.0 (+14.4%)
Vessel type						
Ropax_vessels	14.5 (+.7%)	0.0 (+1.2%)	4.2 (+1.5%)	0.1 (+1.5%)	0.0 (+1.4%)	0.1 (+1.2%)
Vehicle_carriers	4.7 (+39.1%)	0.0 (+36.7%)	0.9 (+34.9%)	0.0 (+34.1%)	0.0 (+34.8%)	0.0 (+36.6%)
Roro_vessels	13.6 (+12.3%)	0.0 (+11.7%)	3.2 (+11.3%)	0.1 (+11.2%)	0.0 (+11.4%)	0.1 (+11.7%)
Bulk_carriers	31.9 (-4.8%)	0.1 (-4.8%)	6.5 (-4.9%)	0.1 (-4.9%)	0.0 (-4.9%)	0.1 (-4.9%)
General_cargo	55.8 (-2.8%)	0.1 (-2.8%)	12.3 (-2.9%)	0.2 (-2.9%)	0.1 (-2.9%)	0.2 (-2.8%)
Container_ships	24.9 (+26.2%)	0.1 (+24.0%)	4.9 (+22.4%)	0.1 (+21.7%)	0.0 (+22.4%)	0.1 (+23.9%)
Reefers	7.8 (+.2%)	0.0 (+.5%)	1.6 (+.7%)	0.0 (+.8%)	0.0 (+.7%)	0.0 (+.5%)
Tankers	78.3 (+1.1%)	0.2 (+1.4%)	15.4 (+1.6%)	0.3 (+1.7%)	0.1 (+1.6%)	0.3 (+1.4%)
Lng_tankers	0.1 (+30.7%)	0.0 (+4.2%)	0.0 (-10.6%)	0.0 (-15.6%)	0.0 (-10.9%)	0.0 (+2.6%)
Gas_tankers	2.0 (+14.4%)	0.0 (+13.6%)	0.4 (+13.1%)	0.0 (+12.8%)	0.0 (+13.0%)	0.0 (+13.6%)
Passenger_ships	0.9 (+1.5%)	0.0 (+2.4%)	0.3 (+3.1%)	0.0 (+2.9%)	0.0 (+2.7%)	0.0 (+2.5%)
Cruisers	4.1 (+20.8%)	0.0 (+19.2%)	0.8 (+17.7%)	0.0 (+17.4%)	0.0 (+17.9%)	0.0 (+19.0%)
Fishing_vessels	3.0 (+19.5%)	0.0 (+21.6%)	0.7 (+22.9%)	0.0 (+23.5%)	0.0 (+23.0%)	0.0 (+21.6%)
Service_ships	0.6 (-11.9%)	0.0 (-9.1%)	0.2 (-7.5%)	0.0 (-6.9%)	0.0 (-7.5%)	0.0 (-9.1%)
Unknown	1.6 (+47.0%)	0.0 (+46.4%)	0.4 (+45.5%)	0.0 (+46.3%)	0.0 (+46.5%)	0.0 (+46.3%)
Misc	5.7 (+6.2%)	0.0 (+7.2%)	1.5 (+7.6%)	0.0 (+7.8%)	0.0 (+7.7%)	0.0 (+7.1%)

2009	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	45.3	397.8	108.6	0.0	0.0	4021.2	847.8
Vehicle_carriers	4.1	11.8	1.2	0.0	0.0	4.7	3.4
RoRo_vessels	23.8	67.9	7.3	0.0	0.0	53.0	38.2
Bulk_carriers	34.0	149.1	6.0	0.0	0.0	44.9	32.4
General_cargo	41.3	1078.2	27.2	0.0	0.0	174.5	126.0
Container_ships	28.4	130.4	8.2	0.0	0.0	42.3	30.5
Reefers	3.2	57.6	3.4	0.0	0.0	15.1	10.9
Tankers	141.0	0.3	20.3	44.2	0.0	107.6	37.6
LNG_tankers	0.1	0.3	0.2	0.0	0.0	0.1	0.0
Gas_tankers	1.8	8.2	0.6	0.0	0.0	2.6	0.9
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	8.5	9.4	12.3	0.0	0.0	771.7	162.7
Fishing_vessels	0.0	83.0	5.6	0.0	0.0	16.0	1.6
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	98.3	12.7	0.0	0.0	6.4	2.6
Total	332	2092	213	44	0	5260	1295

2009	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	409.8	43.5	112.7	39.7	0.2	48.7
Vehicle_carriers	0.6	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	7.1	0.8	2.0	0.7	0.0	0.8
Bulk_carriers	6.0	0.6	1.7	0.6	0.0	0.7
General_cargo	23.5	2.5	6.5	2.2	0.0	2.8
Container_ships	5.7	0.6	1.6	0.6	0.0	0.7
Reefers	2.8	0.2	0.4	0.3	0.0	0.2
Tankers	16.4	1.7	4.5	1.6	0.0	1.9
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.4	0.0	0.1	0.0	0.0	0.0
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	78.6	42.8	21.6	7.7	0.2	9.3
Fishing_vessels	0.4	0.2	0.5	0.0	0.0	0.2

Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.7	0.1	0.2	0.0	0.0	0.1
Total	551	93	152	53	0	65

2009	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	253.0 (+1.1%)	0.5 (+.8%)	53.7 (+.7%)	1.1 (+.6%)	0.4 (+.7%)	1.0 (+.8%)
Baltic Proper	107.0 (-4.3%)	0.2 (-4.6%)	22.8 (-4.9%)	0.5 (-5.0%)	0.2 (-4.9%)	0.4 (-4.7%)
Kattegat	74.3 (+15.0%)	0.2 (+15.6%)	15.8 (+16.0%)	0.3 (+16.2%)	0.1 (+16.0%)	0.3 (+15.6%)
Gulf of Finland	51.3 (-2.7%)	0.1 (-3.4%)	10.6 (-3.8%)	0.2 (-4.0%)	0.1 (-3.8%)	0.2 (-3.4%)
Gulf of Bothnia	14.6 (-6.0%)	0.0 (-7.1%)	3.2 (-7.3%)	0.1 (-8.2%)	0.0 (-8.0%)	0.1 (-7.0%)
Gulf of Riga	5.8 (+4.0%)	0.0 (+3.9%)	1.3 (+3.8%)	0.0 (+3.7%)	0.0 (+3.8%)	0.0 (+3.9%)
Vessel type						
Ropax_vessels	14.3 (-1.0%)	0.0 (-.8%)	4.2 (-.7%)	0.1 (-.6%)	0.0 (-.6%)	0.1 (-.8%)
Vehicle_carriers	3.2 (-31.5%)	0.0 (-29.6%)	0.6 (-28.0%)	0.0 (-27.4%)	0.0 (-28.0%)	0.0 (-29.5%)
Roro_vessels	13.7 (+.7%)	0.0 (+.9%)	3.2 (+1.3%)	0.1 (+1.2%)	0.0 (+1.1%)	0.1 (+1.0%)
Bulk_carriers	31.9 (-.1%)	0.1 (-.9%)	6.4 (-1.4%)	0.1 (-1.7%)	0.0 (-1.5%)	0.1 (-.9%)
General_cargo	52.4 (-6.0%)	0.1 (-7.7%)	11.2 (-8.8%)	0.2 (-9.3%)	0.1 (-8.9%)	0.2 (-7.7%)
Container_ships	20.4 (-18.0%)	0.0 (-17.5%)	4.1 (-17.2%)	0.1 (-17.0%)	0.0 (-17.2%)	0.1 (-17.5%)
Reefers	7.1 (-9.1%)	0.0 (-7.7%)	1.5 (-6.7%)	0.0 (-6.3%)	0.0 (-6.7%)	0.0 (-7.7%)
Tankers	89.3 (+14.1%)	0.2 (+14.4%)	17.6 (+14.6%)	0.3 (+14.7%)	0.1 (+14.6%)	0.3 (+14.4%)
Lng_tankers	0.7 (+459.1%)	0.0 (+460.5%)	0.1 (+461.5%)	0.0 (+462.0%)	0.0 (+461.6%)	0.0 (+460.5%)
Gas_tankers	1.6 (-20.3%)	0.0 (-19.6%)	0.3 (-19.0%)	0.0 (-18.8%)	0.0 (-19.0%)	0.0 (-19.5%)
Passenger_ships	1.1 (+20.8%)	0.0 (+20.7%)	0.3 (+20.0%)	0.0 (+20.5%)	0.0 (+20.6%)	0.0 (+20.4%)
Cruisers	4.3 (+5.7%)	0.0 (+6.1%)	0.9 (+6.5%)	0.0 (+6.5%)	0.0 (+6.3%)	0.0 (+6.1%)
Fishing_vessels	2.6 (-13.6%)	0.0 (-15.7%)	0.6 (-17.1%)	0.0 (-17.6%)	0.0 (-17.1%)	0.0 (-15.8%)
Service_ships	0.7 (+14.3%)	0.0 (+13.8%)	0.2 (+13.6%)	0.0 (+13.3%)	0.0 (+13.4%)	0.0 (+13.8%)
Unknown	2.0 (+23.9%)	0.0 (+26.3%)	0.6 (+27.4%)	0.0 (+28.2%)	0.0 (+27.8%)	0.0 (+26.3%)
Misc	6.6 (+15.1%)	0.0 (+16.0%)	1.8 (+16.8%)	0.0 (+16.6%)	0.0 (+16.4%)	0.0 (+16.1%)

2010	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	41.0	384.4	101.2	0.0	0.0	3684.6	776.8
Vehicle_carriers	4.8	10.3	0.9	0.0	0.0	5.2	3.7
RoRo_vessels	18.5	61.0	6.8	0.0	0.0	48.8	35.2
Bulk_carriers	35.4	157.0	6.3	0.0	0.0	47.5	34.3
General_cargo	43.8	1127.0	29.0	0.0	0.0	192.6	139.0
Container_ships	33.1	150.6	9.3	0.0	0.0	51.7	37.3
Reefers	2.6	48.5	2.8	0.0	0.0	12.6	9.1
Tankers	135.2	0.3	20.7	65.6	0.0	108.2	37.8
LNG_tankers	0.1	0.2	0.1	0.0	0.0	0.0	0.0
Gas_tankers	1.3	7.2	0.5	0.0	0.0	2.5	0.9
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	6.7	9.2	11.3	0.0	0.0	729.3	153.7
Fishing_vessels	0.0	101.5	6.6	0.0	0.0	16.7	1.7
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	115.5	14.8	0.0	0.0	7.0	2.9
Total	323	2173	210	66	0	4907	1232

2010	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	375.5	39.9	103.3	36.2	10.6	44.6
Vehicle_carriers	0.7	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	6.6	0.7	1.8	0.6	0.2	0.8
Bulk_carriers	6.4	0.7	1.8	0.6	0.2	0.8
General_cargo	25.9	2.8	7.1	2.5	0.7	3.1
Container_ships	6.9	0.7	1.9	0.7	0.2	0.8
Reefers	2.4	0.1	0.4	0.2	0.0	0.2
Tankers	16.5	1.8	4.5	1.6	0.5	2.0
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.4	0.0	0.1	0.0	0.0	0.0
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	74.3	40.4	20.4	7.3	11.8	8.8

Fishing_vessels	0.4	0.2	0.5	0.0	0.0	0.2
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.7	0.1	0.2	0.0	0.0	0.1
Total	516	87	142	50	24	61

2010	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	258.1 (+2.0%)	0.6 (+2.3%)	55.1 (+2.5%)	1.1 (+2.6%)	0.4 (+2.5%)	1.0 (+2.3%)
Baltic Proper	111.0 (+3.8%)	0.2 (+3.9%)	23.8 (+4.0%)	0.5 (+4.1%)	0.2 (+4.0%)	0.4 (+3.9%)
Kattegat	71.7 (-3.5%)	0.2 (-3.4%)	15.2 (-3.4%)	0.3 (-3.4%)	0.1 (-3.4%)	0.3 (-3.4%)
Gulf of Finland	53.6 (+4.5%)	0.1 (+5.0%)	11.2 (+5.4%)	0.2 (+5.6%)	0.1 (+5.4%)	0.2 (+5.0%)
Gulf of Bothnia	16.0 (+9.8%)	0.0 (+11.3%)	3.6 (+12.1%)	0.1 (+12.8%)	0.0 (+12.4%)	0.1 (+11.3%)
Gulf of Riga	5.8 (-1.1%)	0.0 (-.6%)	1.3 (-.4%)	0.0 (-.3%)	0.0 (-.4%)	0.0 (-.7%)
Vessel type						
Ropax_vessels	13.7 (-4.1%)	0.0 (-4.6%)	4.0 (-4.8%)	0.1 (-4.9%)	0.0 (-4.8%)	0.1 (-4.6%)
Vehicle_carriers	3.0 (-6.0%)	0.0 (-8.0%)	0.6 (-9.4%)	0.0 (-10.1%)	0.0 (-9.5%)	0.0 (-8.0%)
Roro_vessels	12.9 (-5.4%)	0.0 (-6.9%)	2.9 (-7.9%)	0.1 (-8.4%)	0.0 (-8.0%)	0.1 (-7.0%)
Bulk_carriers	34.3 (+7.3%)	0.1 (+7.8%)	6.9 (+8.2%)	0.1 (+8.4%)	0.0 (+8.2%)	0.1 (+7.9%)
General_cargo	53.8 (+2.7%)	0.1 (+4.3%)	11.8 (+5.4%)	0.2 (+5.9%)	0.1 (+5.5%)	0.2 (+4.4%)
Container_ships	23.6 (+15.5%)	0.0 (+15.6%)	4.7 (+15.6%)	0.1 (+15.6%)	0.0 (+15.6%)	0.1 (+15.6%)
Reefers	6.0 (-16.3%)	0.0 (-16.8%)	1.2 (-17.3%)	0.0 (-17.5%)	0.0 (-17.3%)	0.0 (-16.9%)
Tankers	88.2 (-1.3%)	0.2 (-1.4%)	17.3 (-1.5%)	0.3 (-1.5%)	0.1 (-1.5%)	0.3 (-1.4%)
Lng_tankers	0.6 (-6.6%)	0.0 (-9.5%)	0.1 (-11.8%)	0.0 (-12.7%)	0.0 (-11.8%)	0.0 (-9.7%)
Gas_tankers	1.6 (-1.6%)	0.0 (-1.8%)	0.3 (-1.9%)	0.0 (-1.9%)	0.0 (-1.9%)	0.0 (-1.8%)
Passenger_ships	1.2 (+11.2%)	0.0 (+12.4%)	0.4 (+12.7%)	0.0 (+13.0%)	0.0 (+12.9%)	0.0 (+12.2%)
Cruisers	4.1 (-4.1%)	0.0 (-3.7%)	0.8 (-3.0%)	0.0 (-3.1%)	0.0 (-3.3%)	0.0 (-3.5%)

Fishing_vessels	2.3 (-9.7%)	0.0 (-7.7%)	0.5 (-6.3%)	0.0 (-5.9%)	0.0 (-6.4%)	0.0 (-7.6%)
Service_ships	1.2 (+58.7%)	0.0 (+62.6%)	0.3 (+63.5%)	0.0 (+64.5%)	0.0 (+63.9%)	0.0 (+61.9%)
Unknown	2.3 (+15.0%)	0.0 (+16.1%)	0.6 (+16.5%)	0.0 (+16.9%)	0.0 (+16.7%)	0.0 (+16.1%)
Misc	8.3 (+25.6%)	0.0 (+25.3%)	2.2 (+24.8%)	0.0 (+25.2%)	0.0 (+25.3%)	0.0 (+25.2%)

2011	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	53.2	420.2	113.5	0.0	0.0	4132.2	871.2
Vehicle_carriers	6.0	12.4	1.1	0.0	0.0	6.5	4.7
RoRo_vessels	26.1	63.8	7.2	0.0	0.0	52.5	37.9
Bulk_carriers	44.9	179.2	7.4	0.0	0.0	53.8	38.9
General_cargo	50.1	1189.7	30.5	0.0	0.0	197.3	142.4
Container_ships	40.9	157.8	10.1	0.0	0.0	56.3	40.6
Reefers	2.5	44.8	2.6	0.0	0.0	12.0	8.6
Tankers	145.4	0.4	21.7	74.8	0.0	110.5	38.6
LNG_tankers	0.1	0.2	0.1	0.0	0.0	0.1	0.0
Gas_tankers	1.6	7.9	0.5	0.0	0.0	2.4	0.9
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	8.7	10.0	12.2	0.0	0.0	783.8	165.2
Fishing_vessels	0.0	138.1	8.9	0.0	0.0	20.8	2.1
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	141.6	18.3	0.0	0.0	8.8	3.5
Total	380	2366	234	75	0	5437	1355

2011	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	421.1	44.7	115.8	41.0	0.0	50.0
Vehicle_carriers	0.9	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	7.1	0.8	1.9	0.7	0.0	0.8
Bulk_carriers	7.2	0.8	2.0	0.7	0.0	0.9
General_cargo	26.5	2.8	7.3	2.5	0.0	3.2
Container_ships	7.6	0.8	2.1	0.7	0.0	0.9
Reefers	2.2	0.1	0.3	0.2	0.0	0.1
Tankers	16.8	1.8	4.6	1.6	0.0	2.0
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.4	0.0	0.1	0.0	0.0	0.0
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	79.9	43.4	22.0	7.8	0.0	9.5
Fishing_vessels	0.5	0.2	0.6	0.0	0.0	0.3

Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.9	0.1	0.3	0.1	0.0	0.1
Total	570	96	157	55	0	68

2011	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	266.0 (+3.1%)	0.6 (+4.2%)	57.7 (+4.9%)	1.1 (+5.2%)	0.4 (+4.9%)	1.1 (+4.2%)
Baltic Proper	110.9 (-.1%)	0.2 (+1.4%)	24.3 (+2.3%)	0.5 (+2.7%)	0.2 (+2.3%)	0.4 (+1.4%)
Kattegat	71.7 (-.0%)	0.2 (+.5%)	15.4 (+.8%)	0.3 (+1.0%)	0.1 (+.9%)	0.3 (+.5%)
Gulf of Finland	60.4 (+12.8%)	0.1 (+14.0%)	12.9 (+14.8%)	0.3 (+15.2%)	0.1 (+14.9%)	0.2 (+14.0%)
Gulf of Bothnia	16.1 (+.6%)	0.0 (+1.7%)	3.7 (+2.4%)	0.1 (+2.7%)	0.0 (+2.4%)	0.1 (+1.7%)
Gulf of Riga	6.9 (+19.4%)	0.0 (+20.0%)	1.5 (+20.4%)	0.0 (+20.5%)	0.0 (+20.4%)	0.0 (+20.0%)
Vessel type						
Ropax_vessels	14.4 (+4.7%)	0.0 (+5.0%)	4.2 (+4.9%)	0.1 (+4.9%)	0.0 (+4.9%)	0.1 (+4.8%)
Vehicle_carriers	3.5 (+16.9%)	0.0 (+16.7%)	0.7 (+16.5%)	0.0 (+16.4%)	0.0 (+16.5%)	0.0 (+16.7%)
Roro_vessels	11.5 (-10.9%)	0.0 (-9.9%)	2.7 (-9.5%)	0.1 (-9.2%)	0.0 (-9.4%)	0.0 (-10.0%)
Bulk_carriers	40.8 (+19.2%)	0.1 (+19.0%)	8.2 (+18.8%)	0.2 (+18.8%)	0.1 (+18.8%)	0.2 (+19.0%)
General_cargo	50.7 (-5.8%)	0.1 (-3.5%)	11.5 (-2.0%)	0.2 (-1.4%)	0.1 (-2.0%)	0.2 (-3.5%)
Container_ships	23.4 (-1.1%)	0.0 (+.9%)	4.8 (+2.4%)	0.1 (+3.0%)	0.0 (+2.4%)	0.1 (+1.0%)
Reefers	5.6 (-5.8%)	0.0 (-5.1%)	1.2 (-4.5%)	0.0 (-4.3%)	0.0 (-4.5%)	0.0 (-5.0%)
Tankers	91.3 (+3.5%)	0.2 (+4.5%)	18.3 (+5.3%)	0.4 (+5.6%)	0.1 (+5.3%)	0.3 (+4.5%)
Lng_tankers	0.4 (-32.8%)	0.0 (-32.6%)	0.1 (-32.5%)	0.0 (-32.4%)	0.0 (-32.5%)	0.0 (-32.6%)
Gas_tankers	1.4 (-10.5%)	0.0 (-8.6%)	0.3 (-7.1%)	0.0 (-6.5%)	0.0 (-7.1%)	0.0 (-8.5%)
Passenger_ships	1.3 (+12.5%)	0.0 (+13.2%)	0.4 (+13.4%)	0.0 (+13.5%)	0.0 (+13.4%)	0.0 (+13.1%)
Cruisers	4.4 (+6.4%)	0.0 (+7.0%)	0.9 (+7.1%)	0.0 (+7.8%)	0.0 (+7.6%)	0.0 (+7.0%)
Fishing_vessels	2.4 (+3.7%)	0.0 (+5.4%)	0.6 (+6.4%)	0.0 (+6.6%)	0.0 (+6.2%)	0.0 (+5.3%)
Service_ships	1.3 (+14.9%)	0.0 (+16.5%)	0.4 (+17.4%)	0.0 (+17.9%)	0.0 (+17.6%)	0.0 (+16.6%)
Unknown	2.9 (+23.6%)	0.0 (+23.1%)	0.8 (+22.6%)	0.0 (+22.6%)	0.0 (+22.7%)	0.0 (+23.0%)
Misc	9.4 (+13.0%)	0.0 (+13.4%)	2.5 (+13.5%)	0.1 (+13.7%)	0.0 (+13.6%)	0.0 (+13.4%)

2012	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	52.2	409.3	111.1	0.0	0.0	4169.7	879.1
Vehicle_carriers	6.5	12.8	1.2	0.0	0.0	6.9	5.0
RoRo_vessels	25.2	55.7	6.4	0.0	0.0	46.4	33.5
Bulk_carriers	50.6	171.9	7.3	0.0	0.0	54.7	39.5
General_cargo	48.2	1068.0	27.4	0.0	0.0	177.5	128.1
Container_ships	46.8	153.0	10.2	0.0	0.0	56.0	40.4
Reefers	4.4	78.4	4.1	0.0	0.0	14.1	10.2
Tankers	151.3	0.4	21.5	0.0	0.0	109.2	38.2
LNG_tankers	0.2	0.3	0.1	0.0	0.0	0.2	0.1
Gas_tankers	1.7	10.9	0.7	0.0	0.0	2.7	0.9
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	9.5	8.9	12.4	0.0	0.0	813.0	171.4
Fishing_vessels	0.0	190.8	12.0	0.0	0.0	29.4	2.9
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	158.7	20.5	0.0	0.0	10.7	4.3
Total	397	2319	235	0	0	5491	1354

2012	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	424.9	45.1	116.9	41.5	12.2	50.5

Vehicle_carriers	0.9	0.1	0.3	0.1	0.0	0.1
RoRo_vessels	6.2	0.7	1.7	0.6	0.2	0.7
Bulk_carriers	7.4	0.8	2.0	0.7	0.2	0.9
General_cargo	23.9	2.5	6.6	2.3	0.7	2.8
Container_ships	7.5	0.8	2.1	0.7	0.2	0.9
Reefers	2.6	0.2	0.4	0.2	0.0	0.2
Tankers	16.6	1.8	4.6	1.6	0.5	2.0
LNG_tankers	0.0	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.4	0.0	0.1	0.0	0.0	0.0
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	82.9	45.1	22.8	8.1	13.5	9.8
Fishing_vessels	0.8	0.3	0.8	0.1	0.1	0.4
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	1.1	0.1	0.3	0.1	0.0	0.1
Total	574	97	158	56	28	68

2012	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	260.2 (-2.2%)	0.6 (-2.2%)	56.5 (-2.1%)	1.1 (-2.1%)	0.4 (-2.2%)	1.0 (-2.2%)
Baltic Proper	110.9 (-.0%)	0.2 (-.1%)	24.3 (-.2%)	0.5 (-.2%)	0.2 (-.2%)	0.4 (-.1%)
Kattegat	72.4 (+.9%)	0.2 (+1.6%)	15.7 (+2.1%)	0.3 (+2.3%)	0.1 (+2.1%)	0.3 (+1.6%)
Gulf of Finland	55.9 (-7.4%)	0.1 (-7.9%)	11.8 (-8.2%)	0.2 (-8.4%)	0.1 (-8.2%)	0.2 (-7.9%)
Gulf of Bothnia	14.7 (-8.9%)	0.0 (-8.8%)	3.4 (-8.6%)	0.1 (-8.8%)	0.0 (-8.9%)	0.1 (-8.8%)
Gulf of Riga	0.0 (-100.0%)	0.0 (-8.5%)	1.4 (-8.7%)	0.0 (-8.7%)	0.0 (-8.7%)	0.0 (-8.5%)
Vessel type						
Ropax_vessels	13.8 (-4.3%)	0.0 (-4.1%)	4.0 (-4.0%)	0.1 (-4.0%)	0.0 (-4.0%)	0.1 (-4.1%)

Vehicle_carriers	3.7 (+4.5%)	0.0 (+3.5%)	0.7 (+2.6%)	0.0 (+2.2%)	0.0 (+2.6%)	0.0 (+3.4%)
Roro_vessels	9.9 (-13.8%)	0.0 (-15.5%)	2.2 (-16.8%)	0.0 (-17.3%)	0.0 (-16.8%)	0.0 (-15.7%)
Bulk_carriers	42.6 (+4.3%)	0.1 (+4.3%)	8.6 (+4.3%)	0.2 (+4.3%)	0.1 (+4.3%)	0.2 (+4.3%)
General_cargo	44.9 (-11.6%)	0.1 (-11.5%)	10.2 (-11.4%)	0.2 (-11.4%)	0.1 (-11.4%)	0.2 (-11.5%)
Container_ships	22.6 (-3.3%)	0.0 (-2.4%)	4.7 (-1.7%)	0.1 (-1.5%)	0.0 (-1.7%)	0.1 (-2.3%)
Reefers	6.6 (+17.1%)	0.0 (+20.1%)	1.4 (+22.4%)	0.0 (+22.8%)	0.0 (+22.0%)	0.0 (+20.1%)
Tankers	91.1 (-.2%)	0.2 (-.3%)	18.2 (-.3%)	0.4 (-.3%)	0.1 (-.3%)	0.3 (-.3%)
Lng_tankers	0.5 (+14.4%)	0.0 (+13.0%)	0.1 (+11.8%)	0.0 (+11.2%)	0.0 (+11.7%)	0.0 (+12.9%)
Gas_tankers	1.4 (-2.5%)	0.0 (-.9%)	0.3 (+.1%)	0.0 (+.5%)	0.0 (+.1%)	0.0 (-.9%)
Passenger_ships	1.4 (+1.5%)	0.0 (+1.7%)	0.4 (+1.4%)	0.0 (+1.8%)	0.0 (+1.8%)	0.0 (+1.6%)
Cruisers	4.4 (+.0%)	0.0 (+1.4%)	0.9 (+2.4%)	0.0 (+2.9%)	0.0 (+2.5%)	0.0 (+1.5%)
Fishing_vessels	2.2 (-9.0%)	0.0 (-7.6%)	0.5 (-6.6%)	0.0 (-6.5%)	0.0 (-6.9%)	0.0 (-7.6%)
Service_ships	1.3 (-2.8%)	0.0 (-4.0%)	0.3 (-4.1%)	0.0 (-4.3%)	0.0 (-4.2%)	0.0 (-3.7%)
Unknown	3.0 (+5.9%)	0.0 (+7.4%)	0.9 (+8.2%)	0.0 (+8.5%)	0.0 (+8.2%)	0.0 (+7.5%)
Misc	9.4 (-.2%)	0.0 (+.7%)	2.6 (+1.3%)	0.1 (+1.5%)	0.0 (+1.3%)	0.0 (+.8%)

2013	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	54.0	409.1	111.6	0.0	0.0	4257.0	897.5
Vehicle_carriers	6.3	12.9	1.2	0.0	0.0	7.1	5.1
RoRo_vessels	25.9	51.2	6.3	16.3	0.0	43.7	31.5
Bulk_carriers	56.3	180.1	7.7	0.0	0.0	57.9	41.8
General_cargo	46.8	1015.2	26.3	0.0	0.0	174.1	125.7
Container_ships	48.5	149.0	10.0	0.0	0.0	56.2	40.6
Reefers	2.1	29.4	1.8	0.0	0.0	9.2	6.6
Tankers	158.2	0.3	21.6	0.0	0.0	111.9	39.1
LNG_tankers	0.2	0.4	0.2	0.0	0.0	0.2	0.1
Gas_tankers	1.9	10.5	0.7	0.0	0.0	3.2	1.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	10.3	9.1	13.7	0.0	0.0	917.3	193.4
Fishing_vessels	0.0	145.9	9.2	0.0	0.0	25.1	2.5
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	32.7	4.0	0.0	0.0	2.1	0.8
Total	411	2046	214	16	0	5665	1386

2013	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	**433.8**	**46.1**	**119.3**	42.4	12.7	51.5
Vehicle_carriers	**1.0**	**0.1**	**0.3**	0.1	0.0	0.1
RoRo_vessels	**5.9**	**0.6**	**1.6**	0.6	0.2	0.7
Bulk_carriers	**7.8**	**0.8**	**2.1**	0.7	0.2	0.9
General_cargo	**23.4**	**2.5**	**6.4**	2.2	0.7	2.8
Container_ships	**7.6**	**0.8**	**2.1**	0.7	0.2	0.9
Reefers	**1.7**	**0.1**	**0.3**	0.2	0.0	0.1
Tankers	**17.1**	**1.8**	**4.7**	1.6	0.5	2.0
LNG_tankers	**0.0**	**0.0**	**0.0**	0.0	0.0	0.0
Gas_tankers	**0.5**	**0.1**	**0.1**	0.0	0.0	0.1
Passenger_ships	**0.0**	**0.0**	**0.0**	0.0	0.0	0.0
Cruisers	**93.5**	**50.8**	**25.7**	9.1	15.5	11.1
Fishing_vessels	**0.6**	**0.3**	**0.7**	0.1	0.1	0.3

Service_ships	**0.0**	**0.0**	**0.0**	0.0	0.0	0.0
Unknown	**#DIV/0!**	**#DIV/0!**	**#DIV/0!**	#DIV/0!	0.0	#DIV/0!
Total	**593**	**104**	**163**	58	30	71

2013	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	266.5 (+2.4%)	0.6 (+1.6%)	57.1 (+1.0%)	1.1 (+.8%)	0.4 (+1.0%)	1.1 (+1.5%)
Baltic Proper	113.6 (+2.4%)	0.2 (+1.4%)	24.4 (+.8%)	0.5 (+.5%)	0.2 (+.7%)	0.5 (+1.4%)
Kattegat	71.4 (-1.4%)	0.2 (-2.3%)	15.2 (-3.0%)	0.3 (-3.3%)	0.1 (-3.0%)	0.3 (-2.4%)
Gulf of Finland	59.3 (+6.1%)	0.1 (+5.7%)	12.5 (+5.6%)	0.2 (+5.5%)	0.1 (+5.6%)	0.2 (+5.8%)
Gulf of Bothnia	15.7 (+6.6%)	0.0 (+5.9%)	3.5 (+5.1%)	0.1 (+5.4%)	0.0 (+5.6%)	0.1 (+5.8%)
Gulf of Riga	#DIV/0!	0.0 (+1.9%)	1.4 (+.8%)	0.0 (+.3%)	0.0 (+.7%)	0.0 (+1.9%)
Vessel type						
Ropax_vessels	13.7 (-.8%)	0.0 (-.9%)	4.0 (-1.0%)	0.1 (-1.0%)	0.0 (-1.0%)	0.1 (-.9%)
Vehicle_carriers	3.7 (-.3%)	0.0 (-.8%)	0.7 (-1.2%)	0.0 (-1.3%)	0.0 (-1.2%)	0.0 (-.8%)
Roro_vessels	10.0 (+1.0%)	0.0 (+.8%)	2.2 (+.6%)	0.0 (+.6%)	0.0 (+.6%)	0.0 (+.8%)
Bulk_carriers	46.4 (+9.0%)	0.1 (+9.0%)	9.3 (+8.9%)	0.2 (+8.9%)	0.1 (+8.9%)	0.2 (+9.0%)
General_cargo	46.7 (+4.0%)	0.1 (+3.5%)	10.6 (+3.2%)	0.2 (+3.1%)	0.1 (+3.2%)	0.2 (+3.5%)
Container_ships	24.5 (+8.3%)	0.1 (+5.6%)	4.9 (+3.7%)	0.1 (+2.9%)	0.0 (+3.6%)	0.1 (+5.5%)
Reefers	4.2 (-36.6%)	0.0 (-39.9%)	0.8 (-42.3%)	0.0 (-43.0%)	0.0 (-42.1%)	0.0 (-40.1%)
Tankers	95.7 (+5.1%)	0.2 (+5.6%)	19.3 (+6.0%)	0.4 (+6.2%)	0.1 (+6.1%)	0.4 (+5.7%)
Lng_tankers	1.0 (+100.3%)	0.0 (+98.3%)	0.2 (+96.8%)	0.0 (+96.0%)	0.0 (+96.7%)	0.0 (+98.3%)
Gas_tankers	1.8 (+29.7%)	0.0 (+26.1%)	0.4 (+23.7%)	0.0 (+22.7%)	0.0 (+23.6%)	0.0 (+26.0%)
Passenger_ships	0.9 (-33.6%)	0.0 (-33.7%)	0.3 (-33.4%)	0.0 (-33.6%)	0.0 (-33.6%)	0.0 (-33.5%)
Cruisers	4.8 (+10.3%)	0.0 (+9.2%)	1.0 (+8.4%)	0.0 (+8.0%)	0.0 (+8.4%)	0.0 (+9.1%)
Fishing_vessels	1.9 (-13.2%)	0.0 (-14.3%)	0.4 (-14.9%)	0.0 (-15.4%)	0.0 (-15.1%)	0.0 (-14.3%)
Service_ships	1.2 (-10.1%)	0.0 (-11.6%)	0.3 (-12.2%)	0.0 (-12.4%)	0.0 (-12.2%)	0.0 (-11.5%)
Unknown	0.6 (-81.6%)	0.0 (-81.6%)	0.2 (-81.5%)	0.0 (-81.7%)	0.0 (-81.7%)	0.0 (-81.6%)
Misc	8.1 (-13.2%)	0.0 (-14.3%)	2.2 (-14.8%)	0.0 (-15.2%)	0.0 (-15.0%)	0.0 (-14.3%)

2014	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	52.5	416.5	108.0	3955.3	0.0	4206.7	886.9
Vehicle_carriers	6.0	12.9	1.2	9.3	0.0	6.8	4.9
RoRo_vessels	27.0	51.1	6.2	8715.2	0.1	44.1	31.8
Bulk_carriers	64.8	204.9	8.7	618.7	0.0	66.8	48.2
General_cargo	47.3	1043.1	27.0	0.0	1.8	174.3	125.8
Container_ships	51.9	151.1	10.4	242.8	8.5	57.1	41.2
Reefers	1.8	24.0	1.5	0.0	0.0	7.9	5.7
Tankers	156.9	0.4	22.4	1823.9	0.0	114.6	40.1
LNG_tankers	0.5	0.5	0.3	0.0	0.0	0.4	0.1
Gas_tankers	3.2	13.7	0.9	0.0	0.0	4.2	1.5
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	10.0	9.4	13.8	3570.1	0.0	901.5	190.1
Fishing_vessels	0.0	283.4	17.6	0.0	0.0	37.1	3.7
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	189.7	24.5	0.0	0.0	11.5	4.7
Total	422	2401	242	18935	10	5633	1385

2014	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	428.7	45.6	117.9	41.8	12.5	50.9
Vehicle_carriers	0.9	0.1	0.3	0.1	0.0	0.1
RoRo_vessels	5.9	0.6	1.6	0.6	0.2	0.7
Bulk_carriers	9.0	1.0	2.5	0.9	0.3	1.1
General_cargo	23.4	2.5	6.4	2.2	0.7	2.8
Container_ships	7.7	0.8	2.1	0.8	0.2	0.9
Reefers	1.5	0.1	0.2	0.1	0.0	0.1
Tankers	17.5	1.9	4.8	1.7	0.5	2.1
LNG_tankers	0.1	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.6	0.1	0.2	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	91.9	50.0	25.3	8.9	15.2	10.9
Fishing_vessels	1.0	0.4	1.1	0.1	0.1	0.5
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.0	#DIV/0!
Total	588	103	162	57	30	70

2014	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	282.5 (+6.0%)	0.6 (+6.3%)	60.7 (+6.4%)	1.2 (+6.5%)	0.4 (+6.4%)	1.1 (+6.3%)
Baltic Proper	122.3 (+7.6%)	0.3 (+8.1%)	26.5 (+8.3%)	0.5 (+8.4%)	0.2 (+8.3%)	0.5 (+8.0%)
Kattegat	75.5 (+5.7%)	0.2 (+6.1%)	16.2 (+6.4%)	0.3 (+6.5%)	0.1 (+6.4%)	0.3 (+6.1%)
Gulf of Finland	60.9 (+2.6%)	0.1 (+2.5%)	12.8 (+2.5%)	0.3 (+2.4%)	0.1 (+2.5%)	0.2 (+2.5%)
Gulf of Bothnia	16.4 (+4.8%)	0.0 (+4.5%)	3.7 (+4.5%)	0.1 (+4.1%)	0.0 (+4.2%)	0.1 (+4.5%)
Gulf of Riga	#DIV/0!	0.0 (+14.8%)	1.6 (+15.0%)	0.0 (+15.1%)	0.0 (+15.0%)	0.0 (+14.9%)
Vessel type						
Ropax_vessels	12.9 (-5.6%)	0.0 (-5.8%)	3.7 (-5.9%)	0.1 (-5.9%)	0.0 (-5.9%)	0.1 (-5.8%)
Vehicle_carriers	3.5 (-4.4%)	0.0 (-3.6%)	0.7 (-3.0%)	0.0 (-2.7%)	0.0 (-3.0%)	0.0 (-3.6%)
Roro_vessels	9.7 (-3.6%)	0.0 (-2.7%)	2.2 (-2.1%)	0.0 (-1.8%)	0.0 (-2.1%)	0.0 (-2.7%)
Bulk_carriers	53.9 (+16.2%)	0.1 (+15.9%)	10.8 (+15.6%)	0.2 (+15.5%)	0.1 (+15.6%)	0.2 (+15.8%)
General_cargo	46.7 (+.1%)	0.1 (-.1%)	10.5 (-.3%)	0.2 (-.3%)	0.1 (-.3%)	0.2 (-.1%)
Container_ships	25.2 (+3.0%)	0.1 (+4.1%)	5.2 (+4.9%)	0.1 (+5.3%)	0.0 (+4.9%)	0.1 (+4.1%)
Reefers	3.6 (-13.3%)	0.0 (-13.4%)	0.7 (-13.4%)	0.0 (-13.4%)	0.0 (-13.4%)	0.0 (-13.4%)
Tankers	97.2 (+1.6%)	0.2 (+1.2%)	19.5 (+.9%)	0.4 (+.8%)	0.1 (+.9%)	0.4 (+1.2%)
Lng_tankers	1.1 (+8.9%)	0.0 (+12.2%)	0.2 (+14.8%)	0.0 (+16.0%)	0.0 (+14.9%)	0.0 (+12.3%)
Gas_tankers	2.5 (+39.4%)	0.0 (+38.7%)	0.5 (+38.2%)	0.0 (+38.0%)	0.0 (+38.2%)	0.0 (+38.7%)
Passenger_ships	1.5 (+62.6%)	0.0 (+62.6%)	0.4 (+62.1%)	0.0 (+62.3%)	0.0 (+62.4%)	0.0 (+62.3%)
Cruisers	4.9 (+1.6%)	0.0 (+.9%)	1.0 (+.3%)	0.0 (+.0%)	0.0 (+.2%)	0.0 (+.8%)
Fishing_vessels	2.6 (+37.8%)	0.0 (+40.9%)	0.6 (+42.5%)	0.0 (+43.4%)	0.0 (+42.7%)	0.0 (+40.8%)
Service_ships	1.2 (+3.8%)	0.0 (+6.0%)	0.3 (+7.1%)	0.0 (+7.3%)	0.0 (+6.9%)	0.0 (+5.9%)
Unknown	3.7 (+564.0%)	0.0 (+566.5%)	1.1 (+560.6%)	0.0 (+570.1%)	0.0 (+570.1%)	0.0 (+564.7%)
Misc	10.2 (+25.1%)	0.0 (+26.6%)	2.8 (+27.0%)	0.1 (+27.6%)	0.0 (+27.3%)	0.0 (+26.5%)

2015	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	50.8	419.4	107.3	17051.4	0.5	4005.0	844.4
Vehicle_carriers	4.9	9.8	0.9	12.4	0.0	4.9	3.6
RoRo_vessels	27.0	54.2	6.4	42715.3	0.3	45.9	33.2
Bulk_carriers	69.9	221.9	9.6	1033.7	0.0	71.3	51.5
General_cargo	45.0	999.6	26.1	4168.6	4.1	170.2	122.9
Container_ships	50.2	150.7	10.3	181.3	10.4	54.8	39.6
Reefers	1.9	27.3	1.6	0.0	0.0	7.8	5.7
Tankers	161.6	0.4	22.1	3226.0	0.0	115.4	40.3
LNG_tankers	0.7	0.8	0.4	0.0	0.0	0.6	0.2
Gas_tankers	3.6	14.3	0.9	5.0	0.0	4.8	1.7
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	9.8	8.8	13.1	6526.3	2.7	857.6	180.8
Fishing_vessels	0.0	249.7	15.4	0.0	0.0	32.5	3.3
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	77.5	10.1	1.4	0.0	4.1	1.7
Total	425	2234	224	74921	18	5375	1329

2015	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	408.2	43.4	112.2	39.7	10.8	48.5
Vehicle_carriers	0.7	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	6.2	0.7	1.7	0.6	0.2	0.7
Bulk_carriers	9.6	1.0	2.6	0.9	0.3	1.1
General_cargo	22.9	2.4	6.3	2.2	0.6	2.7
Container_ships	7.4	0.8	2.0	0.7	0.2	0.9
Reefers	1.5	0.1	0.2	0.1	0.0	0.1
Tankers	17.6	1.9	4.8	1.7	0.5	2.1
LNG_tankers	0.1	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.7	0.1	0.2	0.1	0.0	0.1

Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	87.4	47.5	24.0	8.5	13.1	10.4
Fishing_vessels	0.8	0.4	0.9	0.1	0.1	0.4
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.4	0.0	0.1	0.0	0.0	0.1
Total	563	98	155	55	26	67

2015	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	285.6 (+1.1%)	0.6 (+.8%)	61.1 (+.6%)	1.2 (+.5%)	0.4 (+.6%)	1.1 (+.8%)
Baltic Proper	123.6 (+1.1%)	0.3 (+.7%)	26.6 (+.4%)	0.5 (+.3%)	0.2 (+.4%)	0.5 (+.7%)
Kattegat	76.7 (+1.6%)	0.2 (+1.5%)	16.4 (+1.5%)	0.3 (+1.5%)	0.1 (+1.5%)	0.3 (+1.5%)
Gulf of Finland	61.6 (+1.2%)	0.1 (+.8%)	12.8 (+.6%)	0.3 (+.4%)	0.1 (+.6%)	0.2 (+.8%)
Gulf of Bothnia	15.6 (-5.1%)	0.0 (-5.4%)	3.5 (-5.6%)	0.1 (-5.8%)	0.0 (-5.7%)	0.1 (-5.5%)
Gulf of Riga	#DIV/0!	0.0 (+8.1%)	1.7 (+7.8%)	0.0 (+7.6%)	0.0 (+7.8%)	0.0 (+8.1%)
Vessel type						
Ropax_vessels	13.0 (+.9%)	0.0 (+.5%)	3.7 (+.2%)	0.1 (+.2%)	0.0 (+.2%)	0.1 (+.4%)
Vehicle_carriers	2.6 (-26.5%)	0.0 (-26.4%)	0.5 (-26.3%)	0.0 (-26.3%)	0.0 (-26.3%)	0.0 (-26.4%)
Roro_vessels	9.3 (-3.7%)	0.0 (-5.9%)	2.0 (-7.7%)	0.0 (-8.4%)	0.0 (-7.8%)	0.0 (-6.2%)
Bulk_carriers	59.1 (+9.5%)	0.1 (+10.0%)	11.9 (+10.3%)	0.2 (+10.5%)	0.1 (+10.4%)	0.2 (+10.0%)
General_cargo	46.1 (-1.3%)	0.1 (-1.6%)	10.3 (-1.8%)	0.2 (-1.9%)	0.1 (-1.8%)	0.2 (-1.6%)
Container_ships	25.5 (+.9%)	0.1 (+1.3%)	5.2 (+1.6%)	0.1 (+1.8%)	0.0 (+1.6%)	0.1 (+1.3%)
Reefers	3.7 (+3.4%)	0.0 (+4.0%)	0.7 (+4.4%)	0.0 (+4.6%)	0.0 (+4.4%)	0.0 (+4.0%)
Tankers	98.4 (+1.2%)	0.2 (+.8%)	19.6 (+.5%)	0.4 (+.4%)	0.1 (+.5%)	0.4 (+.8%)
Lng_tankers	1.1 (+1.0%)	0.0 (+10.0%)	0.2 (+16.2%)	0.0 (+19.1%)	0.0 (+16.4%)	0.0 (+9.9%)
Gas_tankers	2.8 (+10.9%)	0.0 (+9.9%)	0.5 (+9.0%)	0.0 (+8.8%)	0.0 (+9.1%)	0.0 (+9.8%)
Passenger_ships	0.9 (-35.8%)	0.0 (-36.5%)	0.3 (-36.7%)	0.0 (-36.6%)	0.0 (-36.6%)	0.0 (-36.4%)
Cruisers	4.6 (-5.5%)	0.0 (-5.9%)	0.9 (-6.1%)	0.0 (-6.3%)	0.0 (-6.2%)	0.0 (-5.9%)
Fishing_vessels	2.6 (+.4%)	0.0 (+1.9%)	0.6 (+3.0%)	0.0 (+3.3%)	0.0 (+2.9%)	0.0 (+2.0%)
Service_ships	1.6 (+33.0%)	0.0 (+34.1%)	0.4 (+35.2%)	0.0 (+34.9%)	0.0 (+34.6%)	0.0 (+34.3%)
Unknown	1.5 (-58.5%)	0.0 (-58.2%)	0.4 (-58.0%)	0.0 (-57.8%)	0.0 (-57.9%)	0.0 (-58.1%)
Misc	11.2 (+10.6%)	0.0 (+11.1%)	3.1 (+11.6%)	0.1 (+11.7%)	0.0 (+11.6%)	0.1 (+11.3%)

2016	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	51.4	419.5	108.3	54681.0	13.9	3990.1	841.2
Vehicle_carriers	4.8	9.4	0.8	3519.3	0.0	4.6	3.3
RoRo_vessels	27.4	53.0	6.4	73989.9	1.5	46.4	33.5
Bulk_carriers	71.8	227.6	10.0	1421.9	0.0	74.8	54.0
General_cargo	45.7	1028.2	26.8	6184.7	5.5	173.4	125.2
Container_ships	54.2	145.1	10.5	2278.4	9.5	56.4	40.7
Reefers	2.3	30.9	1.9	0.0	0.0	8.4	6.0
Tankers	162.1	0.4	22.3	2713.5	0.0	115.7	40.4
LNG_tankers	2.1	0.9	0.5	0.0	0.0	0.9	0.3
Gas_tankers	3.9	15.4	1.0	13.3	0.0	5.4	1.9
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	9.6	9.0	13.2	2679.8	5.6	891.4	187.9
Fishing_vessels	0.0	275.7	17.1	0.0	0.0	37.4	3.7
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	557.6	73.0	26.4	0.0	36.4	14.8
Total	496	3337	362	267050	59	6218	1553

2016	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	406.6	43.2	111.8	39.7	11.4	48.3
Vehicle_carriers	0.6	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	6.2	0.7	1.7	0.6	0.2	0.7
Bulk_carriers	10.1	1.1	2.8	1.0	0.3	1.2
General_cargo	23.3	2.5	6.4	2.2	0.7	2.8
Container_ships	7.6	0.8	2.1	0.7	0.2	0.9
Reefers	1.6	0.1	0.2	0.1	0.0	0.1
Tankers	17.6	1.9	4.8	1.7	0.5	2.1
LNG_tankers	0.1	0.0	0.0	0.0	0.0	0.0
Gas_tankers	0.8	0.1	0.2	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0

Cruisers	90.8	49.4	25.0	8.8	14.3	10.8
Fishing_vessels	1.0	0.4	1.1	0.1	0.1	0.5
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	3.8	0.4	1.0	0.2	0.1	0.5
Total	566	100	156	55	28	68

2016	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	308.5 (+8.0%)	0.7 (+8.0%)	66.0 (+8.1%)	1.3 (+8.1%)	0.4 (+8.1%)	1.2 (+8.1%)
Baltic Proper	131.4 (+6.3%)	0.3 (+6.3%)	28.2 (+6.3%)	0.6 (+6.2%)	0.2 (+6.3%)	0.5 (+6.3%)
Kattegat	87.2 (+13.7%)	0.2 (+14.3%)	18.9 (+14.8%)	0.4 (+15.0%)	0.1 (+14.8%)	0.4 (+14.4%)
Gulf of Finland	64.9 (+5.4%)	0.1 (+5.1%)	13.5 (+4.9%)	0.3 (+4.8%)	0.1 (+4.9%)	0.3 (+5.1%)
Gulf of Bothnia	17.2 (+10.7%)	0.0 (+9.3%)	3.8 (+8.6%)	0.1 (+7.9%)	0.0 (+8.3%)	0.1 (+9.3%)
Gulf of Riga	17.2 (+1024.8%)	0.0 (-4.8%)	1.7 (-5.1%)	0.0 (-5.2%)	0.0 (-5.1%)	0.0 (-4.9%)
Vessel type						
Ropax_vessels	13.2 (+1.6%)	0.0 (+1.1%)	3.8 (+.9%)	0.1 (+.8%)	0.0 (+.9%)	0.1 (+1.1%)
Vehicle_carriers	2.6 (+2.1%)	0.0 (+1.5%)	0.5 (+1.0%)	0.0 (+.7%)	0.0 (+.9%)	0.0 (+1.4%)
Roro_vessels	9.9 (+6.4%)	0.0 (+5.1%)	2.1 (+4.1%)	0.0 (+3.9%)	0.0 (+4.3%)	0.0 (+5.0%)
Bulk_carriers	62.4 (+5.6%)	0.1 (+5.4%)	12.5 (+5.3%)	0.2 (+5.2%)	0.1 (+5.2%)	0.2 (+5.4%)
General_cargo	50.4 (+9.2%)	0.1 (+7.8%)	11.0 (+6.8%)	0.2 (+6.4%)	0.1 (+6.8%)	0.2 (+7.7%)
Container_ships	26.9 (+5.8%)	0.1 (+4.8%)	5.5 (+4.1%)	0.1 (+3.8%)	0.0 (+4.1%)	0.1 (+4.8%)
Reefers	4.4 (+17.7%)	0.0 (+18.5%)	0.9 (+19.1%)	0.0 (+19.4%)	0.0 (+19.2%)	0.0 (+18.5%)
Tankers	100.0 (+1.7%)	0.2 (+1.5%)	19.8 (+1.3%)	0.4 (+1.3%)	0.1 (+1.3%)	0.4 (+1.5%)
Lng_tankers	1.7 (+54.7%)	0.0 (+51.8%)	0.4 (+50.4%)	0.0 (+49.8%)	0.0 (+50.4%)	0.0 (+52.1%)
Gas_tankers	3.1 (+13.0%)	0.0 (+12.2%)	0.6 (+11.6%)	0.0 (+11.3%)	0.0 (+11.6%)	0.0 (+12.1%)
Passenger_ships	1.5 (+55.5%)	0.0 (+55.8%)	0.4 (+56.5%)	0.0 (+55.1%)	0.0 (+55.1%)	0.0 (+55.7%)
Cruisers	4.8 (+4.2%)	0.0 (+4.2%)	1.0 (+4.5%)	0.0 (+4.3%)	0.0 (+4.3%)	0.0 (+4.3%)
Fishing_vessels	2.7 (+3.6%)	0.0 (+1.8%)	0.7 (+.8%)	0.0 (+.4%)	0.0 (+.7%)	0.0 (+1.8%)
Service_ships	1.6 (-3.2%)	0.0 (-3.2%)	0.4 (-3.0%)	0.0 (-2.9%)	0.0 (-2.9%)	0.0 (-3.0%)

Unknown	11.7 (+663.1%)	0.0 (+653.5%)	3.3 (+645.6%)	0.1 (+646.7%)	0.0 (+648.6%)	0.1 (+652.2%)
Misc	9.7 (-13.2%)	0.0 (-13.6%)	2.7 (-13.8%)	0.1 (-14.1%)	0.0 (-14.0%)	0.0 (-13.7%)

2017	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	49.3	392.5	106.3	86567.5	22.1	4168.9	878.9
Vehicle_carriers	6.8	10.6	1.0	6570.0	0.0	5.9	4.2
RoRo_vessels	25.4	46.6	5.9	87436.8	1.8	44.2	31.9
Bulk_carriers	80.5	235.5	10.5	1229.2	0.0	88.8	64.1
General_cargo	45.6	1004.5	26.3	6378.1	5.8	184.5	133.2
Container_ships	55.4	153.0	11.2	3512.0	9.2	61.6	44.5
Reefers	2.3	27.9	1.7	0.0	0.0	10.1	7.3
Tankers	150.8	0.4	21.6	2760.3	0.0	124.0	43.3
LNG_tankers	3.0	1.1	0.6	0.0	0.0	1.2	0.4
Gas_tankers	3.5	13.1	0.9	21.9	0.0	5.0	1.8
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	11.7	10.6	14.9	13874.8	8.7	1024.9	216.1
Fishing_vessels	0.0	268.2	16.9	0.0	0.0	43.9	4.4
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	106.8	14.2	1301.9	0.0	5.3	2.2
Total	434	2271	232	209653	48	5768	1432

2017	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	424.9	45.1	116.8	41.1	0.0	50.5
Vehicle_carriers	0.8	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	5.9	0.6	1.6	0.6	0.0	0.7
Bulk_carriers	11.9	1.3	3.3	1.2	0.0	1.4
General_cargo	24.8	2.6	6.8	2.4	0.0	2.9
Container_ships	8.3	0.9	2.3	0.8	0.0	1.0
Reefers	1.9	0.1	0.3	0.2	0.0	0.1
Tankers	18.9	2.0	5.2	1.8	0.0	2.2

LNG_tankers	0.2	0.0	0.1	0.0	0.0	0.0
Gas_tankers	0.8	0.1	0.2	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	104.5	56.8	28.7	10.3	0.0	12.4
Fishing_vessels						
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown						
Total	603	110	166	59	0	71

2017	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	275.6 (-10.7%)	0.6 (-14.8%)	54.2 (-17.8%)	1.1 (-19.0%)	0.4 (-17.8%)	1.0 (-15.0%)
Baltic Proper	129.7 (-1.3%)	0.3 (-5.6%)	25.8 (-8.4%)	0.5 (-9.7%)	0.2 (-8.5%)	0.5 (-5.7%)
Kattegat	67.9 (-22.2%)	0.1 (-26.0%)	13.4 (-28.9%)	0.3 (-30.0%)	0.1 (-29.0%)	0.3 (-26.3%)
Gulf of Finland	54.9 (-15.5%)	0.1 (-19.5%)	10.5 (-22.4%)	0.2 (-23.6%)	0.1 (-22.4%)	0.2 (-19.6%)
Gulf of Bothnia	16.4 (-4.9%)	0.0 (-10.3%)	3.2 (-15.0%)	0.1 (-15.4%)	0.0 (-13.9%)	0.1 (-10.8%)
Gulf of Riga	0.0 (-99.9%)	0.0 (-18.0%)	1.3 (-21.5%)	0.0 (-22.9%)	0.0 (-21.5%)	0.0 (-18.2%)
Vessel type						
Ropax_vessels	15.9 (+20.2%)	0.0 (+16.1%)	4.3 (+15.0%)	0.1 (+14.9%)	0.0 (+15.2%)	0.1 (+16.5%)
Vehicle_carriers	2.3 (-10.9%)	0.0 (-11.9%)	0.4 (-13.1%)	0.0 (-13.7%)	0.0 (-13.1%)	0.0 (-12.2%)
Roro_vessels	9.6 (-2.6%)	0.0 (-5.0%)	2.0 (-6.5%)	0.0 (-7.3%)	0.0 (-6.6%)	0.0 (-5.2%)
Bulk_carriers	49.9 (-20.0%)	0.1 (-23.7%)	9.2 (-26.7%)	0.2 (-28.0%)	0.1 (-26.8%)	0.2 (-24.0%)
General_cargo	48.0 (-4.7%)	0.1 (-12.6%)	9.0 (-18.2%)	0.2 (-20.4%)	0.1 (-18.3%)	0.2 (-13.0%)
Container_ships	29.0 (+7.5%)	0.1 (+2.0%)	5.4 (-1.8%)	0.1 (-3.7%)	0.0 (-2.1%)	0.1 (+1.9%)
Reefers	3.2 (-26.3%)	0.0 (-30.6%)	0.6 (-33.9%)	0.0 (-35.2%)	0.0 (-34.0%)	0.0 (-30.8%)
Tankers	78.7 (-21.4%)	0.2 (-24.5%)	14.5 (-26.9%)	0.3 (-28.0%)	0.1 (-27.0%)	0.3 (-24.7%)
Lng_tankers	1.4 (-18.1%)	0.0 (-21.4%)	0.3 (-23.6%)	0.0 (-24.6%)	0.0 (-25.1%)	0.0 (-21.5%)
Gas_tankers	2.0 (-36.0%)	0.0 (-37.7%)	0.4 (-37.9%)	0.0 (-38.6%)	0.0 (-38.2%)	0.0 (-37.4%)
Passenger_ships	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)
Cruisers	5.1 (+6.1%)	0.0 (+.9%)	1.0 (-2.9%)	0.0 (-4.2%)	0.0 (-2.9%)	0.0 (+.8%)
Fishing_vessels	3.2 (+18.9%)	0.0 (+11.2%)	0.7 (+6.0%)	0.0 (+4.9%)	0.0 (+6.6%)	0.0 (+10.9%)
Service_ships	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)
Unknown	10.4 (-11.4%)	0.0 (-15.7%)	2.7 (-17.9%)	0.1 (-18.6%)	0.0 (-17.9%)	0.0 (-15.8%)

Misc	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)	0.0 (-100.0%)

2018	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	52.4	400.5	106.6	108141.8	28.1	4114.5	867.4
Vehicle_carriers	6.6	10.7	1.0	6491.2	0.0	5.9	4.2
RoRo_vessels	27.4	48.4	5.8	75752.9	1.9	45.5	32.9
Bulk_carriers	83.4	245.9	11.1	1389.9	0.0	91.0	65.7
General_cargo	51.8	1114.4	29.6	6383.9	5.9	201.6	145.5
Container_ships	62.1	161.1	12.4	7302.6	10.5	63.7	46.0
Reefers	1.7	25.0	1.6	0.0	0.0	8.8	6.3
Tankers	157.3	0.4	22.2	4205.1	0.0	127.9	44.7
LNG_tankers	2.6	1.3	0.6	0.0	0.0	1.6	0.5
Gas_tankers	3.2	11.6	0.8	24.8	0.0	4.5	1.6
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	12.6	10.3	16.4	27961.6	8.7	1163.1	245.2
Fishing_vessels	0.0	269.8	16.9	0.0	0.0	45.2	4.5
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	135.5	18.0	1244.4	0.0	10.7	4.4
Total	461	2435	243	238898	55	5884	1469

2018	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	419.3	44.6	115.3	40.9	12.3	49.8
Vehicle_carriers	0.8	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	6.1	0.7	1.7	0.6	0.2	0.7
Bulk_carriers	12.2	1.3	3.4	1.2	0.4	1.5
General_cargo	27.1	2.9	7.5	2.7	0.8	3.2
Container_ships	8.6	0.9	2.4	0.8	0.3	1.0
Reefers	1.6	0.1	0.3	0.2	0.0	0.1
Tankers	19.5	2.1	5.4	1.9	0.6	2.3
LNG_tankers	0.2	0.0	0.1	0.0	0.0	0.0
Gas_tankers	0.7	0.1	0.2	0.1	0.0	0.1

Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	118.5	64.5	32.6	11.6	19.7	14.1
Fishing_vessels	1.2	0.5	1.3	0.1	0.1	0.6
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown						
Total	616	118	170	60	34	73

2018	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	392.7 (+42.5%)	0.8 (+41.4%)	76.2 (+40.5%)	1.5 (+40.1%)	0.5 (+40.5%)	1.5 (+41.3%)
Baltic Proper	181.3 (+39.8%)	0.4 (+38.3%)	35.5 (+37.2%)	0.7 (+36.7%)	0.2 (+37.2%)	0.7 (+38.3%)
Kattegat	89.8 (+32.2%)	0.2 (+30.5%)	17.3 (+29.0%)	0.3 (+28.4%)	0.1 (+29.0%)	0.3 (+30.3%)
Gulf of Finland	87.2 (+58.9%)	0.2 (+59.1%)	16.7 (+59.3%)	0.3 (+59.3%)	0.1 (+59.3%)	0.3 (+59.1%)
Gulf of Bothnia	24.7 (+50.9%)	0.1 (+52.0%)	4.9 (+52.9%)	0.1 (+53.3%)	0.0 (+52.9%)	0.1 (+52.1%)
Gulf of Riga	9.7 (+73860.2%)	0.0 (+43.0%)	1.9 (+42.5%)	0.0 (+42.2%)	0.0 (+42.5%)	0.0 (+43.0%)
Vessel type						
Ropax_vessels	18.6 (+16.9%)	0.0 (+17.0%)	5.1 (+16.9%)	0.1 (+16.6%)	0.0 (+16.8%)	0.1 (+17.2%)
Vehicle_carriers	3.2 (+35.7%)	0.0 (+37.6%)	0.6 (+40.2%)	0.0 (+41.4%)	0.0 (+40.2%)	0.0 (+38.3%)
Roro_vessels	13.1 (+35.5%)	0.0 (+36.4%)	2.7 (+37.7%)	0.1 (+38.2%)	0.0 (+37.7%)	0.1 (+37.0%)
Bulk_carriers	80.8 (+61.8%)	0.2 (+60.6%)	14.7 (+59.5%)	0.3 (+59.1%)	0.1 (+59.5%)	0.3 (+60.5%)
General_cargo	76.2 (+58.7%)	0.2 (+59.9%)	14.5 (+60.9%)	0.3 (+61.2%)	0.1 (+60.8%)	0.3 (+59.9%)
Container_ships	40.2 (+38.8%)	0.1 (+39.7%)	7.5 (+40.1%)	0.1 (+40.6%)	0.1 (+40.3%)	0.1 (+39.6%)
Reefers	4.3 (+33.1%)	0.0 (+33.1%)	0.8 (+33.3%)	0.0 (+33.2%)	0.0 (+33.2%)	0.0 (+33.2%)
Tankers	113.2 (+43.9%)	0.2 (+44.0%)	20.9 (+44.0%)	0.4 (+44.1%)	0.1 (+44.0%)	0.4 (+44.0%)
Lng_tankers	1.8 (+30.4%)	0.0 (+29.3%)	0.3 (+27.9%)	0.0 (+27.6%)	0.0 (+30.3%)	0.0 (+28.9%)
Gas_tankers	2.4 (+18.6%)	0.0 (+18.5%)	0.4 (+16.0%)	0.0 (+16.1%)	0.0 (+16.5%)	0.0 (+17.5%)
Passenger_ships	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Cruisers	7.3 (+42.3%)	0.0 (+43.2%)	1.4 (+43.6%)	0.0 (+43.6%)	0.0 (+43.7%)	0.0 (+42.9%)
Fishing_vessels	3.6 (+12.4%)	0.0 (+12.4%)	0.8 (+12.2%)	0.0 (+12.2%)	0.0 (+12.3%)	0.0 (+12.3%)
Service_ships	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Unknown	3.2 (-68.9%)	0.0 (-69.4%)	0.8 (-69.9%)	0.0 (-70.0%)	0.0 (-69.9%)	0.0 (-69.5%)
Misc	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

2019	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	56.9	432.0	111.8	121320.9	33.7	4310.2	908.7
Vehicle_carriers	6.7	10.2	1.0	6808.9	0.0	6.0	4.3
RoRo_vessels	26.4	48.1	5.8	75674.3	1.9	43.8	31.6
Bulk_carriers	83.8	250.4	11.1	1980.8	0.0	91.4	66.0
General_cargo	53.3	1117.2	29.4	6287.1	5.4	201.2	145.3
Container_ships	66.6	155.4	12.3	14499.2	9.9	65.4	47.2
Reefers	2.0	22.5	1.6	0.0	0.0	8.6	6.2
Tankers	176.6	0.4	23.4	7358.3	0.0	132.8	46.4
LNG_tankers	6.6	2.3	0.9	0.0	0.0	3.1	1.1
Gas_tankers	3.5	14.8	1.0	14.9	0.0	5.5	1.9
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	13.0	10.1	16.7	31568.7	8.4	1227.5	258.8
Fishing_vessels	0.0	303.0	18.9	0.0	0.0	47.6	4.8
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	970.1	128.5	1537.2	0.0	74.7	30.3
Total	496	3337	362	267050	59	6218	1553

2019	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	439.3	46.7	120.8	42.6	12.9	52.2
Vehicle_carriers	0.8	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	5.9	0.6	1.6	0.6	0.2	0.7
Bulk_carriers	12.3	1.3	3.4	1.2	0.4	1.5
General_cargo	27.1	2.9	7.4	2.7	0.8	3.2
Container_ships	8.8	0.9	2.4	0.9	0.3	1.0
Reefers	1.6	0.1	0.2	0.2	0.0	0.1
Tankers	20.2	2.1	5.6	2.0	0.6	2.4
LNG_tankers	0.5	0.1	0.1	0.0	0.0	0.1
Gas_tankers	0.8	0.1	0.2	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0

Cruisers	125.1	68.0	34.4	12.4	20.7	14.9
Fishing_vessels	1.2	0.5	1.4	0.1	0.1	0.6
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	7.8	0.8	2.1	0.4	0.2	0.9
Total	644	123	178	63	36	77

2019	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	427.3 (+8.8%)	0.9 (+9.8%)	84.2 (+10.5%)	1.6 (+10.9%)	0.6 (+10.6%)	1.6 (+9.8%)
Baltic Proper	185.7 (+2.4%)	0.4 (+3.5%)	37.0 (+4.2%)	0.7 (+4.5%)	0.2 (+4.2%)	0.7 (+3.5%)
Kattegat	113.8 (+26.8%)	0.2 (+29.0%)	22.6 (+30.9%)	0.4 (+31.7%)	0.2 (+30.9%)	0.4 (+29.2%)
Gulf of Finland	92.5 (+6.1%)	0.2 (+6.1%)	17.7 (+6.0%)	0.3 (+5.9%)	0.1 (+6.0%)	0.3 (+6.0%)
Gulf of Bothnia	25.7 (+3.7%)	0.1 (+4.1%)	5.1 (+4.4%)	0.1 (+4.5%)	0.0 (+4.4%)	0.1 (+4.1%)
Gulf of Riga	10.2 (+4.7%)	0.0 (-1.4%)	1.8 (-1.1%)	0.0 (-.9%)	0.0 (-1.1%)	0.0 (-1.4%)
Vessel type						
Ropax_vessels	16.8 (-9.7%)	0.0 (-7.5%)	4.7 (-6.6%)	0.1 (-6.2%)	0.0 (-6.5%)	0.1 (-7.6%)
Vehicle_carriers	3.3 (+3.0%)	0.0 (+2.6%)	0.6 (+2.3%)	0.0 (+2.2%)	0.0 (+2.3%)	0.0 (+2.6%)
Roro_vessels	11.4 (-12.6%)	0.0 (-11.4%)	2.4 (-10.8%)	0.0 (-10.5%)	0.0 (-10.8%)	0.0 (-11.5%)
Bulk_carriers	80.6 (-.3%)	0.2 (-.0%)	14.7 (+.2%)	0.3 (+.3%)	0.1 (+.2%)	0.3 (-.0%)
General_cargo	74.7 (-2.1%)	0.1 (-2.3%)	14.2 (-2.5%)	0.3 (-2.6%)	0.1 (-2.5%)	0.3 (-2.3%)
Container_ships	43.7 (+8.7%)	0.1 (+8.1%)	8.1 (+7.6%)	0.2 (+7.4%)	0.1 (+7.6%)	0.2 (+8.1%)
Reefers	4.3 (+.8%)	0.0 (+.4%)	0.8 (+.1%)	0.0 (-.0%)	0.0 (+.1%)	0.0 (+.4%)
Tankers	119.5 (+5.6%)	0.2 (+5.5%)	22.0 (+5.5%)	0.4 (+5.4%)	0.1 (+5.5%)	0.4 (+5.5%)
Lng_tankers	3.2 (+77.9%)	0.0 (+73.9%)	0.6 (+71.2%)	0.0 (+70.0%)	0.0 (+71.2%)	0.0 (+74.0%)
Gas_tankers	3.0 (+28.9%)	0.0 (+29.1%)	0.6 (+29.1%)	0.0 (+29.2%)	0.0 (+29.2%)	0.0 (+29.1%)
Passenger_ships	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Cruisers	7.5 (+3.5%)	0.0 (+4.2%)	1.4 (+4.7%)	0.0 (+5.0%)	0.0 (+4.8%)	0.0 (+4.2%)
Fishing_vessels	3.8 (+5.6%)	0.0 (+6.8%)	0.8 (+7.7%)	0.0 (+8.1%)	0.0 (+7.8%)	0.0 (+6.9%)
Service_ships	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Unknown	24.9 (+674.0%)	0.1 (+682.4%)	6.4 (+690.4%)	0.1 (+694.7%)	0.0 (+692.5%)	0.1 (+685.5%)
Misc	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!

2020	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	47.4	432.2	112.9	114419.4	26.5	1769.5	373.0
Vehicle_carriers	5.1	10.1	1.0	5944.4	0.0	5.1	3.7
RoRo_vessels	26.0	54.9	6.5	69378.7	1.8	46.7	33.7
Bulk_carriers	84.9	251.0	11.0	10423.3	0.1	92.3	66.6
General_cargo	52.1	1163.9	30.7	6665.6	5.6	205.7	148.5
Container_ships	61.3	142.0	11.0	23189.3	10.1	58.1	41.9
Reefers	2.1	21.9	1.5	2302.8	0.0	8.4	6.0
Tankers	161.3	0.4	23.2	16276.2	0.0	129.4	45.2
LNG_tankers	7.4	2.7	1.1	0.0	0.0	4.0	1.4
Gas_tankers	2.9	14.7	1.0	0.0	0.0	5.1	1.8
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	0.7	7.6	7.9	5772.8	0.8	159.0	33.5
Fishing_vessels	0.0	292.8	18.5	0.0	0.0	43.8	4.4
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	932.7	123.9	1887.0	0.0	47.3	19.2
Total	451	3327	350	256259	45	2574	779

2020	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	180.3	19.2	49.6	16.8	5.3	21.4
Vehicle_carriers	0.7	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	6.3	0.7	1.7	0.6	0.2	0.7
Bulk_carriers	12.4	1.3	3.4	1.2	0.4	1.5
General_cargo	27.7	2.9	7.6	2.7	0.8	3.3
Container_ships	7.8	0.8	2.1	0.8	0.2	0.9
Reefers	1.6	0.1	0.2	0.2	0.0	0.1
Tankers	19.7	2.1	5.4	1.9	0.6	2.3
LNG_tankers	0.6	0.1	0.2	0.1	0.0	0.1
Gas_tankers	0.8	0.1	0.2	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0

Cruisers	16.2	8.8	4.5	1.2	2.7	1.9
Fishing_vessels	1.1	0.5	1.3	0.1	0.1	0.5
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.1	#DIV/0!
Total	225.0	83.4	147.9	37.6	24.0	63.9

2020	**CuO [tonnes]**	**CuPyr [tonnes]**	**ZnO [tonnes]**	**ZnPyr [tonnes]**	**DCOIT [tonnes]**	**Zineb [tonnes]**
Total	422.2 (-1.2%)	0.9 (-1.1%)	83.3 (-1.1%)	1.6 (-1.1%)	0.6 (-1.1%)	1.6 (-1.1%)
Baltic Proper	178.6 (-3.8%)	0.4 (-3.8%)	35.6 (-3.8%)	0.7 (-3.8%)	0.2 (-3.8%)	0.7 (-3.8%)
Kattegat	121.3 (+6.6%)	0.2 (+6.9%)	24.2 (+7.1%)	0.5 (+7.2%)	0.2 (+7.1%)	0.5 (+6.9%)
Gulf of Finland	87.6 (-5.4%)	0.2 (-5.3%)	16.7 (-5.2%)	0.3 (-5.2%)	0.1 (-5.2%)	0.3 (-5.3%)
Gulf of Bothnia	26.2 (+1.9%)	0.1 (+.8%)	5.2 (+.2%)	0.1 (-.4%)	0.0 (-.1%)	0.1 (+.8%)
Gulf of Riga	#VALUE!	0.0 (-11.1%)	1.6 (-11.3%)	0.0 (-11.3%)	0.0 (-11.3%)	0.0 (-11.1%)
Vessel type						
Ropax_vessels	17.6 (+5.0%)	0.0 (+4.8%)	5.0 (+5.0%)	0.1 (+4.9%)	0.0 (+4.9%)	0.1 (+5.0%)
Vehicle_carriers	3.9 (+17.9%)	0.0 (+16.0%)	0.7 (+14.3%)	0.0 (+13.6%)	0.0 (+14.3%)	0.0 (+15.8%)
Roro_vessels	13.8 (+20.3%)	0.0 (+20.4%)	2.9 (+20.6%)	0.1 (+20.7%)	0.0 (+20.6%)	0.1 (+20.5%)
Bulk_carriers	80.2 (-.4%)	0.2 (-.7%)	14.6 (-.9%)	0.3 (-1.0%)	0.1 (-.9%)	0.3 (-.7%)
General_cargo	79.3 (+6.3%)	0.2 (+5.5%)	14.9 (+4.9%)	0.3 (+4.6%)	0.1 (+4.8%)	0.3 (+5.4%)
Container_ships	37.6 (-13.9%)	0.1 (-12.0%)	7.2 (-10.4%)	0.1 (-9.7%)	0.0 (-10.3%)	0.1 (-11.9%)
Reefers	4.0 (-7.2%)	0.0 (-7.0%)	0.7 (-6.8%)	0.0 (-6.7%)	0.0 (-6.8%)	0.0 (-7.0%)
Tankers	119.9 (+.3%)	0.2 (+.1%)	22.0 (-.1%)	0.4 (-.2%)	0.1 (-.1%)	0.4 (+.1%)
Lng_tankers	4.1 (+31.2%)	0.0 (+30.4%)	0.8 (+29.8%)	0.0 (+29.6%)	0.0 (+29.8%)	0.0 (+30.4%)
Gas_tankers	3.1 (+2.2%)	0.0 (+1.2%)	0.6 (+.5%)	0.0 (+.2%)	0.0 (+.5%)	0.0 (+1.3%)
Passenger_ships	2.7 (+71.7%)	0.0 (+58.4%)	0.7 (+51.4%)	0.0 (+49.4%)	0.0 (+51.7%)	0.0 (+58.1%)
Cruisers	3.9 (-48.7%)	0.0 (-49.2%)	0.7 (-49.7%)	0.0 (-49.9%)	0.0 (-49.7%)	0.0 (-49.3%)
Fishing_vessels	4.8 (+26.5%)	0.0 (+22.7%)	1.0 (+19.8%)	0.0 (+18.7%)	0.0 (+19.8%)	0.0 (+22.4%)
Service_ships	3.0 (-36.5%)	0.0 (-35.9%)	0.7 (-35.6%)	0.0 (-35.8%)	0.0 (-35.9%)	0.0 (-36.0%)
Unknown	23.1 (-7.1%)	0.1 (-6.3%)	6.1 (-5.7%)	0.1 (-5.6%)	0.0 (-5.8%)	0.1 (-6.2%)
Misc	18.6 (-15.5%)	0.0 (-12.8%)	4.4 (-11.0%)	0.1 (-10.3%)	0.0 (-11.0%)	0.1 (-12.7%)

2021	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	49.2	421.9	109.3	119320.8	26.6	1746.8	368.3
Vehicle_carriers	5.5	8.6	0.8	5628.4	0.0	4.6	3.4
RoRo_vessels	29.0	52.3	6.3	71230.5	1.9	47.9	34.6
Bulk_carriers	79.8	265.4	11.6	18427.7	0.9	97.0	70.0
General_cargo	54.8	1172.3	31.4	8241.8	5.3	212.8	153.6
Container_ships	57.4	139.4	10.5	27166.9	9.5	56.5	40.7
Reefers	1.9	22.6	1.5	2037.1	0.0	8.2	5.9
Tankers	157.2	0.4	22.5	24696.5	0.0	123.5	43.2
LNG_tankers	7.1	2.9	1.2	0.0	0.0	4.6	1.6
Gas_tankers	2.5	11.5	0.7	0.0	0.0	4.2	1.5
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	2.9	10.5	11.7	13501.7	0.7	371.1	78.2
Fishing_vessels	0.0	283.2	17.9	0.0	0.0	39.8	4.0
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	1211.6	160.3	1525.4	0.0	79.7	32.3
Total	447	3603	386	291777	45	2797	837

2021	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	115.7	18.9	49.0	15.9	5.2	21.1
Vehicle_carriers	0.6	0.1	0.2	0.1	0.0	0.1
RoRo_vessels	6.4	0.7	1.8	0.6	0.2	0.8
Bulk_carriers	13.0	1.4	3.6	1.3	0.4	1.5
General_cargo	28.6	3.0	7.9	2.8	0.8	3.4
Container_ships	7.6	0.8	2.1	0.7	0.2	0.9
Reefers	1.5	0.1	0.2	0.1	0.0	0.1
Tankers	18.8	2.0	5.2	1.8	0.6	2.2
LNG_tankers	0.7	0.1	0.2	0.1	0.0	0.1
Gas_tankers	0.6	0.1	0.2	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	24.6	20.6	10.4	3.2	6.3	4.5
Fishing_vessels	1.0	0.4	1.1	0.1	0.1	0.5

Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	0.2	#DIV/0!
Total	116	19	49	16	5	21

2021	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	433.1 (+2.6%)	0.9 (+3.0%)	86.2 (+3.4%)	1.7 (+3.6%)	0.6 (+3.4%)	1.7 (+3.1%)
Baltic Proper	186.0 (+4.1%)	0.4 (+4.6%)	37.4 (+5.1%)	0.7 (+5.3%)	0.2 (+5.1%)	0.7 (+4.7%)
Kattegat	115.9 (-4.4%)	0.2 (-3.4%)	23.6 (-2.6%)	0.5 (-2.3%)	0.2 (-2.6%)	0.4 (-3.4%)
Gulf of Finland	97.2 (+11.0%)	0.2 (+10.8%)	18.5 (+10.6%)	0.4 (+10.5%)	0.1 (+10.6%)	0.4 (+10.8%)
Gulf of Bothnia	25.5 (-2.3%)	0.1 (-2.0%)	5.1 (-1.4%)	0.1 (-1.6%)	0.0 (-1.8%)	0.1 (-1.9%)
Gulf of Riga	#VALUE!	0.0 (-1.2%)	1.6 (-.9%)	0.0 (-.9%)	0.0 (-.9%)	0.0 (-1.1%)
Vessel type						
Ropax_vessels	16.8 (-4.6%)	0.0 (-5.9%)	4.6 (-6.8%)	0.1 (-7.1%)	0.0 (-6.8%)	0.1 (-6.1%)
Vehicle_carriers	2.9 (-24.8%)	0.0 (-24.4%)	0.5 (-24.1%)	0.0 (-24.0%)	0.0 (-24.1%)	0.0 (-24.4%)
Roro_vessels	14.4 (+5.0%)	0.0 (+2.8%)	2.9 (+1.2%)	0.1 (+.5%)	0.0 (+1.1%)	0.1 (+2.7%)
Bulk_carriers	84.5 (+5.3%)	0.2 (+5.7%)	15.4 (+6.0%)	0.3 (+6.2%)	0.1 (+6.0%)	0.3 (+5.7%)
General_cargo	83.1 (+4.8%)	0.2 (+5.5%)	15.8 (+6.1%)	0.3 (+6.4%)	0.1 (+6.2%)	0.3 (+5.6%)
Container_ships	34.3 (-8.9%)	0.1 (-8.7%)	6.6 (-8.5%)	0.1 (-8.4%)	0.0 (-8.5%)	0.1 (-8.7%)
Reefers	4.0 (+.1%)	0.0 (-.1%)	0.7 (-.2%)	0.0 (-.2%)	0.0 (-.2%)	0.0 (-.1%)
Tankers	116.5 (-2.9%)	0.2 (-2.9%)	21.3 (-2.9%)	0.4 (-2.9%)	0.1 (-2.9%)	0.4 (-2.9%)
Lng_tankers	4.1 (-1.9%)	0.0 (+4.5%)	0.9 (+9.9%)	0.0 (+12.4%)	0.0 (+10.1%)	0.0 (+5.0%)
Gas_tankers	2.5 (-18.6%)	0.0 (-18.5%)	0.5 (-18.4%)	0.0 (-18.4%)	0.0 (-18.5%)	0.0 (-18.5%)
Passenger_ships	2.8 (+4.7%)	0.0 (+3.7%)	0.7 (+3.4%)	0.0 (+3.1%)	0.0 (+3.2%)	0.0 (+3.8%)
Cruisers	5.4 (+39.8%)	0.0 (+44.3%)	1.1 (+48.7%)	0.0 (+49.8%)	0.0 (+48.2%)	0.0 (+44.8%)
Fishing_vessels	3.9 (-18.6%)	0.0 (-17.4%)	0.8 (-16.4%)	0.0 (-16.0%)	0.0 (-16.4%)	0.0 (-17.3%)
Service_ships	5.0 (+67.0%)	0.0 (+67.8%)	1.1 (+69.0%)	0.0 (+70.2%)	0.0 (+69.7%)	0.0 (+68.5%)
Unknown	29.8 (+28.8%)	0.1 (+28.7%)	7.8 (+28.7%)	0.2 (+28.7%)	0.1 (+28.7%)	0.1 (+28.7%)
Misc	20.6 (+10.5%)	0.0 (+9.7%)	4.8 (+9.2%)	0.1 (+8.9%)	0.0 (+9.1%)	0.1 (+9.7%)

2022	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	50.3	420.0	108.6	124248.0	30.9	3903.0	822.9
Vehicle_carriers	3.5	6.5	0.6	3861.9	0.0	3.3	2.4
RoRo_vessels	42.2	56.1	7.5	76436.3	1.9	89.7	64.8
Bulk_carriers	90.2	315.6	14.1	15823.7	0.3	113.7	82.1
General_cargo	52.0	1138.1	30.5	7806.6	5.3	204.9	147.9
Container_ships	53.2	117.6	9.5	21000.3	2.4	49.2	35.5
Reefers	1.6	22.6	1.6	1528.4	0.0	9.0	6.5
Tankers	170.0	0.4	23.3	31802.6	0.0	134.3	46.9
LNG_tankers	10.2	3.6	1.8	0.0	0.0	5.3	1.9
Gas_tankers	3.4	16.8	1.1	170.9	0.1	6.3	2.2
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	9.1	9.6	13.2	30247.3	5.1	959.6	202.3
Fishing_vessels	0.0	256.7	16.3	0.0	0.0	36.5	3.6
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	1318.5	174.6	1824.5	0.0	90.1	36.5
Total	486	3682	403	314750	46	5605	1456

2022	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	119.3	42.3	109.4	25.7	11.7	47.2
Vehicle_carriers	0.4	0.0	0.1	0.0	0.0	0.1
RoRo_vessels	12.1	1.3	3.3	1.2	0.4	1.4
Bulk_carriers	15.3	1.6	4.2	1.5	0.4	1.8
General_cargo	27.6	2.9	7.6	2.7	0.8	3.3
Container_ships	6.6	0.7	1.8	0.7	0.2	0.8
Reefers	1.7	0.1	0.3	0.2	0.0	0.1
Tankers	20.5	2.2	5.6	2.0	0.6	2.4
LNG_tankers	0.8	0.1	0.2	0.1	0.0	0.1
Gas_tankers	1.0	0.1	0.3	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	29.3	53.2	26.9	6.3	16.3	11.6
Fishing_vessels	0.9	0.4	1.0	0.1	0.1	0.5

Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	9.4	1.0	2.6	0.5	0.3	1.1
Total	236	105	161	40	31	69

2022	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	471.7 (+8.9%)	1.0 (+8.5%)	93.3 (+8.2%)	1.8 (+8.1%)	0.6 (+8.2%)	1.8 (+8.5%)
Baltic Proper	206.5 (+11.0%)	0.4 (+10.1%)	40.8 (+9.3%)	0.8 (+9.0%)	0.3 (+9.3%)	0.8 (+10.0%)
Kattegat	124.0 (+7.0%)	0.3 (+7.0%)	25.3 (+7.1%)	0.5 (+7.1%)	0.2 (+7.1%)	0.5 (+7.0%)
Gulf of Finland	104.1 (+7.0%)	0.2 (+6.9%)	19.8 (+6.8%)	0.4 (+6.8%)	0.1 (+6.8%)	0.4 (+6.9%)
Gulf of Bothnia	25.9 (+1.4%)	0.1 (+1.9%)	5.2 (+2.0%)	0.1 (+2.4%)	0.0 (+2.3%)	0.1 (+1.9%)
Gulf of Riga	0.0 (+3.5%)	0.0 (+34.2%)	2.2 (+34.7%)	0.0 (+34.9%)	0.0 (+34.7%)	0.0 (+34.3%)
Vessel type						
Ropax_vessels	15.8 (-6.2%)	0.0 (-5.0%)	4.4 (-4.5%)	0.1 (-4.2%)	0.0 (-4.4%)	0.1 (-5.0%)
Vehicle_carriers	2.3 (-22.3%)	0.0 (-22.3%)	0.4 (-22.3%)	0.0 (-22.3%)	0.0 (-22.3%)	0.0 (-22.3%)
Roro_vessels	17.3 (+19.8%)	0.0 (+15.9%)	3.3 (+12.8%)	0.1 (+11.5%)	0.0 (+12.7%)	0.1 (+15.6%)
Bulk_carriers	103.8 (+22.9%)	0.2 (+23.0%)	19.0 (+23.1%)	0.4 (+23.1%)	0.1 (+23.1%)	0.4 (+23.0%)
General_cargo	79.5 (-4.4%)	0.2 (-3.6%)	15.3 (-3.0%)	0.3 (-2.7%)	0.1 (-3.0%)	0.3 (-3.6%)
Container_ships	33.7 (-1.7%)	0.1 (-3.5%)	6.3 (-5.0%)	0.1 (-5.6%)	0.0 (-5.0%)	0.1 (-3.6%)
Reefers	4.3 (+7.3%)	0.0 (+7.2%)	0.8 (+7.1%)	0.0 (+7.1%)	0.0 (+7.1%)	0.0 (+7.2%)
Tankers	130.5 (+12.0%)	0.3 (+12.0%)	23.9 (+12.0%)	0.5 (+11.9%)	0.2 (+12.0%)	0.5 (+12.0%)
Lng_tankers	6.9 (+68.9%)	0.0 (+58.9%)	1.3 (+51.1%)	0.0 (+47.9%)	0.0 (+50.9%)	0.0 (+58.1%)
Gas_tankers	4.1 (+61.8%)	0.0 (+61.8%)	0.7 (+61.8%)	0.0 (+61.9%)	0.0 (+61.9%)	0.0 (+61.8%)
Passenger_ships	3.5 (+25.5%)	0.0 (+33.5%)	1.0 (+38.6%)	0.0 (+41.1%)	0.0 (+39.2%)	0.0 (+34.1%)
Cruisers	6.0 (+11.8%)	0.0 (+9.9%)	1.2 (+8.1%)	0.0 (+7.9%)	0.0 (+8.5%)	0.0 (+9.7%)
Fishing_vessels	3.7 (-5.2%)	0.0 (-4.0%)	0.8 (-3.1%)	0.0 (-2.9%)	0.0 (-3.2%)	0.0 (-4.0%)
Service_ships	3.4 (-32.6%)	0.0 (-32.6%)	0.8 (-32.6%)	0.0 (-32.7%)	0.0 (-32.7%)	0.0 (-32.7%)
Unknown	34.3 (+15.1%)	0.1 (+14.6%)	8.9 (+14.3%)	0.2 (+14.3%)	0.1 (+14.4%)	0.2 (+14.6%)
Misc	19.9 (-3.4%)	0.0 (-3.9%)	4.6 (-4.3%)	0.1 (-4.4%)	0.0 (-4.3%)	0.1 (-4.0%)

2023	Ballast	STO*	Bilge	Scrubber (Open)	Scrubber (Closed)	Grey Water	Black Water
	[million m3]	[m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]	[10^3 m3]
RoPax_vessels	51.2	417.2	106.0	118371.4	31.5	3766.8	794.1
Vehicle_carriers	3.2	5.4	0.5	3550.1	0.0	2.9	2.1
RoRo_vessels	44.7	51.2	6.8	66642.7	1.8	104.9	75.7
Bulk_carriers	89.6	350.1	15.6	13229.0	0.2	127.1	91.8
General_cargo	50.2	1093.2	29.2	6500.5	4.9	195.3	141.0
Container_ships	57.0	119.8	10.4	24811.0	6.1	52.5	37.9
Reefers	1.8	26.6	1.9	2667.4	0.0	10.3	7.5
Tankers	175.1	0.4	25.2	34775.7	0.0	145.5	50.9
LNG_tankers	12.0	5.6	2.6	0.0	0.0	6.1	2.1
Gas_tankers	3.1	16.1	1.1	80.4	0.0	6.0	2.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	6.4	7.0	9.8	21857.3	2.2	589.5	124.3
Fishing_vessels	0.0	249.7	15.8	23.2	0.0	38.4	3.8
Service_ships	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	1415.8	187.7	1795.3	0.0	93.3	37.8
Total	494	3758	413	294304	47	5139	1371

2023	Sewage Nitrogen	Food Waste Nitrogen	Grey Water Nitrogen	Sewage Phosphorus	Food Waste Phosphorus	Grey Water Phosporus
	[tonne]	[tonne]	**[tonnes]**	[tonnes]	[tonnes]	[tonnes]
RoPax_vessels	115.2	40.8	105.6	24.7	11.3	45.6
Vehicle_carriers	0.4	0.0	0.1	0.0	0.0	0.0
RoRo_vessels	14.1	1.5	3.9	1.4	0.4	1.7
Bulk_carriers	17.1	1.8	4.7	1.7	0.5	2.0
General_cargo	26.3	2.8	7.2	2.6	0.8	3.1
Container_ships	7.1	0.8	1.9	0.7	0.2	0.8
Reefers	1.9	0.1	0.3	0.2	0.0	0.1
Tankers	22.2	2.4	6.1	2.1	0.7	2.6
LNG_tankers	0.9	0.1	0.3	0.1	0.0	0.1
Gas_tankers	0.9	0.1	0.3	0.1	0.0	0.1
Passenger_ships	0.0	0.0	0.0	0.0	0.0	0.0
Cruisers	18.0	32.7	16.5	4.0	10.0	7.1
Fishing_vessels	1.0	0.4	1.1	0.1	0.1	0.5

Service_ships	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	9.8	1.0	2.7	0.5	0.3	1.2
Total	225	83	148	38	24	64

2023	CuO [tonnes]	CuPyr [tonnes]	ZnO [tonnes]	ZnPyr [tonnes]	DCOIT [tonnes]	Zineb [tonnes]
Total	494.1 (+4.8%)	1.0 (+5.0%)	98.1 (+5.2%)	1.9 (+5.3%)	0.7 (+5.2%)	1.9 (+5.0%)
Baltic Proper	218.2 (+5.7%)	0.5 (+6.5%)	43.8 (+7.2%)	0.9 (+7.5%)	0.3 (+7.2%)	0.8 (+6.6%)
Kattegat	126.7 (+2.1%)	0.3 (+1.9%)	25.7 (+1.8%)	0.5 (+1.7%)	0.2 (+1.8%)	0.5 (+1.9%)
Gulf of Finland	117.5 (+12.9%)	0.2 (+12.5%)	22.2 (+12.2%)	0.4 (+12.1%)	0.1 (+12.2%)	0.4 (+12.5%)
Gulf of Bothnia	23.7 (-8.6%)	0.0 (-8.4%)	4.8 (-8.1%)	0.1 (-8.2%)	0.0 (-8.3%)	0.1 (-8.3%)
Gulf of Riga	0.1 (+108.5%)	0.0 (-26.9%)	1.6 (-26.1%)	0.0 (-25.7%)	0.0 (-26.1%)	0.0 (-26.9%)
Vessel type						
Ropax_vessels	16.4 (+4.0%)	0.0 (+2.3%)	4.5 (+1.6%)	0.1 (+1.2%)	0.0 (+1.5%)	0.1 (+2.4%)
Vehicle_carriers	1.9 (-15.1%)	0.0 (-15.3%)	0.3 (-15.5%)	0.0 (-15.6%)	0.0 (-15.5%)	0.0 (-15.3%)
Roro_vessels	12.7 (-26.3%)	0.0 (-20.9%)	2.8 (-16.7%)	0.1 (-14.7%)	0.0 (-16.5%)	0.1 (-20.7%)
Bulk_carriers	112.5 (+8.4%)	0.2 (+8.5%)	20.6 (+8.6%)	0.4 (+8.7%)	0.1 (+8.6%)	0.4 (+8.5%)
General_cargo	75.5 (-5.0%)	0.2 (-5.1%)	14.5 (-5.1%)	0.3 (-5.1%)	0.1 (-5.1%)	0.3 (-5.1%)
Container_ships	36.8 (+9.4%)	0.1 (+9.9%)	7.0 (+10.4%)	0.1 (+10.6%)	0.0 (+10.4%)	0.1 (+10.0%)
Reefers	5.4 (+24.6%)	0.0 (+24.3%)	1.0 (+24.0%)	0.0 (+23.9%)	0.0 (+24.0%)	0.0 (+24.3%)
Tankers	150.8 (+15.6%)	0.3 (+16.0%)	27.8 (+16.4%)	0.5 (+16.6%)	0.2 (+16.4%)	0.6 (+16.0%)
Lng_tankers	8.4 (+21.9%)	0.0 (+26.0%)	1.7 (+28.9%)	0.0 (+30.3%)	0.0 (+29.0%)	0.0 (+26.0%)
Gas_tankers	3.8 (-6.9%)	0.0 (-5.8%)	0.7 (-4.9%)	0.0 (-4.4%)	0.0 (-4.8%)	0.0 (-5.7%)
Passenger_ships	2.5 (-29.0%)	0.0 (-25.6%)	0.7 (-24.7%)	0.0 (-24.4%)	0.0 (-24.8%)	0.0 (-26.2%)
Cruisers	4.0 (-34.2%)	0.0 (-35.3%)	0.7 (-36.4%)	0.0 (-36.8%)	0.0 (-36.4%)	0.0 (-35.5%)
Fishing_vessels	4.0 (+7.1%)	0.0 (+5.8%)	0.8 (+4.9%)	0.0 (+4.6%)	0.0 (+4.9%)	0.0 (+5.8%)
Service_ships	3.1 (-9.3%)	0.0 (-9.2%)	0.7 (-9.2%)	0.0 (-9.3%)	0.0 (-9.3%)	0.0 (-9.3%)
Unknown	36.4 (+6.0%)	0.1 (+6.6%)	9.6 (+6.9%)	0.2 (+7.0%)	0.1 (+6.9%)	0.2 (+6.6%)
Misc	17.0 (-14.4%)	0.0 (-12.8%)	4.1 (-11.8%)	0.1 (-11.5%)	0.0 (-11.9%)	0.1 (-12.8%)