Baltic Sea Environment Proceedings No.123

Maritime Activities in the Baltic Sea

An integrated thematic assessment on maritime activities and response to pollution at sea in the Baltic Sea region

Helsinki Commission

Baltic Marine Environment Protection Commission

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Preface

Maritime safety and response to accidents at sea have high priority in the Baltic Sea region due to the natural conditions and the high density of shipping. More than three decades ago the Baltic Sea countries decided to jointly tackle these issues under the framework of HELCOM, the intergovernmental organization working to protect the Baltic marine environment and to ensure the safety of navigation.

During the last decade shipping has steadily increased around the Baltic Sea, reflecting intensifying international co-operation and economic growth. Both the numbers and the sizes of ships have grown and the trend is expected to continue. This leads to increased pollution and other pressures on the marine environment. Also, the dramatic rise in oil transportation significantly raises the risk of a large oil spill in the Baltic marine area.

Recognizing these critical changes, in 2007 the HELCOM countries and the European Union devised a set of measures to advance the safety of navigation, including prevention of marine pollution, and to reduce environmental impacts of shipping as well as facilitate emergency response in the region. These measures are part of the overarching HELCOM Baltic Sea Action Plan to radically reduce pollution to the marine environment and restore its good ecological status by 2021.

The thematic assessment on maritime activities in the Baltic Sea is a direct follow-up of the HELCOM Baltic Sea Action Plan, along with three other similar assessments on eutrophication, hazardous substances and biodiversity. The maritime assessment is intended to provide baseline data on shipping and other maritime activities in the Baltic Sea, and an overview of measures that are being implemented in order to achieve the objectives of the Baltic Sea Action Plan concerning the reduction of pollution, improvement of navigational safety and response capacity in the region. It also includes recommendations on further necessary steps to implement the HELCOM Baltic Sea Action Plan.

Today, the main environmental impacts of shipping and other activities at sea include air pollution, illegal deliberate and accidental discharges of oil, hazardous substances and other wastes, and the unintentional introduction of invasive alien organisms via ships' ballast water or hulls. Shipping adds to the problem of eutrophication of the Baltic Sea with its nutrient inputs from nitrogen oxides (NOx) emissions and sewage discharges.

HELCOM has been developing its own regulations to address these sources of pollution to the marine environment. Additionally, the HELCOM countries have been jointly contributing to the development, by the International Maritime Organization (IMO), of relevant global legislation to ensure that the highest practicable standards to control and prevent pollution from ships are applied in the Baltic Sea. Recently, the Baltic Sea states resolved to act jointly within the IMO to apply stricter controls over the sources of nutrient pollution. This includes introduction of new standards for nutrients in sewage discharges from ships and tightening of regulations on ships' NOx emissions.

This assessment, prepared by the HELCOM Secretariat, presents the current maritime and response situation in the Baltic Sea region based on the latest data emerging from monitoring activities supported by national information. It is hoped that this assessment provides a sound basis for further decisions to reach the goal of the HELCOM Baltic Sea Action Plan to have maritime activities in the Baltic Sea carried out in an environmentally friendly way.

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Executive Summary

The Baltic Sea has always been a difficult area for ships to navigate, due to its narrow straits and shallow waters. It is also an area of heavy maritime traffic which has grown remarkably during recent years, and is predicted to grow also in the future. This rise in shipping is due to the economical growth as well as increasing oil production and transportation activities. However, it results in increasing risks of major pollution accidents, which could have a devastating impact on the marine environment, especially in the costal waters. The winter conditions in the northern Baltic Sea, and especially in the Gulf of Finland, add to these risks.

There are around 2,000 sizable ships at sea at any one time. The number of ships entering or leaving the Baltic Sea via Skaw in 2009 has increased by 20% since 2006. Approximately, 20% are tankers, carrying as much as 166 million tonnes of oil.

Also the amount of oil turnover in the largest oil terminals surrounding the Baltic Sea has been growing each year reaching 251 million tonnes in 2008. Due to the construction and expansion of Russian oil terminals, the export of Russian oil alone through the Baltic ports, currently at the level of 111 million tonnes, is expected to reach 180 million tonnes in 2020.

Each year there are 120-140 shipping accidents in the Baltic Sea area. The number of accidents has risen since 2006, which can be linked to the 20% increase in ship traffic. The majority of accidents are groundings and collisions. The share of groundings in the total number of accidents is higher for the Baltic Sea than for other European waters.
On average, 7% of the shipping accidents in the Baltic Sea results in some kind of pollution, usually containing not more than 0.1-1 tonnes of oil. For the last six years, no major accidental oil spill has happened in the Baltic Sea.

Every ship entering the Baltic Sea must comply with the anti-pollution regulations of the Helsinki Convention and MARPOL Convention, including those resulting from the designation of the Baltic Sea area as a Special Area for prevention of pollution by oil (Annex I of MARPOL) and garbage (Annex V). Even though strict controls over ships' discharges have been established by the Baltic Sea countries, illegal spills and discharges continue to happen.

Fortunately, the number of deliberate, illegal oil spills has been reduced dramatically over the last twenty years, from 763 spills in 1989 to 178 spills in 2009. Also, the size of the spills has been decreasing - most are less than one cubic metre and even less than 100 litres today.

However, the cumulative effects of such smaller accidental and illegal spills have direct harmful impacts. Oiled birds and mammals suffer from hypothermia or intoxication, which are particularly lethal to the avian fauna. It is estimated that 100,000–500,000 ducks, guillemots and other bird species die each year owing to small oil spills.

NOx emissions from ships contribute considerably to the most severe environmental problem of the Baltic Sea, namely eutrophication. Eutrophication is caused by excessive inputs of nutrients - nitrogen and phosphorus - to the marine environment, and results in algal blooms, murky waters, loss of submerged aquatic vegetation, and lifeless zones on the sea floor.

Shipping has its share in atmospheric nitrogen deposition through the emission of NOx from the operation of ships' diesel engines. Annual NOx emissions from the Baltic shipping are comparable to the combined land-based NOx emissions from Finland and Sweden. NOx emitted to the air is deposited both directly onto the sea surface and in the catchment area, from where part of the nitrogen drains into the sea via rivers. NOx deposited onto the Baltic Sea is particularly effective in causing eutrophication.

During 2000–2006, shipping in the Baltic was the fifth greatest contributor (5% and on average 11,500 tonnes of N annually) to the total nitrogen deposition to the Baltic Sea basin. The Baltic shipping contribution to the total deposited nitrogen was even higher in 2007, and reached 12,400 tonnes.

After the Baltic Sea SOx Emission Control Area entered into force in 2006, SOx emissions from ships have steadily decreased. During 2008, 135,000 tonnes of SOx was emitted by ships in the Baltic Sea, which is 8% less than two years before. A further decrease in sulphur oxides emissions is expected due to stricter regulations for sulphur content in marine fuel introduced by the revised MARPOL Annex VI.

A cut in NOx emissions from ships in the Baltic Sea required by the revised Annex VI will be much less significant, and not sufficient to counterbalance the increasing emissions related to the predicted growth in maritime transportation, unless the Baltic Sea is designated as a NOx Emission Control Area.

Further, nitrogen loads to the Baltic Sea originating from ships' sewage discharges contribute to eutrophication. While these loads are relatively small compared to the total nutrient load to the Baltic Sea, they are, however, significant due to the sensitivity of the Baltic Sea to eutrophication. Nutrients in sewage discharge may have considerable effects on the growth of pelagic phytoplankton since the nutrients are discharged directly to the open sea ecosystem.

Due to increasing shipping, more alien species are finding their way into the Baltic Sea than ever before. The species are most often deploying ballast water and hull-fouling as vectors. The invaders can induce considerable changes in the structure and dynamics of marine ecosystems and can also hamper the economic use of the sea or even represent a risk to human health. Over 100 non-native aquatic species have been recorded in the Baltic Sea to date, and around 80 of these have established viably reproducing populations in some parts of the Baltic. Eight new species have been observed during the past five years alone. Most of these invasive species originate from freshwater or brackish water environments, particularly from North America or the Ponto-Caspian region.

Heavy shipping also has a number of other negative impacts on the marine environment, especially in shallow areas, including underwater noise and the release of anti-fouling chemicals used on ship hulls, which cause acute effects on organisms, especially at lower trophic levels of the food web.

Apart from shipping, there are also other maritime activities that have an impact on the Baltic Sea, including energy-related activities, like wind power production, oil extraction and gas pipelines, as well as fisheries and leisure boating.

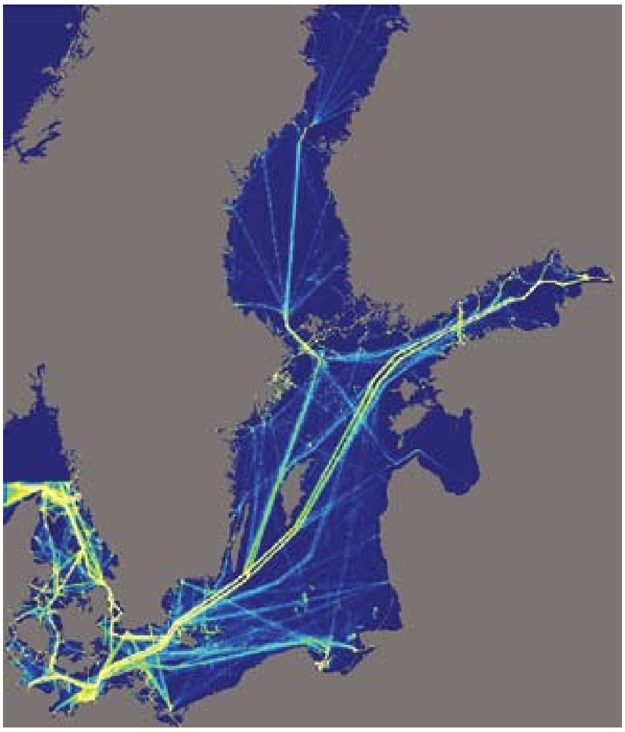
Nikolay Vlasov, HELCOM

Chapter I: Introduction

Due to its narrow straits, shallow waters and its vast labyrinths of skerries and islands, the Baltic Sea has always been a difficult area for ships to navigate; nevertheless, the Baltic has always also been a blessing. Together with the forests and fields it has been a central lifeline to peoples living on these northern shores and this relationship continues today in the form of a multitude of maritime activities. Alongside maritime traffic, which has grown remarkably during recent years, there are extensive plans for wind power and continuing fisheries among others. The role of the first part of this report is to give a short overview of a suite of maritime activities in the Baltic Sea to be complemented by more specific chapters mainly focusing on shipping.

Ships in numbers

Since 1 July 2005, the whole Baltic Sea area has been covered by an interlinked network of land-based Automatic Identification System (AIS) stations. AIS was invented for the exchange of information between ships and between ships and shore stations. Ship traffic in the Baltic Sea based on AIS signals is presented on **Map 1**.



Map 1: Ship traffic in the Baltic Sea during one week in 2008. Data are calculated on a grid, showing the areas of heavy traffic. Source: HELCOM AIS.

The HELCOM shore-based AIS network provides a monitoring tool for supervision, risk analyses, search and rescue operations, port Sate control, identification of illegal polluters, security and other safety-related tasks to ensure safe navigation. Additionally, AIS information is used for estimating ship emissions and monitoring non-compliant ships entering the sea.

The maritime transportation intensity in the Baltic Sea has increased significantly during recent years with more than 2,000 sizable ships at sea at any one time, and this is predicted to increase even further.

In 2009, vessels entered or left the Baltic Sea via Skaw 62,743 times (figure representing the number of crossings through a pre-defined AIS line, **Map 2**). This number has increased by more than 20% since 2006 (**Figure 1**). Approximately 21% of those ships were tankers, 46% other cargo ships, and 4.5% passenger ships.

Additionally, heavy ship traffic goes through the 98-kilometer long Kiel Canal linking the Baltic Sea with the North Sea. In total, 30,314 ships passed through the Kiel Canal in 2009 (www.kiel-canal.org).

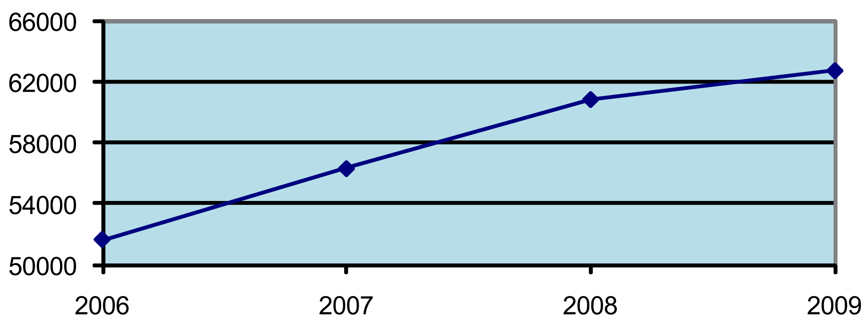
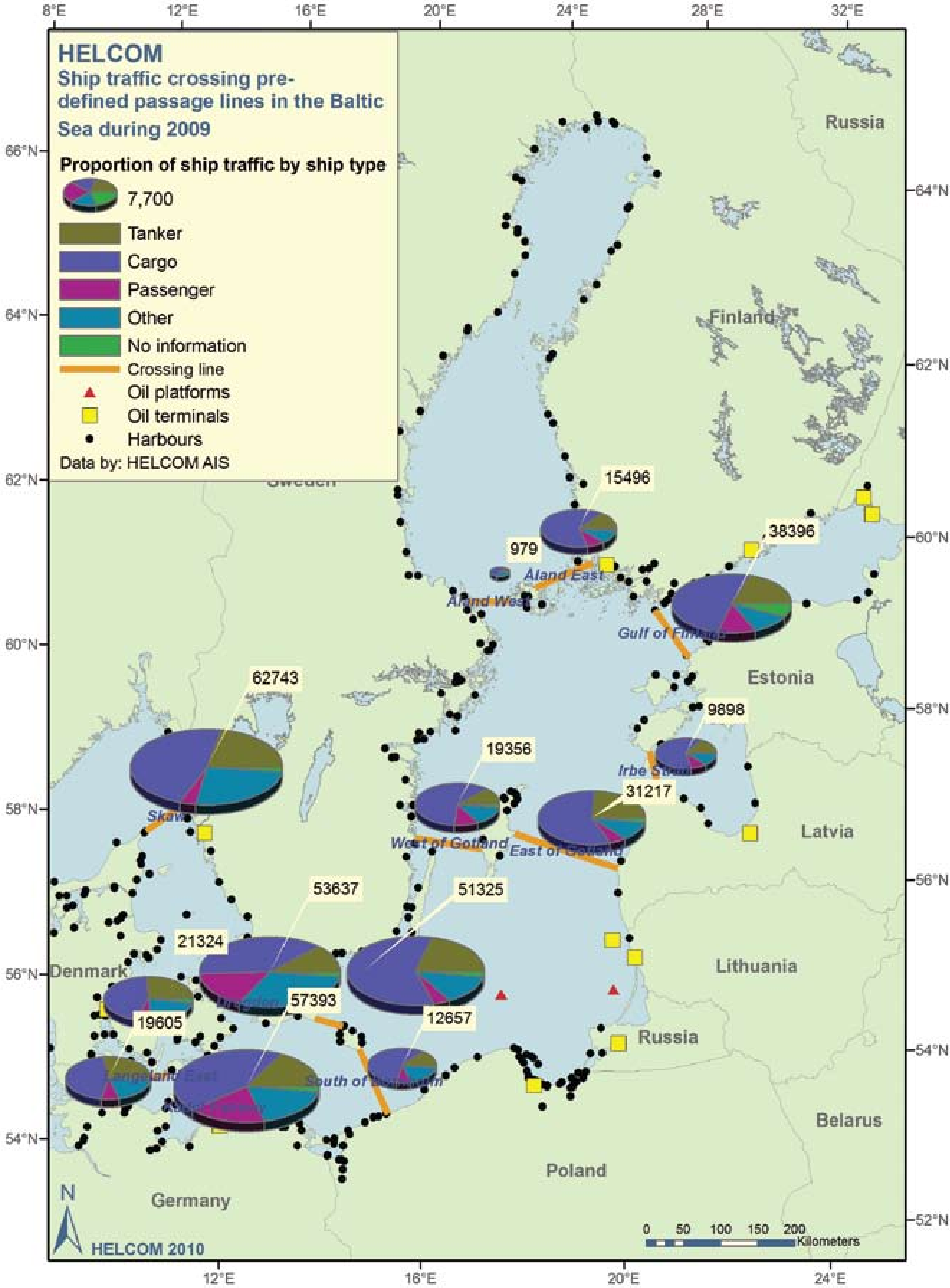


Figure 1. Number of ships entering or leaving the Baltic Sea via Skaw (crossings through a pre-defined AIS line), 2006-2009.



Map 2. **Number of ships crossing pre-defined AIS lines in the Baltic Sea by ship type, 2009. Source: HELCOM AIS.**

	Passenger	Cargo	Tanker	Other	No info	Total
2006	42731	226855	67458	39627	-	376671
%	*11.3*	*60.2*	*17.9*	*10.5*	-	*100.0*
2007	43215	237342	69335	56981	6901	413774
%	*10.4*	*57.4*	*16.8*	*13.8*	*1.7*	*100.0*
2008	49355	210021	61996	122029	10297	453698
%	*10.9*	*46.3*	*13.7*	*26.9*	*2.3*	*100*
2009	42408	200595	69021	73906	8096	394026
%	10.8	50.9	17.5	18.8	2.1	100

Table 1. Number of ships crossing pre-defined AIS lines in the Baltic Sea, 2006-2009. Data source: HELCOM AIS. 'Other' refers to other types of ships; 'No Info' refers to unspecified ships.

	Draught							
	<7 m	7-9 m	9-11 m	11-13 m	13-15 m	>15 m	Unknown	Total
Total	246211	60323	24341	6156	5457	1064	50474	394026
Percentage of tot.	62.50%	15.30%	6.20%	1.60%	1.40%	0.30%	12.80%	100.00%

Table 2. Number of ships crossing pre-defined AIS lines in the Baltic Sea by draught, 2009. Data source: HELCOM AIS.

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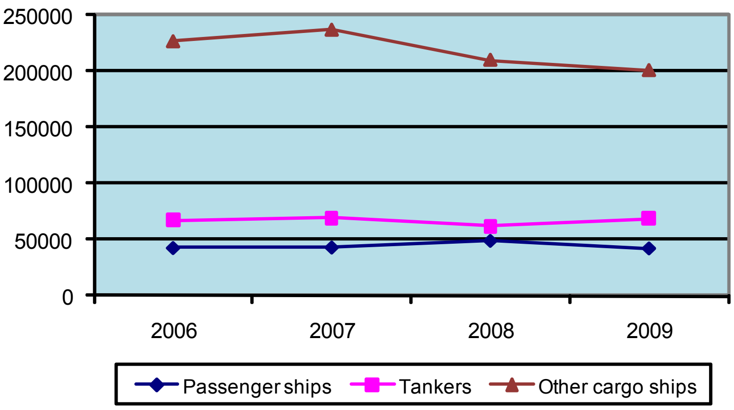

Figure 2. Number of ships crossing pre-defined AIS lines in the Baltic Sea by ship type, 2006-2009.

The overall number of vessels crossing all pre-defined AIS lines in the Baltic Sea in 2009 is lower by 13% than in 2008 (**Table 1**) – a reflection of the economic turndown the region has been experiencing. However, when observing the number of specific ship types crossing AIS lines, it can be seen that the number of tankers has increased (**Figure 2**).

The majority of all ships in the Baltic Sea are smaller vessels with a draught less than 7 m (**Table 2**).

Transportation of cargo

The total amount of cargo handled in the ports surrounding the Baltic Sea was 822.4 million tonnes in 2008, which is 3% more than in 2006, but 0.4% less than 2007. The two biggest ports were Primorsk and St. Petersburg, accounting for 16% of the total traffic volumes (Särkiärvi et al. 2009).

The amount of oil turnover in the 16 largest oil terminals of the Baltic Sea has been growing each year (**Figure 3**). Oil terminals with over three million tonnes turnover per year are shown on **Map 3 (next page)**.

Also transportation of oil to and from the Baltic Sea via Skaw has grown over the years; however, a slight decrease was seen in 2009 over 2008 (**Figure 4**).

The oil transportation is predicted to increase further, especially in the Gulf of Finland, due to the construction and expansion of Russian oil terminals. The export of Russian oil alone through the Baltic ports, currently at the level of 111 million tonnes, is expected to reach 180 million tonnes in 2020.

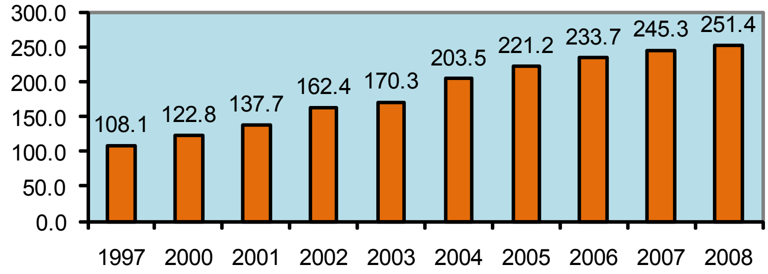

Figure 3: Amount of oil transported via the 16 largest oil terminals in the Baltic Sea area during 1997, and 2000-2008. Data source: HELCOM MARIS.

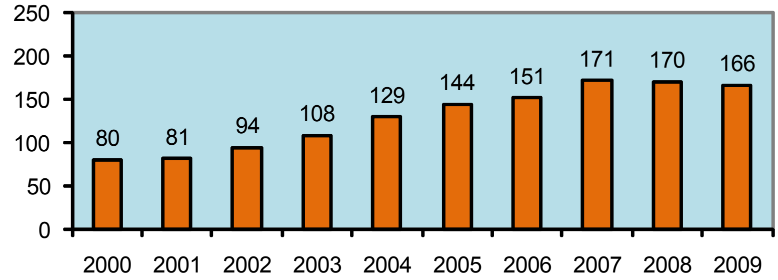

Figure 4. Amount of oil transported to and from the Baltic Sea via the Great Belt, 2000-2009. Data source: SHIPPOS (2000-2007) and the Danish reporting system (2008-2009).

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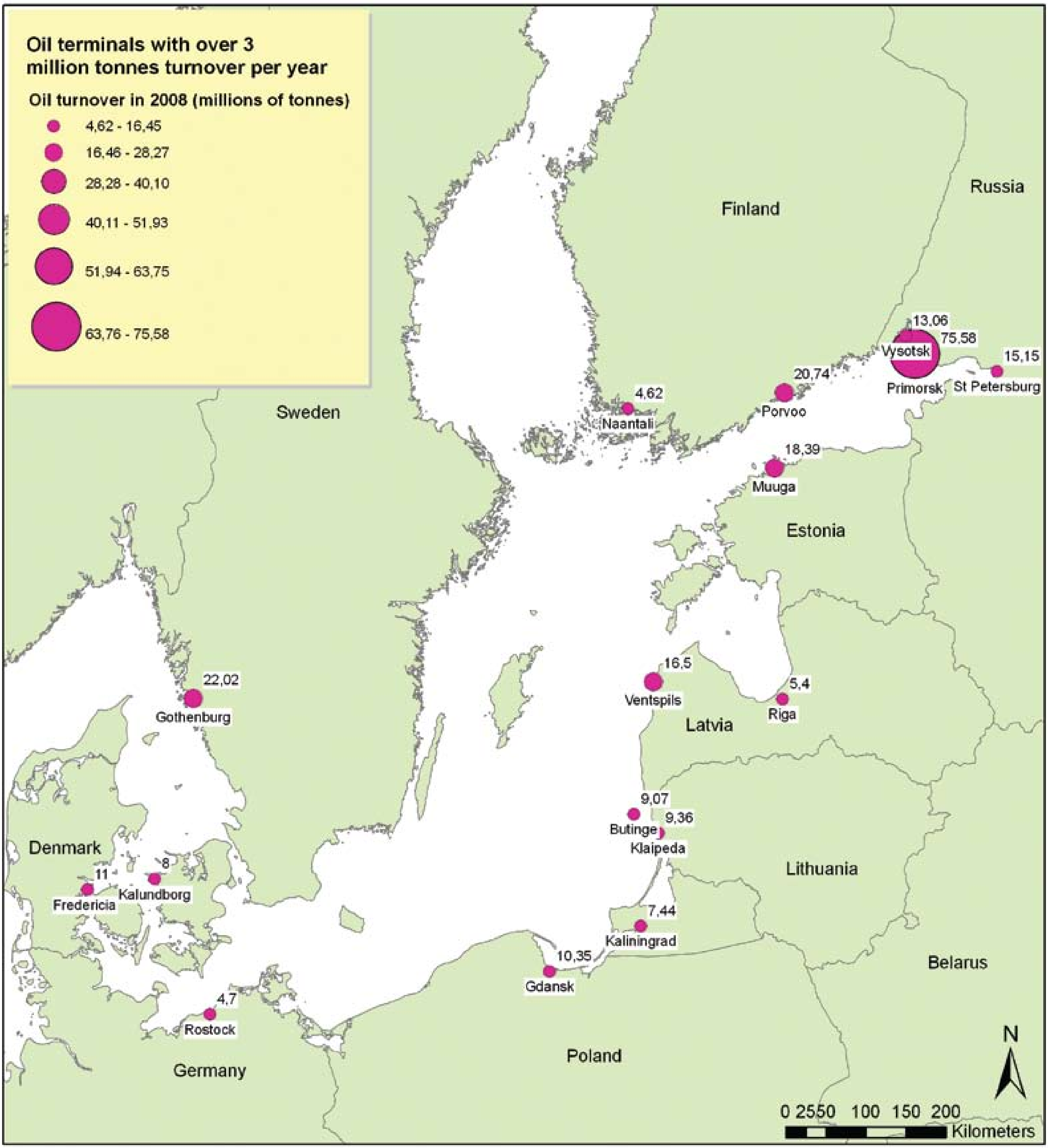

Map 3. **Major oil terminals along the Baltic Sea coastline. Data source: HELCOM MARIS.**


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Global processes behind the increasing Baltic traffic

Economic growth within the region, in Europe and globally brings with it increasing transportation volumes, both in terms of oil and other cargo. This is reflected directly in shipping which, according to the International Maritime Organization (IMO), transports 90% of world trade. The world fleet has consequently almost doubled in tonnage during the last thirty years.

The growth of shipping has been particularly fast during the first decade of the 21st century corresponding to the accelerating pace of world trade. In terms of total seaborne trade, the world experienced an increase from six to more than eight thousand million tonnes during 2000-2008 (**Table 3**), corresponding to an increase of around 36% (UNCTAD 2009). These global developments are also reflected in the Baltic Sea region transport volumes growing until recently.

Year	Oil	Main bulks[a]	Other dry cargo	Total (all cargoes)
1970	1,442	448	676	2,566
1980	1,871	796	1,037	3,704
1990	1,755	968	1,285	4,008
2000	2,163	1,288	2,533	5,984
2006	2,648	1,888	3,009	7,545
2007	2,705	2,013	3,164	7,882
2008 [b]	2,749	2,097	2,322	8,168

Table 3. Development of international seaborne trade for selected years (million of tonnes loaded). Data source: UNCTAD. [a] Iron ore, grain, coal, bauxite/alumina and phosphate; [b] Preliminary.

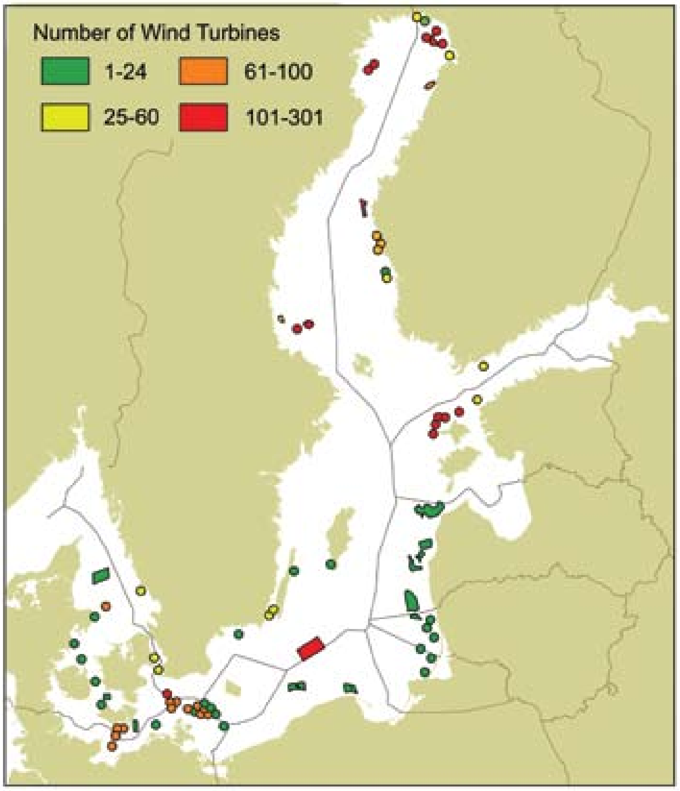
Other types of maritime activities

Energy-related activities

Besides shipping, and the closely related developments in harbours, also other types of human activities can be considered under the 'maritime' heading. This includes mainly energy-related activities, of which wind power is perhaps the most rapidly expanding field. Wind power developments, in turn, are linked to Climate Change mitigation concerns, including the EU 2007 goal aiming at 20% for renewable energy sources by 2020. Although there are currently only a few large wind farms in operation in the Baltic Sea, numerous wind farms are planned or already going through an Environmental Impact Assessment (EIA) process (**Map 4**).

Although wind farms are not a source of direct chemical or biological pollution they have other effects, both environmental and aesthetic, some of which remain controversial. Regardless of their environmental effects, wind farms compete for space with, e.g. shipping, particularly in narrow straits and other densely used areas.

In addition to wind farms, the two Baltic oil platforms 'Petrobaltic' in the Polish exclusive economical zone (EEZ), and 'D-6' in the Russian territorial waters of Kaliningrad Oblast can also be mentioned in this context. The operation of these oil platforms has not been observed to cause any significant environmental problems; however, possible growth in oil and gas extraction activities may be a potential source of environmental concern.



Map 4. **Planned and existing wind farms in the Baltic Sea.**

Currently, there are at least three planned gas pipeline routes in the Baltic Sea: 'Baltic Gas Interconnector' from Germany to Sweden; 'BalticPipe' from Denmark to Poland; and 'Nord Stream' from Russia to Germany across the Gulf of Finland and the Baltic Proper. The largest of the three, the Nord Stream construction, will consist of two pipelines, both 1,200 km long, with a diameter of 122 cm. The 'Nord Stream' transboundary Environmental Impact Assessment and permitting procedures were finalised in 2010 with construction (started April 2010) planned to be completed by 2012.

Fisheries

The most important and internationally managed and assessed fish stocks caught offshore in the Baltic Sea are those of cod (caught by bottom and midwater trawling and longlines), herring and sprat (midwater trawling) and salmon (longlines). Fishery activities regarding these species are in principle international, even if relatively few vessels from outside the region fish in the Baltic. The present regional management structure for these species is based on a bilateral agreement between the Russian Federation and the European Union achieved in 2009. Other species mainly caught inshore are of more local concern, and are consequently managed nationally for the most part.

In terms of intensity, fishery activities are mainly concentrated in the southern parts of the Baltic Sea, even if important fisheries of salmon as well as herring and sprat also take place in the northern parts. However, due to data access issues it is currently difficult to get accurate information on fishing vessel movements comparable to AIS information (e.g. **Map 1**) even if the European Vessel Monitoring System (VMS) continuously monitors bigger fishing vessels. However, this might change in the future as already now, the new European regulation 199/2008 provides a (conditional) legal basis for sharing VMS information.

Leisure crafts

The majority of leisure boats in the Baltic Sea area belong to residents of Denmark, Finland and Sweden (**Figure 5**) with boat ownership much less common in the other countries. In Denmark and Finland, the number of privately owned boats used specifically along the Baltic Sea coast is around 400,000, and in Sweden the number is 450,000; these estimates include vessels ranging from rowboats to motor and sailing boats with overnight capacity (SCB 2004). In Estonia and Latvia, the number of leisure boats is about 14,500 and 7,300, respectively. Offshore sailing and boating crossing national borders is still relatively uncommon in the Baltic even if it is increasing rapidly.

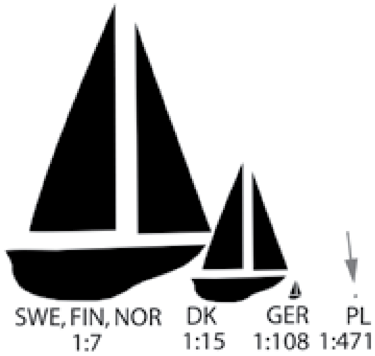


Figure 5. Recreational boats: Population for some Baltic countries. Note that figures include boats of all sizes, also smaller open types. HELCOM/ Hermanni Backer. Data sources: websites of European Boating Association, International Boating Industry.

Maritime Office in Gdynia, Poland

Policy framework beyond HELCOM

The law of the sea and the International Maritime Organization

Shipping is perhaps the most international of the world's industries, serving more than 90% of global trade by carrying huge quantities of cargo.

For more than two centuries and until recently, the vast areas of ocean were open and free with all states enjoying the freedom of navigation, uncontrolled fishing, the right to lay and maintain submarine cables and pipelines, and the freedom to fly over areas beyond a limited area of a territorial sea.

For the first time in history, sea boundaries have been agreed in the UNCLOS Convention (the United Nations Convention on the Law of the Sea), open for signature in 1982.

Beyond territorial waters, the Convention allows the creation of an exclusive economic zone area of up to 200 nautical miles in order for coastal states to gain economic benefit from areas further off their shores: notably rights over fishing and the exploitation of non-living resources. At the same time, however, neighbouring land-locked and geographically disadvantaged states have also been given some rights over these areas.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The countries' acceptance of the coastal state jurisdiction over a 200-mile EEZ has a revolutionary effect – the elimination of freedom in fishing and giving a coastal state's sovereign rights over the exploitation, conservation and management of living resources.

The seabed beyond the limits of national jurisdiction was accepted as a common heritage of mankind. Further, the traditional right of innocent passage through territorial waters is also recognised.

UNCLOS comprises 320 articles and nine annexes, governing all aspects of ocean space from delimitations to environmental control, scientific research, economic and commercial activities, technology and the settlement of disputes relating to ocean matters.

In 1948, an international conference in Geneva adopted a convention formally establishing the International Maritime Organization. The IMO Convention entered into force in 1958. IMO is the global regulator of shipping, and its main task has been to develop and maintain a comprehensive regulatory framework for shipping. Its remit today includes safety, environmental concerns, legal matters, technical cooperation, maritime security and the efficiency of shipping.

As a result of IMO's work, a comprehensive body of international conventions, supported by hundreds of recommendations governing every facet of shipping, has been created. The conventions concern the prevention of pollution from ships, standards of training for seafarers, search and rescue, oil pollution response, harmful anti-fouling systems on ships, alien species transferred via ballast water of ships, and more.

EU initiatives related to maritime activities

The EU Green Paper on the future Maritime Policy (2006) and its Blue Book/Action Plan 'An Integrated Maritime Policy for the European Union' (2007) have, in general, put further emphasis on the role of maritime economies in achieving green growth in Europe. Within the

Integrated Maritime Policy framework, HELCOM has been actively participating in developing, inter alia, the concept of regional Baltic Sea Maritime Spatial Planning (MSP) and the EMODNET data structures together with the Member States.

HELCOM's efforts to develop Maritime Spatial Planning is rooted in the Baltic Sea Action Plan, which committed the coastal countries and the European Commission to jointly develop by 2010, as well as test, apply and evaluate by 2012, in cooperation with other relevant international bodies, broad-scale, cross-sectoral, marine spatial planning principles using as an overarching principle the Ecosystem Approach that reflect the specific conditions and needs in the Baltic Sea Region, as well as the HELCOM Recommendation 28E/9 on the development of broad-scale marine spatial planning principles in the Baltic Sea area. Regional MSP principles to fulfil the BSAP commitment, developed jointly with other regional organisations, are anticipated to be adopted in HELCOM Ministerial Meeting in 2010.

In 2009, the EU Strategy and Action Plan for the Baltic Sea Region were adopted. The strategy is the first EU macro regional strategy to address, on a voluntary basis, common challenges, like the deteriorating state of the Baltic Sea, poor transport links, barriers to trade and energy supply concerns, through integrated approach and coordinated actions. The four cornerstones of the Strategy are to make this part of Europe more:

- Environmentally sustainable (e.g. reducing pollution in the sea);
- Prosperous (e.g. promoting innovation in small and medium enterprises);
- Accessible and attractive (e.g. better transport links); and
- Safe and secure (e.g. improving accident response).

HELCOM's measures included in the Maritime Activities segment of the HELCOM Baltic Sea Action Plan have served the development of the many strategic and cooperative actions as well as flag ship projects of the EU Strategy for the Baltic Sea Region in its environmental pillar (priority areas 2 and 4) and safety and security pillar (priority areas 13 and 14).

The EU Strategy has been given an additional political support and has strengthened the commitments already made by the Baltic Sea countries in the BSAP. It has also pushed for a more coordinated approach among different authorities in the countries, local governments, NGO's and other stakeholders in implementing various activities, including those aiming at making the Baltic Sea region an environmentally sustainable as well as a safe and secure place.

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Chapter II: Safety of Navigation

The Baltic Sea is an area of heavy maritime traffic, which has grown remarkably during recent years, and is predicted to grow also in the future. This rise in shipping is due to economical growth and increasing oil production and transportation activities; however, it is also resulting in increasing risks of major pollution accidents, which could have a devastating impact on the marine environment, especially in the costal waters. The winter conditions in the northern Baltic Sea, especially in the Gulf of Finland, add to these risks.

Since 1 July 2005, the whole Baltic Sea area has been covered by land-based Automatic Identification System (AIS) stations, making the Baltic Sea the first region in the world capable of monitoring ship traffic in real-time, considerably increasing the safety of navigation. Fortunately, since the ‘Fu Shan Hai’ incident in 2003, resulting in the release of 1,200 tonnes of fuel oil, no major shipping accident has occurred in the Baltic Sea.

This chapter focuses on issues, in general terms, relating to the safety of navigation and on risks of shipping accidents. Accidental pollution is covered in Chapter **III**.

Overview of shipping accidents

There are some 120-140 shipping accidents in the Baltic Sea area annually (**Figure 6**) (HELCOM 2009a). The number of accidents has risen since 2006, which can be linked to the 20% increase in ship traffic (**Table 1**). The number of ships involved in accidents in the Baltic Sea represents around 16% of the European total for 2008 (754 vessels involved in 670 accidents) (EMSA 2009).

Almost all accidents occur very close to shore or in harbours (**Map 5**).

Cargo vessels are the main group of ships involved in accidents, followed by passenger ships and tankers (45%, 18% and 10%, respectively, in 2008). An almost identical share of different ship types in accidents can be observed for EU waters (EMSA 2009).

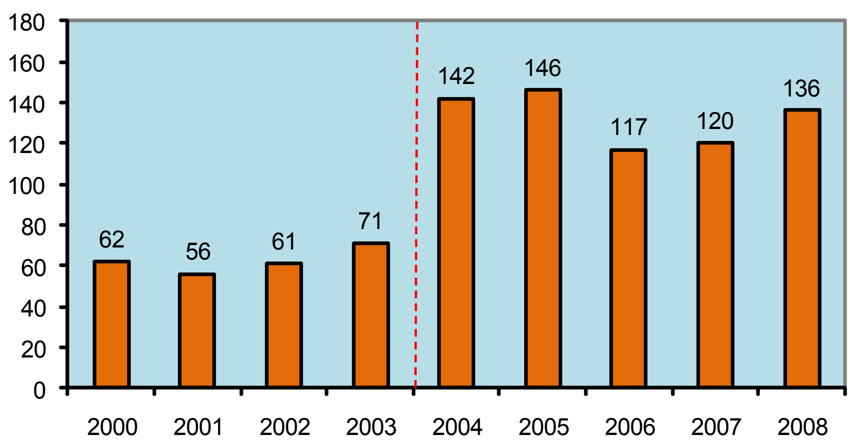
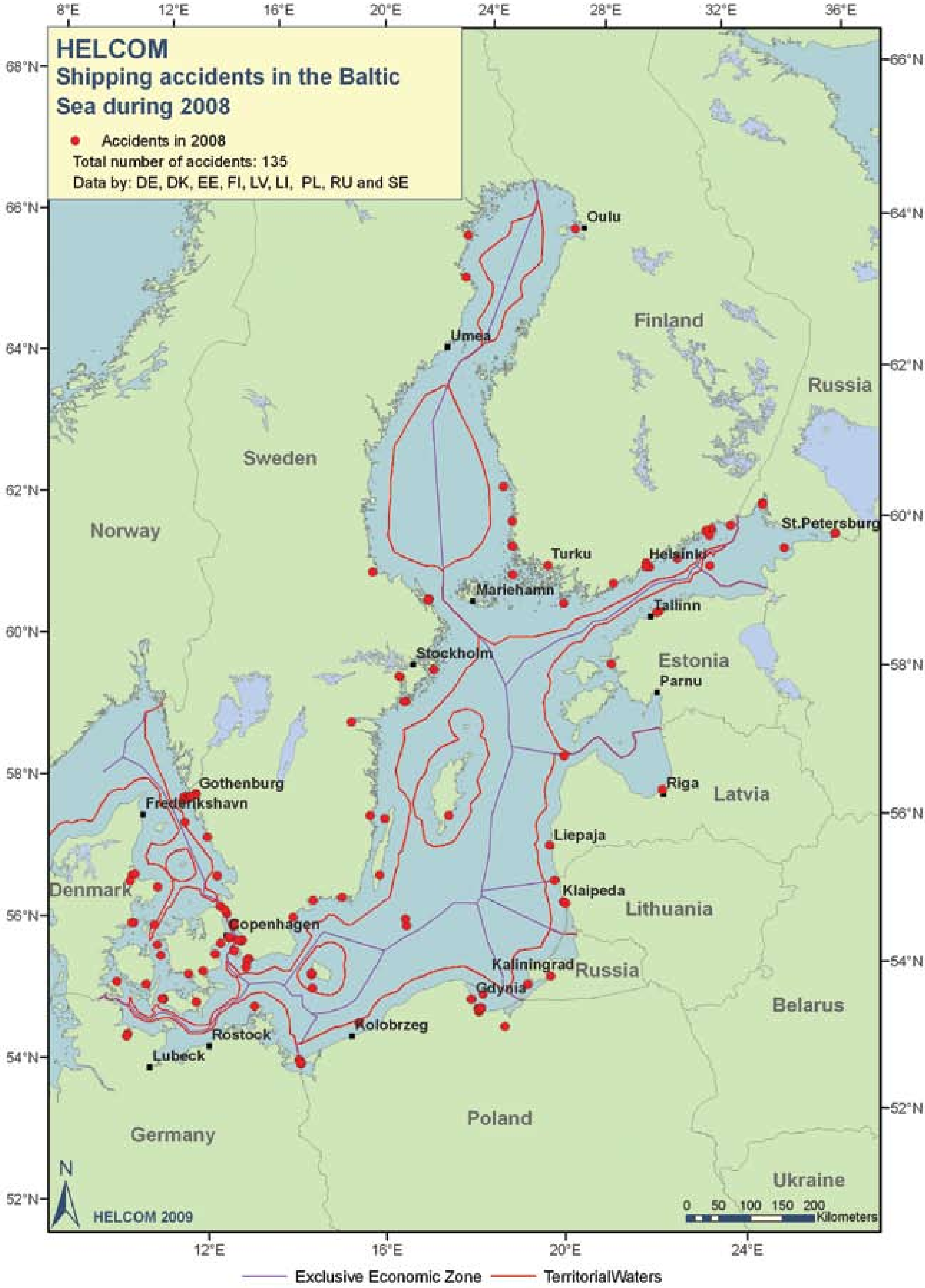
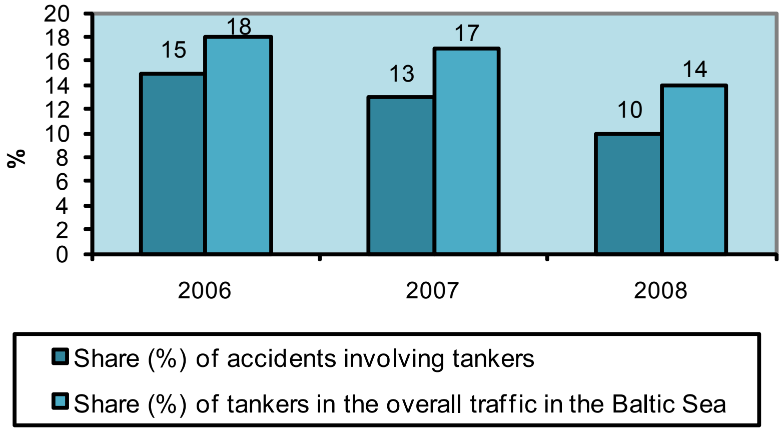


Figure 6. Number of shipping accidents in the Baltic Sea, 2000-2008. Data up to 2003 are not fully comparable with data for the following years due to a different reporting scheme.



Map 5. Spatial distribution of shipping accidents in the Baltic Sea, 2008.



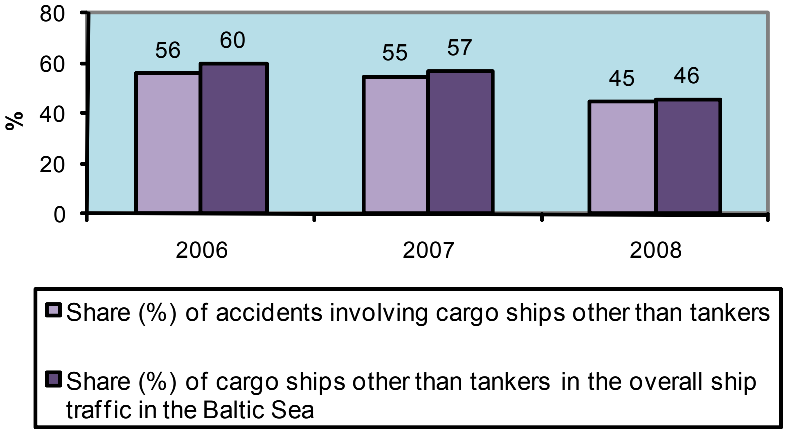


Figure 7 and 8. Share of tankers and cargo ships (other than tankers), respectively, in the total number of accidents and in the overall ship traffic in the Baltic Sea, 2006-2009. Ship traffic is reflected as the number of ship crossings through pre-defined AIS lines.

When comparing the share of different ship types in accidents and in overall ship traffic in the Baltic Sea, it can be noted that tankers make up around 14-18% of the overall traffic, while their share in accidents is 10- 15% (**Figure 7**). For other cargo ships the share in accidents and the overall traffic remains at the same level (**Figure 8**). A more sophisticated risk analysis would be needed to draw any final conclusions on which vessel groups pose the highest risks and why. None of the tankers involved in the polution accidents in the Baltic Sea over the years were single-hull tankers.

Almost half of the reported accidents in 2008 were the result of human factors, followed by technical and external factors (**Figure 9**).

Due to many shallow areas, especially in the Danish straits, the Baltic Sea is much more difficult to navigate than many other areas in Europe. This can be seen when comparing the share of groundings in the total number of accidents for the Baltic Sea and in European waters. In 2008, 60 groundings were reported by HELCOM countries (**Figure 10**), accounting for 44% of the total number of accidents, while in and around EU waters the share of vessels involved in groundings for the same year was 29% (EMSA 2009).

The majority of grounded vessels (65%) did not have a pilot onboard at the time of incident. On the other hand, small vessels with a draught of less than 7 metres accounted for 80% of the

groundings; small vessels are not covered by IMO's recommendations on the use of pilotage.

Some 58% of all groundings registered in 2000-2008 took place in the south-western Baltic Sea, including the Danish straits.

Collisions are the second most frequent type of shipping accidents in the Baltic Sea, amounting to 41 cases (30%) of all accidents in 2008 (**Figure 11**) and 288 cases (32%) for the period 2000-2008.

Ship to ship collisions accounted for 39% of all collision cases in 2008. The rest of the cases were collisions with fixed and/or floating structures, e.g. piers and navigation signs.

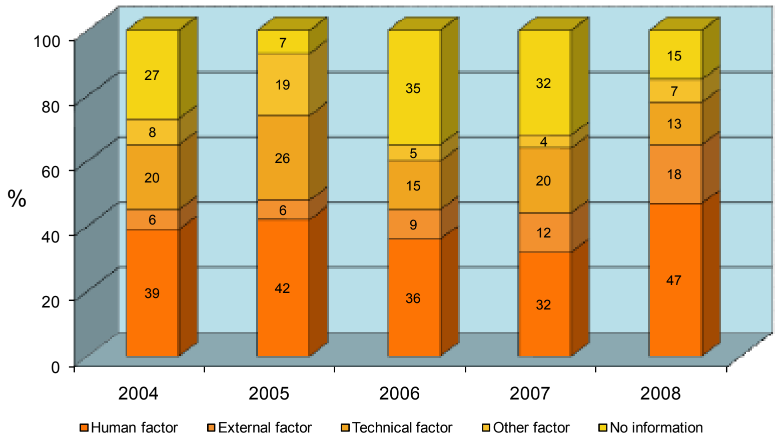


Figure 9. Causes of shipping accidents (%) in the Baltic Sea, 2004-2008.

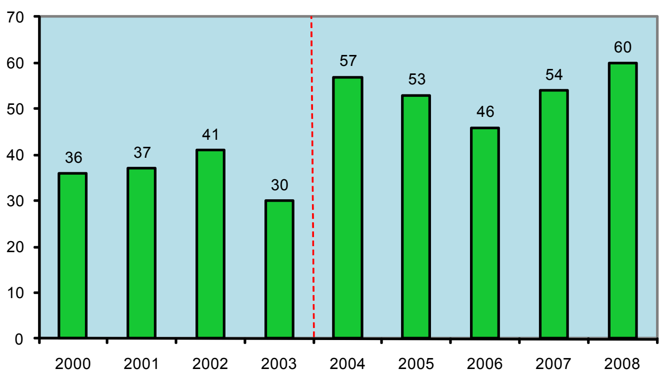


Figure 10. Number of ship groundings in the Baltic Sea, 2000-2008.

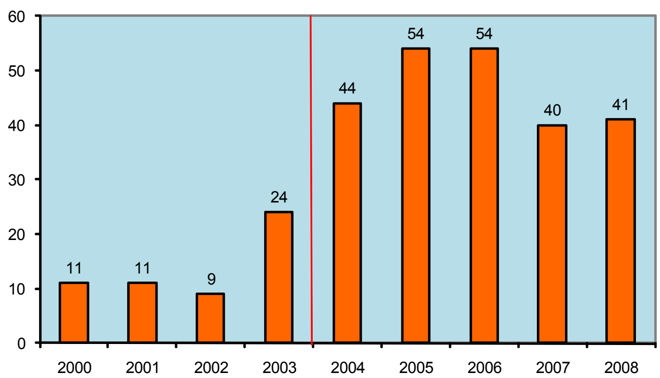


Figure 11. Number of ship collisions in the Baltic Sea, 2000-2008.

On a positive note, the number of ship to ship collisions has almost halved since 2005-2006, whereas the number of collisions with objects has remained largely unchanged (**Figure 12**).

Approaches to ports and the Danish straits are the most risky areas for ships to collide, while the number of incidents in the Gulf of Finland has substantially decreased (from 15 in 2005 to four in 2008).

Existing regulations and regional cooperation

The International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988 (SOLAS Convention) is generally regarded as the most important of all international treaties concerning the safety of merchant ships. The main objective of the SOLAS Convention is to specify minimum standards for the construction, equipment and operation of ships, compatible with their safety.

Regulations 20 and 21 of Annex I to the MARPOL Convention are also important as they set the phase-out schedule for single-hull tankers and introduce a ban on the carriage of heavy grades of oil by single-hull tankers. While some specific exemptions can be made from these regulations, parties to MAPROL Convention are, however, entitled to deny entry of a single-hull tanker which has been granted such an exemption into their ports.
Additionally, EC Regulation 1726/2003 on the accelerated phasing-in of double-hull tankers, requires that no oil tankers carrying heavy grades of oil, irrespective of its flag, shall be allowed to enter or leave ports or offshore terminals or to anchor in areas under the jurisdiction of an EU member state, unless such a tanker is a double-hull tanker.

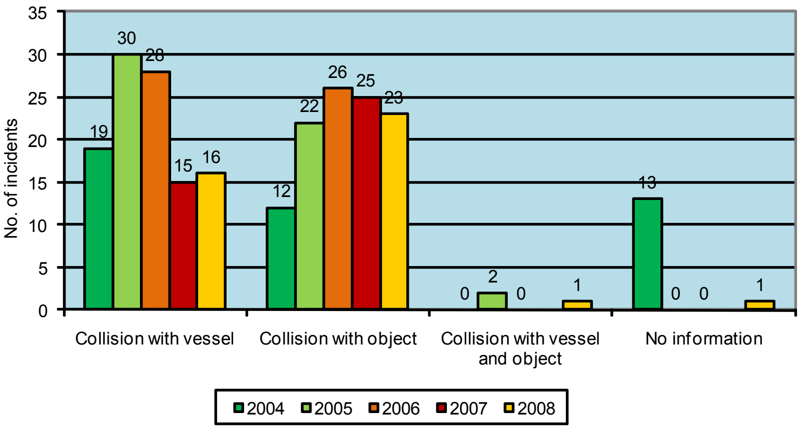


Figure 12. Types of ship collisions in the Baltic Sea, 2004-2008.

In 2009, the third maritime safety package was adopted by the EU. It includes a number of directives and regulations aimed at tightening safety regulations for ships flying an EU member state flag or navigating in European waters. The package includes measures on compliance with flag State obligations; common rules and standards for ship inspection and survey organizations; port State control; maritime casualty investigation; liability of passenger ships; insurance of shipowners for maritime claims; and vessel traffic monitoring. The measures will come into effect in 2010.

In addition to the number of IMO conventions dealing with safety of navigation, the Baltic Sea States have agreed on certain safety measures in the Baltic Sea area, including: ship traffic monitoring; ship routing systems including numerous traffic separation schemes and deep water routes; ship reporting; pilotage; and measures related to safety of winter navigation (HELCOM 2009b). The Mariners' Routeing Guide for the Baltic Sea has been prepared and is available in a form of a chart serving as a single source of navigational information for ships sailing in the Baltic Sea. The web-based version of the Mariners' Routeing Guide for the Baltic Sea is available at: **www.helcom.dk/map.**

Ship reporting systems

Four reporting systems are in force in the Baltic Sea area, out of which the following three are mandatory, requiring a ship to submit a report to the Vessel Traffic System (VTS) Centre:

- BELTREP in the Great Belt Traffic Area, applying to ships with a gross tonnage equal to or exceeding 50 GT, and all ships with an air draught of 15 metres or more;
- GOFREP in the Gulf of Finland, applying to ships with a gross tonnage equal to or exceeding 300 GT;
- GDANREP on the approaches to the Polish Ports in the Gulf of Gdańsk, applying to passenger ships certified to carry more than 12 passengers; ships with a gross tonnage

equal to or exceeding 150 GT; and all vessels engaged in towing.

IMO also recommends that large ships navigating the water of the Sound between Denmark and Sweden participate in the reporting service SOUNDREP.

Mandatory ship reporting systems have also been established nationally by the Baltic Sea States in approaches to oil terminals.

Deep water routes

A transit route (Route T) through the Kattegat, the Great Belt and the Western Baltic has been established for deep draught ships passing through the shallow entrances to the Baltic Sea. Seven other deep water routes have been established:

- DW Route 'Between Hatter Rev and Hatter Barn' for ships with a draught exceeding 13 metres;
- DW Route 'Off the East Coast of Langeland' for ships with a draught exceeding 13 metres;
- DW Route 'Kadetrenden' north–east of Gedser for deep draught ships;
- DW Route 'Off Gotland Island' for all ships passing east and south of the island of Gotland bound to or from the north-eastern part of the Baltic, with a draught exceeding 12 metres;
- DW Route 'Inside the borders of the TSS from Gogland Island to Rodsher Island' intended for the passage of ships with a draught up to 15 metres, including laden tankers sailing from Primorsk;
- DW Route 'Inside the borders of the North Åland Sea TSS'; and
- DW Route 'Inside the borders of South Åland Sea TSS' and 'Off Lågskär TSS'.

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Traffic separation schemes

Traffic separation schemes are established and adopted by IMO in the following parts of the Baltic Sea area:

Area in the Baltic Sea	Number of traffic separation schemes
In Samsø Belt/Great Belt	2
In the Sound	2
Off Kiel lighthouse	1
South of Gedser	1
North of Rügen	1
In Bornholmsgat	1
South of Öland Island	1
In the Gulf of Gdańsk	2
South of Gotland Island	1
Entrance to the Gulf of Finland	2
In the Gulf of Finland	5
North and South Åland Sea	2

Pilotage

Pilotage services are established locally by the coastal states. IMO recommends that when navigating the Sound, local pilotage services should be used by:

- loaded oil tankers with a draught of 7 metres or more;
- loaded chemical tankers and gas carriers irrespective of size; and
- ships carrying a shipment of irradiated nuclear fuel, plutonium and high-level radioactive wastes (INF cargoes).

IMO also recommends that when navigating Route T, established pilotage services should be used by large ships with a draught of 11 metres or more; and ships carrying a shipment of irradiated nuclear fuel, plutonium and high-level radioactive wastes (INF cargoes).

Certified Baltic deep sea pilots are available in all Baltic Sea States.

Safety of winter navigation

Adequate ice strengthening is required for ships sailing in ice according to HELCOM

Recommendation 25/7 on the safety of winter navigation in the Baltic Sea area. Information on ice conditions, traffic restrictions, icebreakers and other issues relevant to mariners navigating in during wintertime can be obtained from the website: www.baltice.org.

Additional information about ice conditions in the Baltic Sea countries can be obtained from the common website of the national ice services of the Baltic Sea States at: www.bsis-ice.de.

Implementation of the HELCOM Baltic Sea Action Plan

In the HELCOM Baltic Sea Action Plan, the Contracting Parties agreed, among others, to support IMO initiatives for introducing a general carriage requirement for the Electronic Chart Display and Information System (ECDIS) as early as possible, and to request IMO to develop a concrete time schedule. ECDIS can substantially improve safety of navigation.

Based on the support of also Baltic Sea countries, IMO adopted in 2009 the amendment to Chapter 5 of SOLAS regarding carriage requirements for shipborne navigational systems and equipment under which, cargo ships, tankers and passenger ships engaged in international voyages shall be fitted with an ECDIS according to the specific timetable (**Annex 1**). The SOLAS amendments should be deemed to have been accepted on 1 July 2010 and should enter into force on 1 January 2011. The new regulations mean that a majority of the ships in the Baltic Sea will be carrying ECDIS onboard by 2018 at the latest.

Progress has also been achieved regarding the development of new AIS binary messages. While their use is not mandatory on ships, they can carry additional information of great value to ships and shore authorities.

Based on the experience of the Baltic Sea region and the results of the HELCOM supported Baltic AIS Trial Project (AISBALTIC), a proposal for amendments to the binary messages - now called AIS application-specific messages - was made to IMO, as required by the HELCOM BSAP. In 2009, IMO approved, in principle, a new SN circular on the Guidance on the use of AIS application-specific messages, which is expected to be adopted by the Maritime Safety Committee in 2010.


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Chapter III: Accidental pollution

Although most of the shipping accidents in the Baltic Sea do not result in any pollution, the risk of a major spillage of oil or hazardous substances is profoundly present. Big tankers, carrying as much as 100,000 – 150,000 thousands tones of oil, are particularly the focus of attention.

At the global level, the number of oil spills from tankers has decreased from 25.5 spills per year on average in the 1970s to 3.3 spills per year this century; further, the quantities of oil spilled from tankers has decreased (www.itopf.com).

It is not only tankers that can be a source of oil pollution since other types of ships carry large quantities of bunker fuel as well. Accidental spills of hazardous substances that are transported as cargo are also a threat, especially as they are much more difficult to combat.

While there is a need to constantly increase the safety of navigation in the Baltic Sea, the risk of accidental spills can never be eliminated. For this reason, the Baltic Sea countries cooperate to enhance their readiness to effectively respond to pollution at sea and to improve their emergency and response resources.

Overview

As mentioned, the number of shipping accidents in the Baltic Sea is increasing. On average, 7% of these accidents resulted in some kind of pollution, usually containing not more than 0.1-1 tonnes of oil. The number of pollution incidents varies between the years, from zero in 2002 to nine in 2008 (**Figure 13**). There have been no major oil spills in the Baltic Sea since 2003.

In 2008, nine out of 135 accidents reported by the HELCOM countries resulted in spillage of approximately 6.5 tonnes of different types of oil, including diesel oil, crude oil and mazut (HELCOM 2009a).

Environmental impact

Despite the increasing preparedness of HELCOM Contracting Parties, a major oil spill would likely have severe impacts both in the offshore as well as coastal areas. However, the exact consequences are difficult to predict as the impact mostly depends on the size of the spill; the type of oil; the weather and sea conditions; and, more importantly, the location and season. The impact is also generally more severe if the oil reaches the shore; further, crude oil or heavy oil presents a more lasting hazard compared to easily evaporating light oil such as diesel oil.

Environmental impacts closer to the shore are easier to observe and monitor while impacts throughout the offshore areas are easier to quantify. Of all casualties among the wildlife, such as seabirds, only a fraction is usually offshore. Marine mammals and turtles are usually less impacted.

Assessing the possible environmental effects of a worst case oil spill scenario in the Baltic Sea can only be made by looking at the consequences of

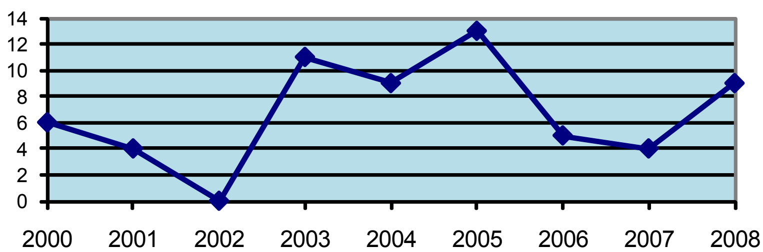

Figure 13. Number of shipping accidents resulting in pollution, 2000-2008.

Recent major pollution accidents in the Baltic Sea:

- 1990 ‘Volgoneft’, 700-800 tonnes of waste oil; nearly all oil recovered at sea
- 2001 ‘Baltic Carrier’, 2,700 tonnes of oil; around 50% of oil recovered at sea
- 2003 ‘Fu Shan Hai’, 1,200 tonnes of fuel oil; around 1,100 tonnes of oil recovered at sea

accidents elsewhere in the world. As an example, the major oil accident (>30.000 tonnes leaked) of M/T Prestige in the Atlantic coast of Spain in 2002 caused a significant short-term reduction in the phyto- and zooplankton biomass, a reduced abundance and species richness of littoral invertebrates and fish reproduction. It also killed or harmed about 200,000 sea birds and a few sea turtles. Some other studies demonstrated a significant egg and adult mortality of peregrine falcons. In the Baltic, cascading ecosystem effects of oil, from phytoplankton to higher trophic levels, are poorly known; however, it is expected to be harmful due to decreased food availability resulting in an increased bioaccumulation of toxic chemicals of types other than carbohydrates in the oil spill itself.

Existing regulations and regional cooperation

The Baltic Sea countries maintain the ability to respond to pollution incidents threatening the marine environment, including adequate equipment, ships and manpower prepared for operations in coastal waters as well as on the high sea.

Principles, rules and operational procedures for joint international response operations have been put in place by HELCOM, including a reporting system on accidental spills, requesting and providing assistance as well as solving related financial issues.

Due to the sensitive ecological condition of the Baltic Sea area, HELCOM countries agreed that response to oil should take place by the use of mechanical means as far as possible. Response by using dispersants should be limited, sinking agents should not be used at all and absorbents only when appropriate.

Today, the HELCOM fleet has more than 48 oil-combating ships on standby, including three oil spill recovery vessels chartered by the European Maritime Safety Agency (EMSA) to top-up the available response resources.

There are two major IMO conventions dealing with pollution-related shipping incidents. The 1990 International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC) has been ratified by all HELCOM countries. The 2000 Protocol on Preparedness,

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Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol) has been ratified by five HELCOM countries.

Additionally, a system of international liability and compensation conventions has been developed over the years to enable the recovery of certain damage and operation costs related to pollution from ships, predominately oil tankers. The ratification status of the international IMO conventions related to compensation and liability by the Baltic Sea countries is presented in **Annex 2**.

Implementation of the HELCOM Baltic Sea Action Plan

Assessment of the risk of pollution from ships

Substantial resources to respond to pollution at sea do exist in the Baltic Sea region. To date, however, no comprehensive Baltic-wide analysis has been carried out to confirm whether the existing emergency and response capacities are sufficient to tackle major spills of oil or hazardous substances. Such an analysis is required by the HELCOM Baltic Sea Action Plan and HELCOM Recommendation 28E/12 on sub-regional cooperation in response field and will be done within the BRISK Project (Sub-regional risk of spill of oil and hazardous substances in the Baltic Sea).

Based on the risk assessment, the Contracting Parties are required by the HELCOM BSAP to identify gaps in emergency and response resources at the sub-regional level, and prepare concrete programmes for fulfilling them by 2013 for pollution by oil, and by 2016 for response to accidents involving hazardous substances. Identifying such gaps is also part of BRISK.

The BRISK Project is co-financed by the European Regional Development Fund within the Baltic Sea Region Programme 2007-2013 (approx. EUR 2.5 million) and will be run until 24 April 2012.

BRISK

Baltic Sea Region
Programme 2007-2013

Part-financed by the European Union (European Regional Development Fund)

Places of Refuge

The HELCOM Baltic Sea Action Plan puts an obligation on the Contracting Parties to develop by 2009 and implement by 2010 a mutual plan for places of refuge, and to investigate the related issues of liability and compensation. Such a mutual plan for places of refuge has been developed as a new HELCOM Recommendation.

A Mutual Plan for Places of Refuge is an agreement among the Baltic Sea countries to provide a basis for considering, due to some specific circumstances, the granting of a place of refuge to a ship in a response zone of a country other than the one in which the need of assistance originally started; this means that the best shelter could be granted to a ship irrespective of countries' borders.

According to the Recommendation, a place of refuge can be requested from a neighbouring country due to lack of adequate shelter in the vicinity of an accident or unfavourable weather conditions. Financial or commercial reasons cannot be the basis for such a request, neither can a lack of response resources.

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The Recommendation also aims at creating a harmonised liability and compensation regime in the whole Baltic Sea region, whereby possible damage costs related to a place of refuge situation could be, to the fullest possible extent, recovered from the international liability and compensation funds.

Oiled wildlife response

Major progress has also been achieved within HELCOM, in cooperation with Sea Alarm and WWF Finland, to put an international policy framework in place for cooperation and mutual assistance in oiled wildlife response, as agreed in the HELCOM Baltic Sea Action Plan.

A new HELCOM Recommendation setting the standards for the planning of oiled wildlife response has been developed. The draft Recommendation specifies how HELCOM countries should put an integrated wildlife response plan in place as part of the overall contingency plan, either at a national or sub-national/local level to guarantee the coordinated conduct of response; the swift mobilization of resources; the use of appropriate rehabilitation and health and safety protocols if rehabilitation is decided; and the likelihood of successful claim to international compensation funds.

Additionally, HELCOM procedures for international oil spill response operations, included in the Response Manual, have been amended to enable mutual assistance when dealing with major oiled wildlife incidents. Through the use of the standard Pollution Reporting System, HELCOM countries can now request the assistance of equipment, as well as trained personnel and volunteers to deal with oiled wildlife from neighbouring countries.

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Chapter IV: Illegal pollution

All ships entering the Baltic Sea need to comply with the anti-pollution regulations of the Helsinki Convention and MARPOL Convention, including those resulting from the designation of the Baltic Sea area as a Special Area for the prevention of pollution by oil (Annex I of MARPOL) and garbage (Annex V). Even though strict controls over ships discharges have been established by the Baltic Sea countries, illegal spills and discharges continue to happen.

Overview

The number of detected oil spillages in the Baltic Sea has been decreasing over the past years, even though the density of shipping has rapidly grown and aerial surveillance in the countries has increased (**Figure 14**). Until 2009, there had been more than 200 illegal oil spills from ships observed each year; fewer spills were detected during 2009 (HELCOM 2010). The following statistics only include detections made by surveillance aircraft; they not take into account observations made by other means (e.g. helicopters or ships), from land or by leisure boaters and are thus underestimated.

The size of slicks is also declining - today, the majority are smaller than a cubic metre, or even less than 100 litres (**Figure 15**).

Most of the illegal oil discharges are detected along major shipping routes (**Map 6**).

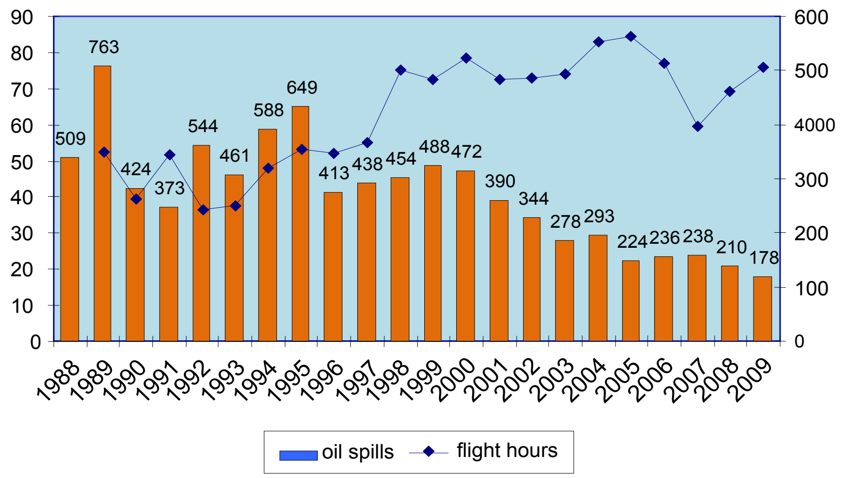


Figure 14. **Total number of surveillance flight hours by HELCOM countries and observed illegal oil spills in the Baltic Sea, 1998-2009.**

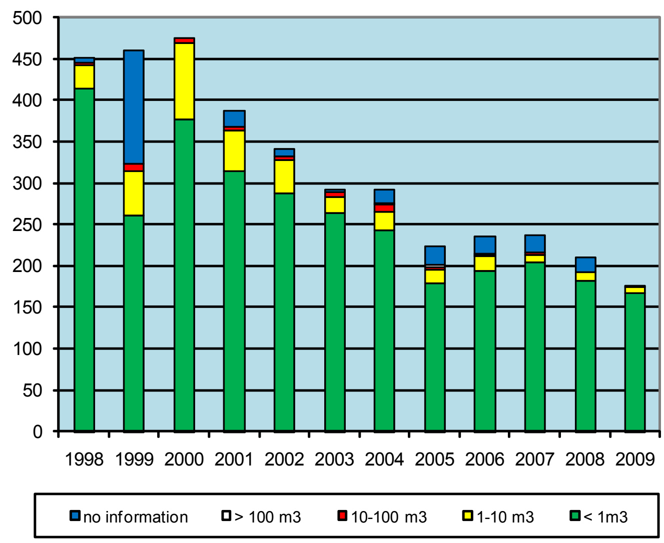
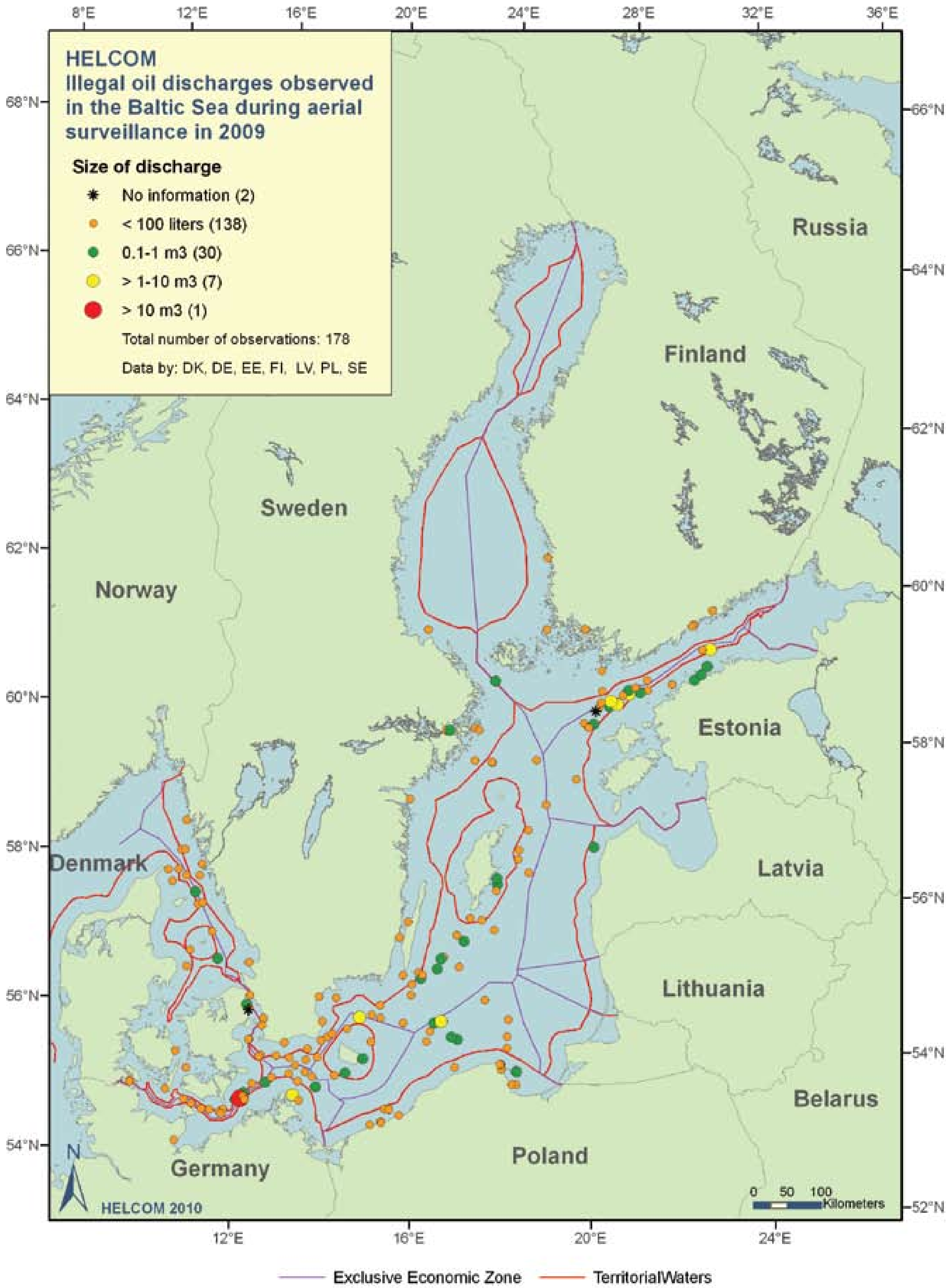


Figure 15. **Illegal oil discharges by spill size during aerial surveillance in the Baltic Sea, 1998-2009.**



Map 6. **Spatial distribution of illegal oil spills observed during aerial surveillance by HELCOM countries, 2009.**

No data exists on illegal discharges of other types of pollution from ships in the Baltic Sea as these are much more challenging to monitor. However, this does not imply that there is no control over these discharges, as other means, like port State control, are used by the Baltic Sea countries to ensure law enforcement and ship compliance with anti-discharge regulations.

Evidence of other pollution, like garbage or marine litter, can be visible in the sea. As there are various possible sources of marine litter, it is usually very difficult to attribute it to any specific human activity, including shipping. Marine litter enters the sea from both land-based sources (e.g. tourism and recreational use of the coasts, fishing by the rivers and intentional waste dumping) and from ships (commercial shipping and pleasure craft) as well as other installations at sea.

The magnitude of the marine litter problem is generally assumed to be somewhat smaller in the Baltic compared to, e.g. the North Sea. However, due to the absence of any regular monitoring, the factual basis of this overview is difficult to determine. According to a literature review conducted in 2007 (HELCOM 2007a), some 20 items on average are found per 100 m stretch in the Baltic Sea, even if some areas are more heavily littered reaching densities similar to the North Sea coasts of 1,000 items per 100 m. In the Baltic, as elsewhere in the world, traces of plastic microfibers have been found to be abundant. The origin of such micro-particles, as that of marine litter in general, is difficult to determine.

Environmental impact

Although most oil spills detected in the Baltic are fairly small illegal or accidental spills, their cumulative effects are, however, significant. Smaller floating concentrations of oil can have direct harmful impacts: oiled birds and mammals suffer from hypothermia or intoxication. According to some estimation (BirdLife International 2007), 100,000–500,000 ducks, guillemots and other bird species are estimated to die annually due to these small oil spills. Further, in a study published in 2005 (Pikkarainen & Lemponen 2005), total hydrocarbon concentrations between 0.13 and 1.8 µg/L were detected in the Baltic Sea water from the Arkona Basin to Bothnian Bay. The highest concentrations were detected in the Gulf of Finland and northern and central Baltic Proper. The effects of such background concentrations are diverse and might be significant in the long term through bioaccumulation and sedimentation.

Plastic particles, whether microscopic or larger, can have a range of effects on the marine life. As an example of the effects of larger particles, various species, like fish-catching birds, are worldwide commonly found dead with plastic particles in their stomachs. Recent studies have discovered that plastic micro-particles, like those found in Baltic seawater, enter to and accumulate in animals such as blue mussels and may thus have significant food-web consequences (Browne et al. 2008).

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Existing regulations and regional cooperation

Ship-generated waste

In accordance with the MARPOL Convention, far-reaching prohibitions and restrictions on any discharge into the sea of oil or oily mixtures have been introduced by the Baltic Sea States. The prohibition of oil discharges applies not only to discharges from the cargo tanks of oil tankers but equally to discharges from the machinery spaces of any ship. Only if the oil content in the effluent does not exceed 15 parts per million can a discharge be permitted. For ships of 400 gross tonnage and above, the oil filtering equipment must be provided with arrangements ensuring that any discharge of oil or oily mixtures is automatically stopped when the oil content in the effluent exceeds 15 parts per million.

Ships of less than 400 tonnes gross tonnage, flying the flag of a Baltic Sea State, should comply with the adopted HELCOM guidelines[1] concerning holding tanks/oily water separating or filtering equipment.

The discharges of noxious liquid substances are also strictly regulated. There is a prohibition on discharges from tanks that have contained Category X, Y or Z substances, specified by IMO's International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC Code). This categorises noxious liquid substances (NLS) carried in bulk according to their magnitude of harm to the marine environment if discharged, unless specific provisions of Annex II 'Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk' to the MARPOL Convention are met.

Tanks having contained Category X substances must be pre-washed before a ship leaves the port of unloading and the resultant tank washings delivered to a reception facility. The concentration of the substance in the effluent to the facility must be at or below 0.1% by weight and the tank must be fully emptied.

For high-viscosity or solidifying substances in Category Y, the specified pre-wash procedure must be applied and the residue discharged to a port reception facility until the tank is empty.

The cargo residues in Category Y or Z must be removed to specified small quantities and any tank washings must be discharged to a reception facility of the port of unloading or another port with a suitable reception facility, provided that it has been confirmed that a reception facility at that port is available and is adequate for such a purpose. The eventual discharge of any residues of substances in Category X, Y or Z into the sea must comply with specific provisions for each substance category on the speed of the ship, discharge below the waterline, distance from the nearest land and depth of water.

The discharge of sewage from ships is prohibited within 12 nautical miles of the nearest land unless sewage has been comminuted and disinfected using an approved system, and the distance from the nearest land is more than three nautical miles. When discharging from a sewage holding tank, the discharge must, in any case, be at a moderate rate and the ship must be proceeding en route at a minimum speed of four knots. Only if an approved sewage treatment plant (according to IMO requirements) is used onboard can the discharge take place anywhere in the Baltic Sea.

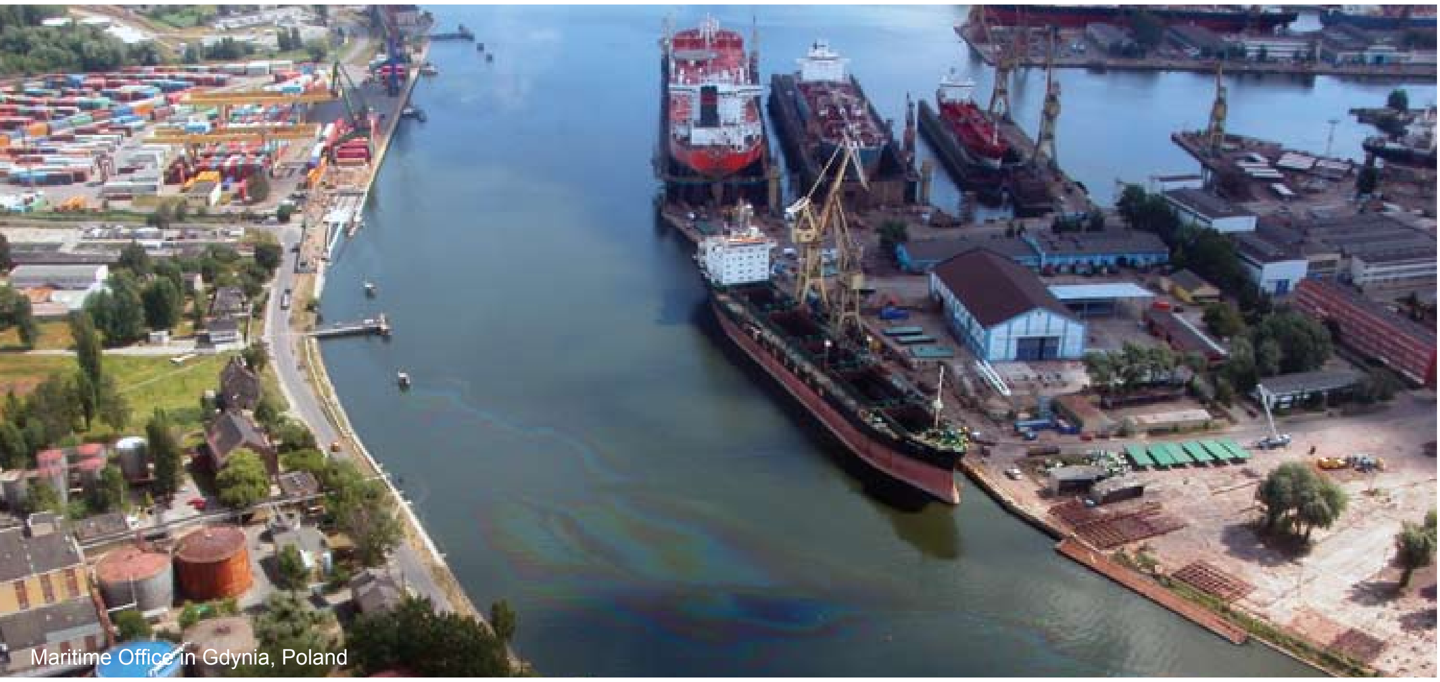
The discharge of garbage is prohibited; food wastes, however, may be discharged but no less than 12 nautical miles from the nearest land.

There is also a general ban on dumping and incineration of other wastes in the entire Baltic Sea area - not incidental to or derived from the normal operation of ships. Dumping means any deliberate disposal at sea of wastes or other matter from ships, or any deliberate disposal of ships at sea. The prohibition of dumping does not apply to the disposal of dredged materials at sea, provided specific provisions are complied with.

Ships flying the flag of a Baltic Sea State should have onboard garbage retention appliances suitable for the collection and separation of garbage.

All the discharge regulations, described above, apply equally to small ships, including fishing

[1]HELCOM Recommendation 19/10 'Application by the Baltic Sea states of guidelines for holding tanks/oily water separating or filtering equipment for ships of less than 400 tons gross tonnage'.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vessels, working vessels and pleasure craft. This includes small ships fitted with a toilet which must comply with the sewage discharge regulations of Annex IV to the MARPOL Convention and be able to connect to sewage reception facility pipes. Small ships built before 1 January 2000 can be exempted by the Baltic Sea countries from this obligation if the installation of toilet retention systems in these ships is technically difficult, or the cost of installation is high compared to the value of the ship.

All ships, with some exceptions, are under an obligation to deliver to a port reception facility, before leaving the port, their ship-generated wastes and cargo residues that cannot be legally discharged under the global MARPOL Convention, or under the Helsinki Convention. Exemptions can be granted from mandatory discharge of all waste to a port reception facility taking into account the need for special arrangements, e.g. passenger ferries engaged in short voyages.

According to MARPOL and the Helsinki Convention, the Contracting Parties shall ensure the provision of adequate facilities at ports and terminals for the reception of oily waste from machinery spaces, garbage and sewage.

According to Regulation 6 of Annex IV of the Helsinki Convention, in case of inadequate reception facilities, ships shall have the right to properly stow and keep wastes onboard for delivery to the next adequate port reception facility. The port Authority or the Operator shall provide a ship with a document informing on the inadequacy of reception facilities.

To eliminate illegal discharges and encourage the delivery to shore facilities of ship-generated wastes, including sewage as of 1 January 2006, HELCOM has established a 'no-special-fee' system[2] for the use of port reception facilities. Under this system, ships are not charged for using such reception facilities; costs are instead recovered from general harbour fees or general environmental fees, for instance.

The above HELCOM requirements addressing pollution by ship-generated waste are commonly known as the Baltic Strategy (the Strategy for Port Reception Facilities for Ship-generated Wastes and Associated Issues).

Surveillance for spills

Cooperation on aerial surveillance within the Baltic Sea area has been established within the framework of the Helsinki Convention, which requires the Contracting Parties to take

[2]HELCOM Recommendation 28E/10 'Application of the no-special-fee system to ship-generated wastes and marine litter caught in fishing nets in the Baltic Sea area'.

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measures to conduct regular surveillance outside their coastlines, and to develop and apply, individually or in cooperation, surveillance activities covering the Baltic Sea area in order to spot and monitor oil and other substances released into the sea.

The purpose of aerial surveillance is to detect spills of oil and other harmful substances which can threaten the marine environment. If possible, the identity of a polluter should be established and a spill sampled from both the sea surface and onboard the suspected offender.

Further, HELCOM Recommendation 12/8[3] recommends that the Contracting Parties take actions to cover the whole of the Baltic Sea area with regular and efficient airborne surveillance, develop and improve the existing remote sensing systems and coordinate surveillance activities which take place outside territorial waters.

Apart from regular national surveillance, the Baltic Sea countries jointly undertake Coordinated Extended Pollution Control Operation (CEPCO) flights to monitor main shipping routes. Two such operations are normally arranged annually. During CEPCO flights, several HELCOM countries jointly carry out continuous aerial surveillance activities for 24 hours or more along predetermined routes in areas where operational spills are likely. In 2009, a Super CEPCO operation was held instead, during which aircraft from several countries surveyed the sea area for six days.

CEPCO flights are also planned to support national aerial surveillance activities by detecting illegal discharges which would not be disclosed by routine national flights. This enables a realistic estimation of the total number of oil spills discharged into the Baltic Sea during one randomly selected day.

Additionally, the Baltic Sea is covered by satellite surveillance within the CleanSeaNet satellite service of EMSA. The satellite images are delivered in near real time to provide the first indication of possible oil slicks to be checked by aircraft on a spot.

Implementation of the HELCOM Baltic Sea Action Plan

The HELCOM Baltic Sea Action Plan requires the Contracting Parties to further enhance satellite and aerial surveillance to cover the whole Baltic Sea area to improve the detection of illicit spills by ships.

Most Baltic Sea countries conduct national surveillance and there is a constant improvement in the equipment. In total, 5,046 surveillance flight hours were carried out by the Baltic Sea countries in 2009, which is 10% more than the year before (**Figure 14**).

In 2009, for the first time in the Baltic Sea, a Super CEPCO operation was organised. The operation revealed only three minor oil spills during six days of continuous aerial surveillance over a large area of the Baltic Sea between Gotland and the Gulf of Finland.

Satellite images delivered to the Baltic Sea countries by EMSA are of great value for the efficient use of limited surveillance resources. Altogether, EMSA provided 608 satellite scenes for the Baltic Sea countries in 2009, indicating 280 possible oil spills; 163 (58%) were verified by aircraft, of which 34 (21%) were confirmed as being mineral oil. The Baltic Sea region has one of the highest rates of verifications and feedback on satellite oil spill indications.

[3]HELCOM Recommendation 12/8 ‘Airborne surveillance with remote sensing equipment in the Baltic Sea area’.

The best way to evaluate the number of illegal oil discharges is to reflect it as a 'Pollution per Flight Hour (PF) Index', which compares the total number of observed oil spills to the total number of flight hours. A decreasing PF Index over the years indicates less oil spills or/and increased surveillance activity. The PF Index for the Baltic Sea is showing a decreasing trend over the years (**Figure 16**).

It is difficult to prosecute the ship responsible for illegal discharging activities. In a vast majority of cases of detected illegal discharges, the polluters remain unknown. In 2009, out of the total number of confirmed illegal discharges (178) as few as in eight cases (4.5%) the polluters were identified. In 2008, this number was higher at 21 cases out of a total of 210 spills. The identification of ships suspected of illegally discharging oil into the sea is facilitated by the Seatrack Web oil drift forecasting system developed within HELCOM. This tool, in combination with AIS, is used for backtracking and forecasting the simulation of detected oil spills, and matching the ship tracks with an oil spill backtracking trajectory. The tool has also been integrated with satellite information to increase the likelihood that the polluters would be identified.

The Contracting Parties also agreed in the HELCOM BSAP to enhance the availability of adequate reception facilities for ship-generated wastes and the mandatory delivery of waste. The increased use of port reception facilities can be illustrated by comparing the amount of the delivered waste to the number of calls at ports. The increasing trend indicates a positive development.

Figure 17 illustrates the ratio between the amount of garbage delivered to PRF and the total number of calls by ships in ports of five Baltic Sea countries (no data is available for the remaining countries). In three countries, there is an increase in the amount of garbage delivered; in one country, a slightly decreasing trend can be observed (no trend can be determined for the fifth country due to the short data set).

The values themselves should not to be compared between the states due to the different nature of ship traffic in the ports and different units (m3 and tonnes).

The ratio between the amount of sewage delivered to PRF and the number of passenger ship calls in ports of four HELCOM countries (for which data are available) is presented in **Figures 18** and **19**.

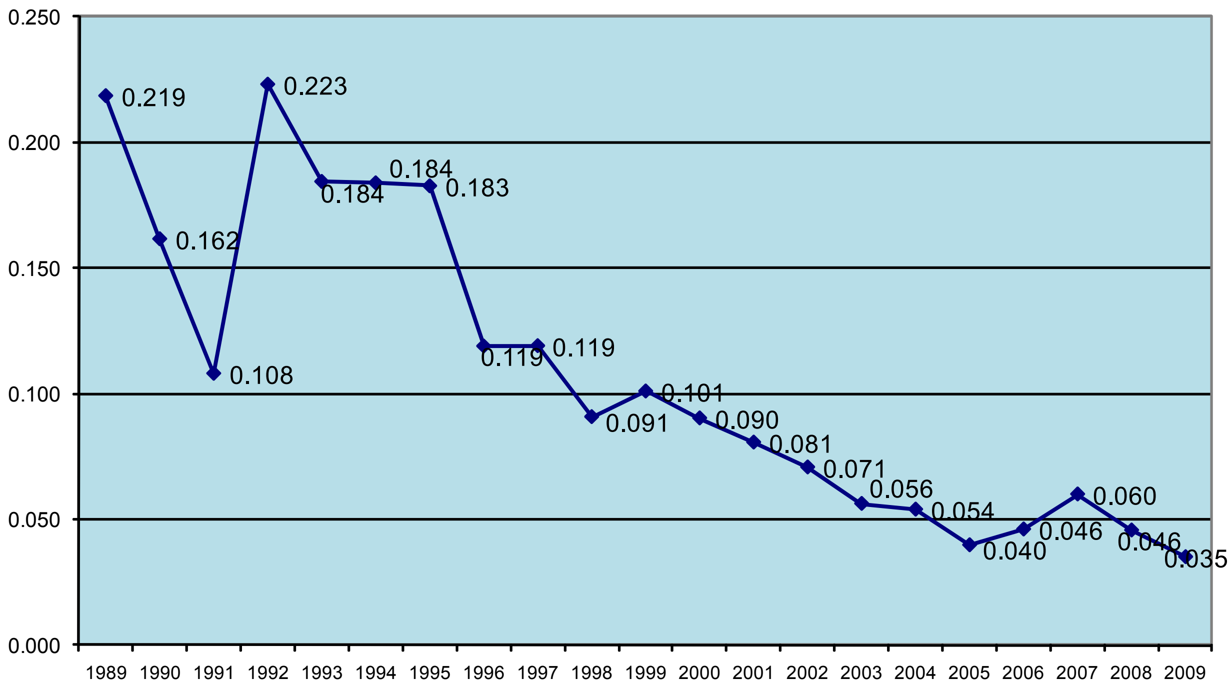


Figure 16. **Pollution per Flight Hour Index for the Baltic Sea, 1989-2009.**

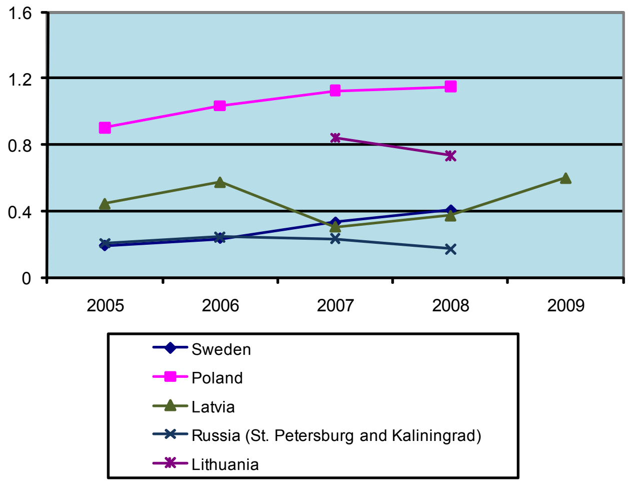


Figure 17. Comparison of the amount of garbage delivered to ports in Sweden, Poland, Latvia, Russia (St. Petersburg and Kaliningrad), and Lithuania to the total number of calls at these ports.

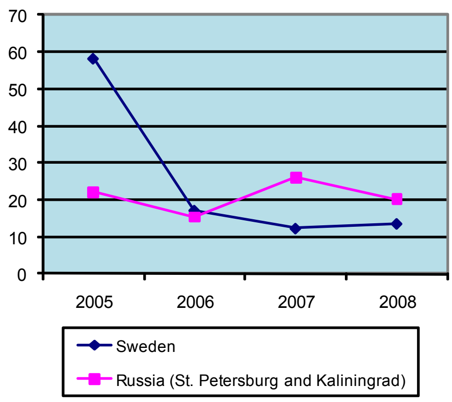


Figure 18. Comparison of the amount of sewage delivered to ports in Sweden and Russia to the total number of passenger ship calls at these ports, 2005-2008.

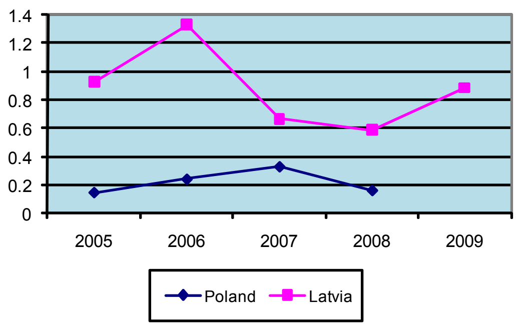


Figure 19. Comparison of the amount of sewage delivered to ports in Poland and Latvia to the total number of passenger ship calls at these ports, 2005-2009.


Maritime Office in Gdynia, Poland

Chapter V: Emissions

The normal operation of a ship creates pollution through exhaust gas emissions. The main pollutants concerned are nitrogen oxides (NOx) and sulphur oxides (SOx). In addition, the released carbon dioxide (CO_2) contributes to global climate change. NOx is emitted to the air mainly from the operation of diesel engines, while SOx emissions result from the combustion of marine fuels and directly depend on the sulphur content of the fuel.

Annex VI to the MARPOL Convention is the global instrument regulating emissions from merchant ships. Some major revision of Annex VI has taken place recently, which will result in cuts in emissions of NOx and SOx. Especially, emissions of sulphur oxides in marine regions designated as a SOx Emission Control Area (SECA) – like the Baltic Sea - will be reduced significantly and will result in an improvement of air quality and reduced health risks in coastal areas within the next couple of years.

A cut in NOx emissions from ships in the Baltic Sea required by the revised Annex VI, however, will be much less significant. This will not be sufficient to counterbalance the increasing emissions related to the predicted growth in maritime transportation unless the Baltic Sea is designated as a NOx Emission Control Area.

There has been increasing global calls to combat CO_2 emissions from maritime traffic in line with other industrial sectors through, e.g. a revision of the United Nations Framework Convention on Climate Change (UNFCCC). The international community is still undecided on the issue. Regardless of the fate of these negotiations, other regional Baltic Sea measures on, e.g. NOx and SOx, will also have an effect in terms of GHG reductions, albeit limited.

Overview

Nitrogen oxides emissions from ships in the Baltic Sea reached 393,000 tonnes in 2008 (**Figure 20**), and are comparable to the combined land-based NOx emissions from Finland and Sweden (Jalkanen & Stipa 2009). The emissions of NOx seem to be levelling off after a strong increase in 2006-2007, probably due to the global financial crisis and smaller volumes of cargo transported.

Around 40% of the NOx emission comes from new ships, built after 1.1.2000. Ships built in the 1990s and 1980s produce ~23% and ~17% of the NOx emissions, respectively.

Based on the share in the total number of ships, it can be concluded that the share of NOx emissions from passenger ships, ro-ro ships and tankers in the total NOx emissions is relatively higher than from other ships (**Figure 21**) (IMO 2008a).

In 2008, more than a half (52%) of the annual NOx emissions were generated by ships flying the flags of the HELCOM countries; 16% from vessels flying a flag of EU Member States from outside the HELCOM area; and a third (32%) came from ships under other countries' flags (Jalkanen & Stipa 2009).

The geographical distribution of NOx emissions is presented in **Map 7**.

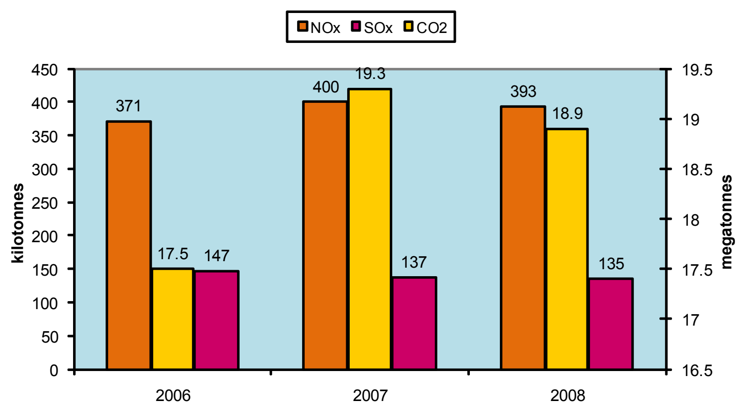


Figure 20. **Annual emissions of NOx, SOx (in kilotonnes) and CO_2 (in megatonnes) from shipping in the Baltic Sea, 2006-2008. Source: Finnish Meteorological Institute.**

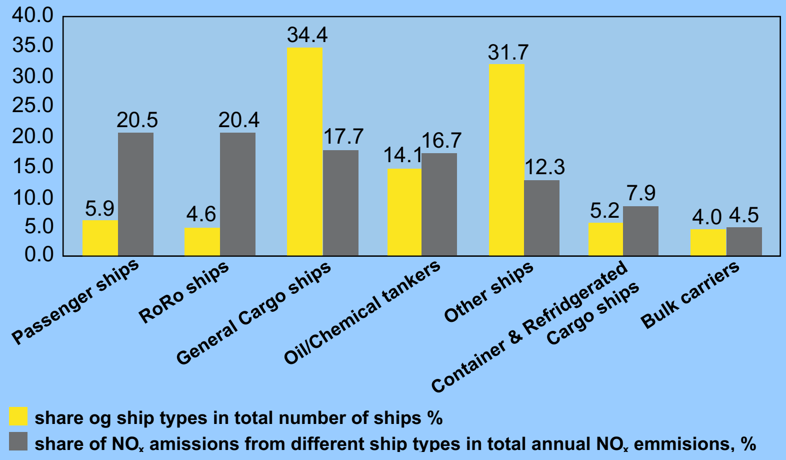
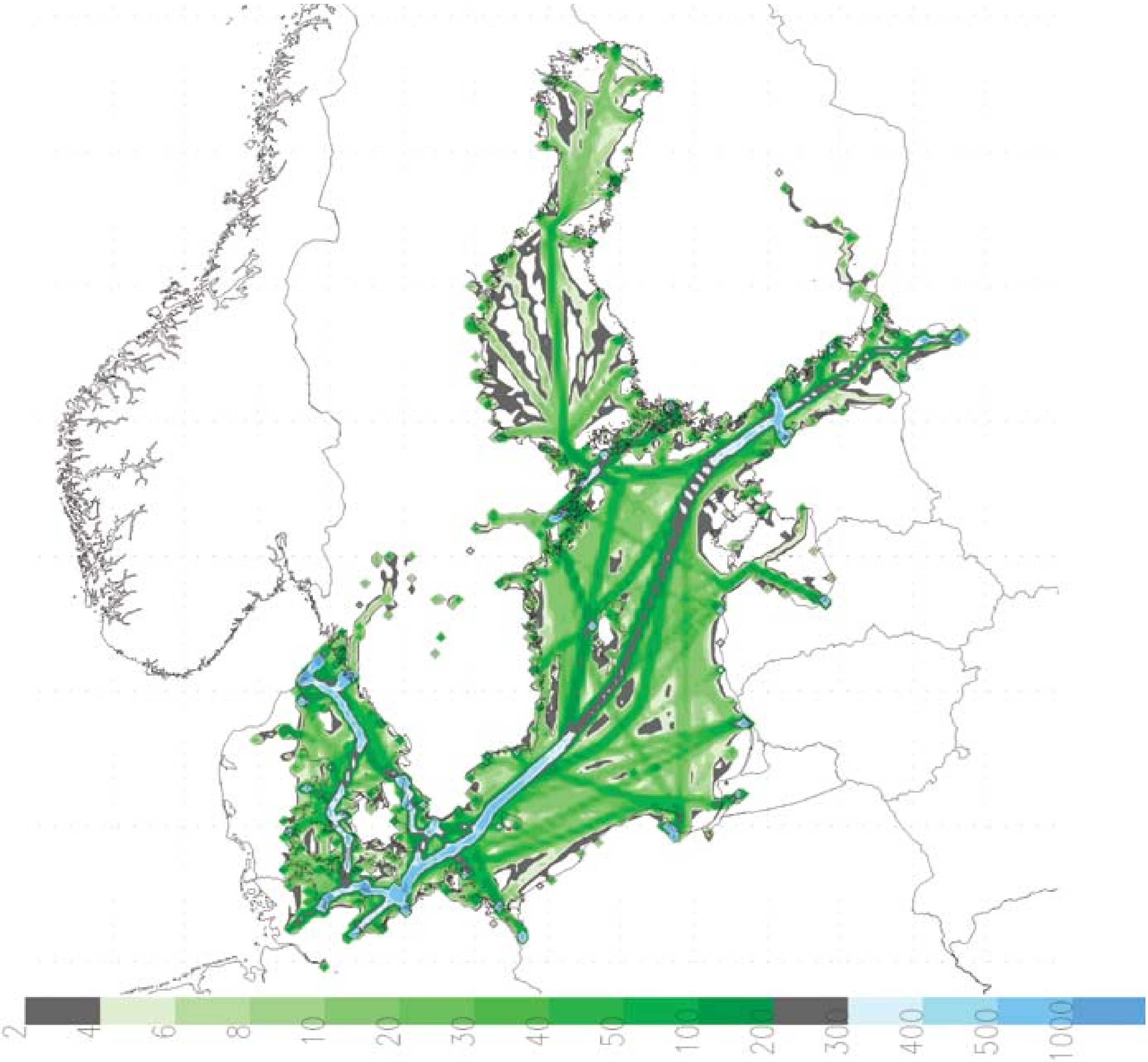


Figure 21. **Shares of total NOx emissions by ship type, compared to ships' share in the traffic in the Baltic Sea, 2006.**



Map 7. **Spatial distribution of NOx emissions from ships in the Baltic Sea, 2008. Values are given in tonnes per grid cell of 9 x 9 km. Source: Finnish Meteorological Institute.**

Chapter V: Emissions

After the Baltic Sea SECA entered into force in 2006, SOx emissions from ships have decreased steadily. During 2008, 135,000 of SOx were emitted by ships into the Baltic Sea, which is 8% less than two years before (**Figure 20**).

CO_2 emissions from Baltic shipping slightly decreased in 2008, after a 14% rise between 2006 and 2007 (**Figure 20**).

Environmental impact

NOx emissions from ships contribute considerably to the most severe environmental problem of the Baltic Sea, namely eutrophication. Eutrophication is caused by excessive inputs of nutrients - nitrogen and phosphorus - to the marine environment, and results in algal blooms, murky waters, loss of submerged aquatic vegetation, and lifeless zones without oxygen on the sea floor.

Riverine load is the biggest source of nitrogen inputs to the sea (75%), mainly related to agriculture and municipal wastewater. However, another major pathway (25% of the total load) is the emissions of NOx and ammonia (NH_3) to the air and the subsequent deposition of nitrogen to the sea. NOx emissions mainly originate from transportation and combustion processes on land as well as from shipping while NH_3 emissions originate from agriculture. NOx is deposited to the sea as oxidized nitrogen and NH_3 as reduced nitrogen.

During 2000-2006, shipping in the Baltic Sea was the second largest contributor (9%, and 11,500 tonnes) to the deposition of nitrogen oxide, and the fifth greatest contributor (5%) to the total nitrogen deposition (Bartnicki & Valiyaveetil 2009). This contribution was even higher in 2007 reaching 12,400 tonnes of nitrogen corresponding to over 6% of the total deposited nitrogen (**Figure 22**) (Bartnicki et al. 2009).

SOx causes acidification of terrestrial and freshwater ecosystems, damages materials and has a negative impact on human health in coastal areas. CO_2 emissions contribute to observed global climate change, which has also regional effects relevant for the Baltic Sea environment. The Baltic Sea is becoming warmer, winter ice coverage has diminished and the sea is, in general, becoming more acidic and less saline (HELCOM 2007b).

Monika Stankiewicz, HELCOM

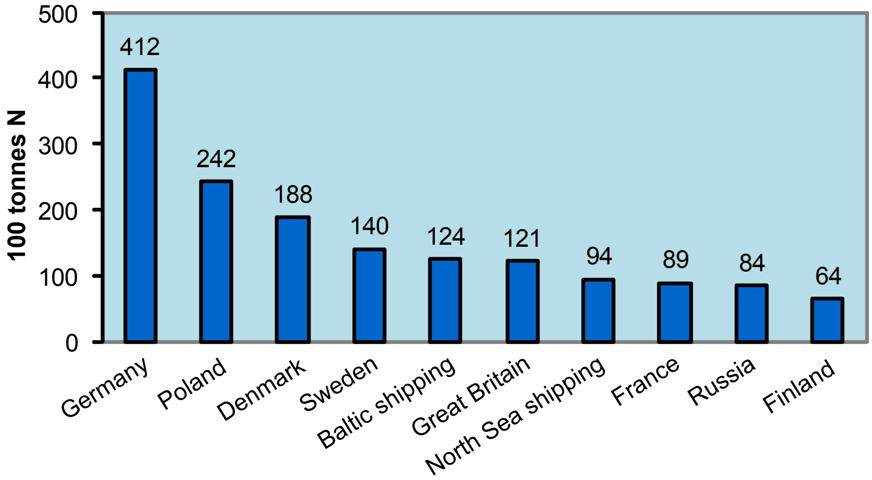


Figure 22. Top ten sources with the highest contributions of nitrogen emissions to annual deposition of total (oxidized + reduced) nitrogen into the Baltic Sea basin, 2007.

Existing regulations and regional cooperation

Emissions from shipping are regulated globally by Annex VI 'Regulations for the Prevention of Air Pollution from Ships' to the MARPOL Convention. Annex VI covers emissions of ozone-depleting substances, NOx, SOx and volatile organic compounds.

The revised Annex VI has been adopted by IMO (MEPC 58) in 2008, providing the legal framework for more stringent requirements for emissions from shipping. The new law will enter into force on 1 July 2010.

As far as NOx emissions are concerned, the revised Annex VI requires worldwide that a marine diesel engine installed on a ship constructed on or after 1 January 2011 achieves a 15% reduction level comparing to the current legislation. It also provides for the establishing of NOx Emission Control Areas, requiring ships to be constructed on or after 1 January 2016 operating in NECA to reduce their NOx emission by 80% compared to the current situation.

Additionally, pre-2000 ships (ships built on or after 1 January 1990 but prior to 1 January 2000), which have not been regulated so far, are required to meet the current NOx reduction levels.

The Annex also introduces stricter requirements on sulphur (S) content in fuel oil used on ships operating in the Baltic Sea SOx Emission Control Area (SECA). Currently, the S limit in the Baltic SECA is set at the level of 1.50% m/m (in force from 19 May 2006), and shall not exceed 1.00% m/m from 1 July 2010, and 0.10% m/m from 1 January 2015 (**Figure 23**). Hence, SOx emissions in the Baltic Sea will be reduced substantially from 2015. Eight out of nine HELCOM Contracting States have already ratified the Annex.

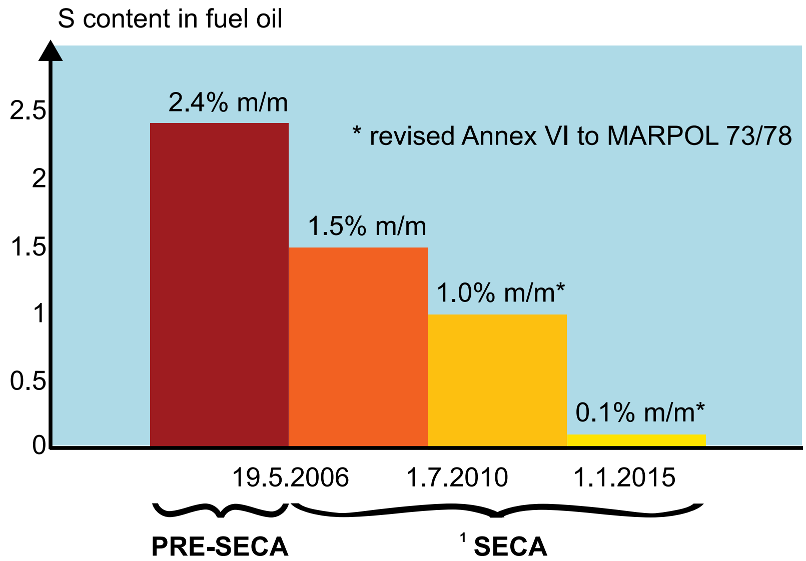


Figure 23. Sulphur (S) content in fuel oil used onboard ships in the Baltic Sea before and after establishing the Baltic Sea as a SOx Emission Control Area (SECA).

EU Directive 2005/33/EC, also known as the EU Sulphur Directive, is intended to combat emissions of sulphur dioxide. It requires the Member States to undertake to stop using heavy fuel oils with a sulphur content of over 1.00% by mass from 1 January 2003.

The Member States must also ensure that gas oil (including gas oil for maritime use) is not used on their territory from 1 July 2000 if the sulphur content is more than 0.20% by mass; and 1 January 2008 if the sulphur content is more than 0.10% by mass.

HELCOM Recommendation 28E/13 'Introduction of economic incentives as a complement to existing regulations to reduce emissions from ships' was adopted in 2007 to encourage the HELCOM countries to introduce economic incentives schemes to reduce air pollution from ships calling at Baltic Sea ports.

Climate change

Shipping is responsible for nearly 3% of global green-house gas (GHG) emissions. According to IMO, these emissions could grow by 150-250% by 2050 with the expected growth in international trade (IMO 2010).

Shipping and aviation are currently the only industrial sectors for which green-house gas emissions are not regulated by UNFCCC or its Kyoto Protocol. Preceding the 2009 Climate Change Conference in Copenhagen, some countries called for Maritime reduction targets to be included within the anticipated post-Kyoto 2012 Climate regime and to be further developed to legal instruments within IMO. The Copenhagen meeting outcomes, however, including the 'Copenhagen Accord', remain silent on the role of international shipping.

During 2010, IMO will study the feasibility of various options available to curb GHG emissions, including, e.g. bunker fuel levies and emissions trading, before preparing an impact assessment. IMO has also (as yet unfinished) plans for mandatory fuel-efficiency standards, an 'Energy Efficiency Design Index' for new ships as well as a 'Ship Energy Efficiency Management Plan' for ships in operation.

Further, other than targeted global efforts, e.g. those regional efforts in the Baltic to reduce SOx and NOx emissions, contribute to reducing total GHG emissions.

Implementation of the HELCOM Baltic Sea Action Plan

The HELCOM Contracting States have been jointly contributing to relevant global legislative developments and policy making processes to ensure that the highest practicable standards to control and prevent pollution from ships, also to the air, are applied. For example, as a result of such a joint proposal to IMO, the Baltic Sea was designated as a SOx Emission Control Area (SECA) under Annex VI to the MARPOL Convention.

To further address emissions from shipping, the Baltic Sea Action Plan required HELCOM countries to support efforts within IMO under the then ongoing review process of Annex VI to strengthen emission requirements. The HELCOM countries submitted two joint documents to MEPC 57 in 2008 calling for tighter international regulations to prevent a predicted sharp increase in NOx emissions from ships as well as describing the Baltic region's experience as a SECA.

The submission regarding NOx was based on a study prepared for HELCOM by the research programme ShipNODeff, which has provided the first reliable estimates of the atmospheric emissions from shipping in the Baltic Sea; it also presented a useful set of scenarios estimating how much NOx emissions from ships would be reduced if different proposed IMO emission control measures were adopted.

The study (IMO 2008a) revealed that with the projected annual 5.2% growth of maritime traffic in the Baltic Sea, the then proposed set of subsequent IMO measures – 19% reductions in emissions from diesel engines to be implemented after 2011, and 50% after 2015 - would not change the situation but could even lead to further increases in emissions in the region. Only the most challenging requirement – an 80% reduction in emissions from marine diesel engines installed on ships on or after 1 January 2015 - would reverse the increasing trend of NOx emissions by 2030.


Maritime Office in Gdynia, Poland

Chapter VI: Sewage

Sewage discharges from merchant ships are regulated globally by Annex IV to MARPOL. The Helsinki Convention further extends the MARPOL provisions to small ships.

The amount of sewage produced onboard a ship depends on its type. Clearly, the biggest amounts of waste water are produced by passenger ships: ferries and cruise liners.

Ferries usually leave the sewage ashore daily and the storage of sewage onboard does not create remarkable problems.

Cruise trips typically last for seven days, during which substantial amounts of sewage are produced by as much as several thousands passengers. Cruise liners calling at Baltic ports seldom leave their sewage in port reception facilities. In most cases the sewage is discharged to the sea, presumably after treatment onboard (Hänninen & Sassi 2009).

The onboard treatment process does not target the removal of nutrients, as their content in the discharged sewage is currently not regulated. Thus, nitrogen and phosphorous loads from ships' sewage reaches the marine environment and contributes to the eutrophication of the Baltic Sea.

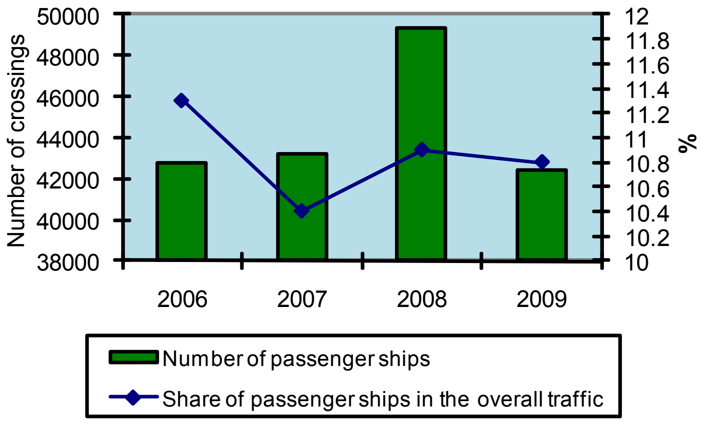


Figure 24. Number of passenger ships and its share in the overall ship traffic in the Baltic Sea based on the number of crossings through pre-defined AIS lines, 2006-2009. Data source: HELCOM AIS.

[4] Cruise Baltic member cities include: Cruise Baltic member cities includes: Copenhagen, Elsinore, Gdynia, Göteborg, Helsingborg, Helsinki, Kalmar, Kalrskrona, Klaipeda, Korsoer, Kotka, Kristiansand, Malmö, Mariehamn, Oslo, Riga, Rostock, Rönne, Saaremaa, St. Petersburg, Stockholm, Tallinn, Turku, Umeå, Visby, Aarhus (port cities outside the Baltic Sea are underlined).

The total amount of nutrient load from shipping is not at the same scale as the problem of nutrient loading from agricultural run-off; however, it is nonetheless still relevant, since during the summer season, nutrients from the discharges are readily available to feed the algae blooms.

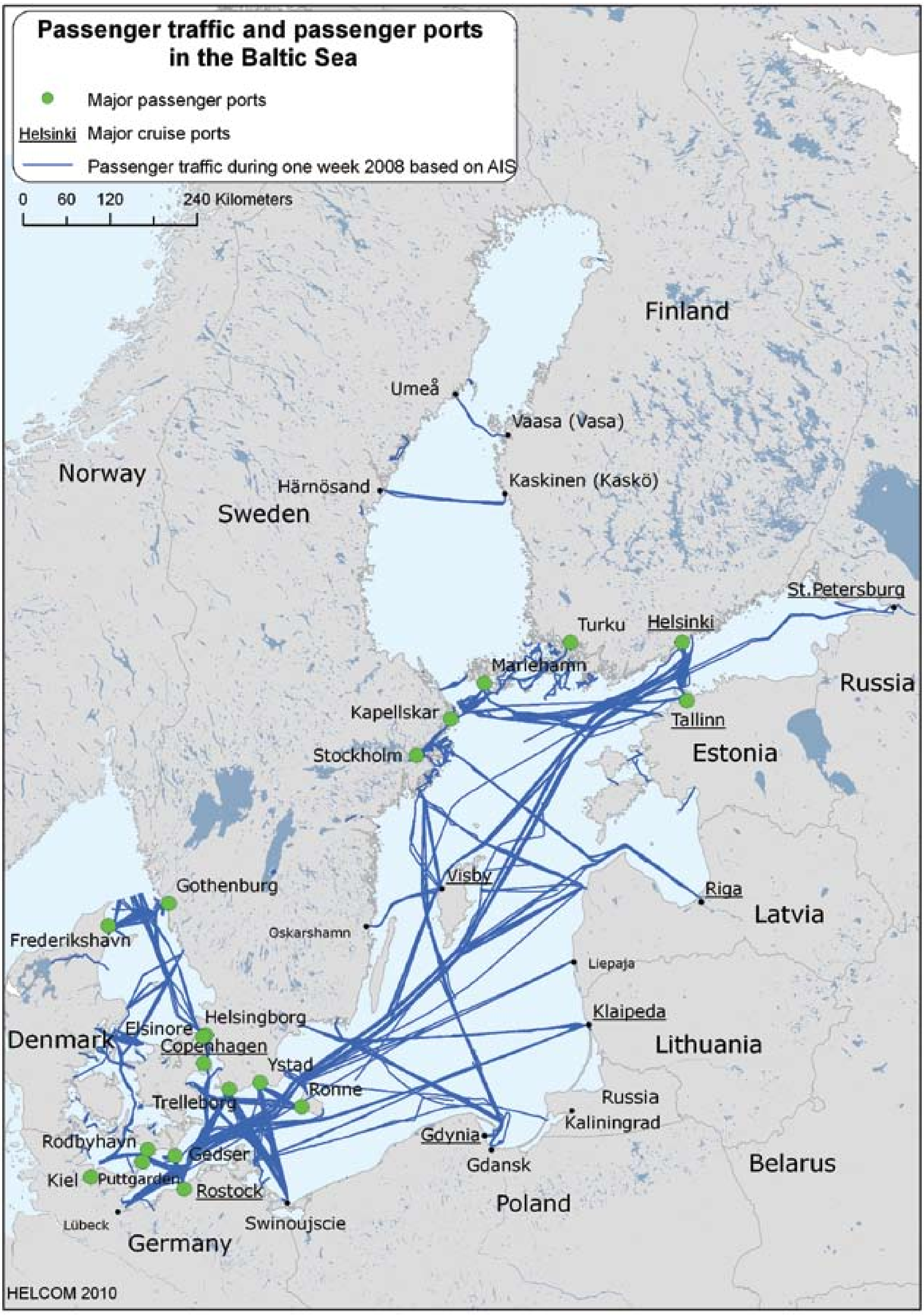
Overview

Passenger ships comprise approximately 11% of the total ship traffic in the Baltic Sea (based on the number of crossings through fixed AIS lines) (**Figure 24**).

Some 91 million passengers in international traffic passed through over 50 Baltic Sea ports in 2008 with the top twenty passenger ports (Map 8) having a 94% share of the total (Ports of Russia are excluded). The two biggest passenger ports - Elsinore and Helsingborg - have ferry lines running between Sweden and Denmark and accounted for almost 11 million passengers (Särkiärvi et al. 2009).

The Baltic Sea region is a popular cruise destination. In 2008, the number of cruise passengers to Cruise Baltic member cities[4] reached 2.8 million – an increase by an average of 13% per year since 2000 and this trend is expected to continue (Cruise Baltic 2009). The main destination is Copenhagen, followed by St. Petersburg, Tallinn, Stockholm and Helsinki. Medium size cruise ports are Gdynia, Riga, Rostock and Visby.

The theoretical total annual discharges of nitrogen and phosphorous in sewage from ships are estimated at 356 tonnes and 119 tonnes, respectively (Hänninen & Sassi 2009). This represents approximately 0.056% of the total waterborne nitrogen load (635,692 tonnes), and 0.422% of the total phosphorus load (28,214.3 tonnes) entering the Baltic Sea in 2006 (HELCOM PLC 2009). These nutrient loads from ship generated sewage were calculated assuming that there was no waste water treatment onboard and all waste waters were discharged into the sea, representing a theoretical worst case scenario. However, many passenger ships either treat their sewage before discharging it to the sea, which reduces the nutrients content to some extent, or deliver their sewage to port reception facilities. Therefore, it is acknowledged that the figures provided above are overestimated.



Map 8. The main passenger ports of the Baltic Sea and passenger ship traffic based on AIS.

Chapter VI: Sewage

Environmental impact

Loads of phosphorus and nitrogen from any source have a detrimental impact on the Baltic marine environment. The nutrient pollution loads originating from waste water discharges from ships into the Baltic Sea remain rather small, but not negligible due to the high sensitivity of the marine environment.

Sewage loading of nutrients, which are concentrated along shipping routes, are immediately available for uptake by planktonic algae adding to the severe eutrophication of the Baltic Sea. In the Gulf of Finland, where maritime traffic has increased rapidly, the annual phosphorus load from ships is now almost the same as from the four largest Finnish coastal cities along the Gulf - Espoo, Hamina, Kotka, and Porvoo (Hänninen & Sassi 2009). Phosphorus is directly responsible for the mass occurrences of blue-green algae, which form foul-smelling masses and make the water unfit for swimming in some places.

Existing regulations and regional cooperation

According to the current Annex IV of the MARPOL Convention, the discharge of sewage into the sea is allowed if a ship is discharging comminuted and disinfected sewage at a distance of more than three nautical miles from the nearest land. Sewage, which is not comminuted or disinfected, can be discharged at a distance of more than 12 nautical miles from the nearest land. In any case, sewage shall not be discharged instantaneously but at a moderate rate when the ship is en route and proceeding at no less than four knots. If the ship has an approved (certified by the Administration) sewage treatment plant in operation, the discharge of sewage is permitted anywhere.

In addition, HELCOM regulations require pleasure craft fitted with toilets to have toilet retention systems in order to be able to deliver sewage to reception facilities in ports.

The nutrient loads released from ships in treated sewage are currently not regulated. The MARPOL quality standards for waste water from ships only concern Biochemical Oxygen Demand (BOD), total suspended solids and faecal coliforms. This means that treated sewage containing some nitrogen and phosphorus is still discharged into the sea thereby increasing the nutrient loads in the marine environment.

More information on international requirements for the delivery of ship-generated waste, including sewage, and for port reception facilities is included in the chapter 'Illegal pollution'.

Maritime Office in Gdynia, Poland

Implementation of the HELCOM Baltic Sea Action Plan

Due to the sensitivity of the Baltic Sea to nutrient load, the HELCOM countries agreed in the HELCOM BSAP to have a joint submission to IMO in order to elaborate relevant new regulations for ships covered by Annex IV to the MARPOL Convention with the aim of eliminating the discharge of sewage from passenger ships.

The HELCOM countries submitted such a proposal to IMO (IMO 2009), aiming at establishing the Baltic Sea as a Special Area for sewage under Annex IV of MARPOL, whereby passenger ships will be banned to discharge sewage in the Baltic Sea unless it has been treated to remove phosphorus and nitrogen to certain levels. Alternatively, sewage can be delivered to PRF. The proposal does not only address the needs of the Baltic Sea, but will also enable other regions around the world suffering from eutrophication to designate their seas as Special Areas for sewage.

The proposal for new sewage regulations was considered by the 60th session of the IMO Marine Environment Protection Committee (MEPC) in March 2010. The majority of the Committee at MEPC 60 agreed to the proposal to amend MARPOL Annex IV to include the concept of Special Areas; to designate the Baltic Sea as a Special Area; and to impose a strict standard for the discharge of nutrients in the sewage from passenger ships within Special Areas. The discussion will continue at MEPC 61 in 2010 and some further inputs have been requested from the HELCOM countries to further address, among others, the adequacy of port reception facilities for large quantities of sewage from passenger ships. Moreover, appropriate provisions are to be included in the proposed amendments that the amendments would not enter into force until the Baltic Sea countries notified the Organisation of the existence of adequate PRF.

As indicated above, the precondition for entering into force of any stricter regulations for the discharge of sewage by ships is the availability of adequate port reception facilities. The Contracting Parties agreed in the HELCOM BSAP to enhance the availability of adequate reception facilities for ship-generated wastes, including making all necessary improvements in the availability of PRF for sewage, as well as applying the 'no-special-fee' system in all Baltic Sea ports. Furthermore, voluntary activities in ports and shipping companies to dispose of sewage to the port reception facilities are to be encouraged.

As a follow up of the IMO submission, work has already started to initiate upgrading of PRF for sewage in major cruise and ferry ports of the Baltic Sea. Some agreements for the voluntary delivery of sewage to PRF have also been put in place. To further encourage voluntary measures, IMO issued in 2009 a circular MEPC.1/Circ.685 encouraging all passenger ships trafficking in closed or semi-closed seas to refrain from discharging their waste water into the sea.

Sergey Vlasov

Chapter VII: Transfer of alien species

The spread of alien, non-indigenous, species is recognised as one of the greatest threats to biodiversity worldwide. The numbers of established and new observations of alien species have increased steadily in the Baltic Sea from the 19th - 21st century and the numbers are still growing due to increasing maritime traffic. The main pathway for new introductions is via shipping, alien species deploying ballast water and hull-fouling as vectors both at sea as well as via inland waterways.

Overview

Over 100 non-indigenous and cryptogenic species have been encountered in the Baltic Sea environment to date (**Figure 25**). Some 80 of them have established viably reproducing populations in some parts of the Baltic.

Most of these non-indigenous species originate from freshwater or brackish water environments, particularly from North America or the Ponto-Caspian region (the general area of Black and Caspian Seas).

Environmental impact

The non-indigenous invaders can induce considerable changes in the structure and dynamics of marine ecosystems; hamper the economic use of the sea; and even represent a risk to human health.

Fishermen in the Gulf of Riga and the Gulf of Finland remember the sudden arrival in 1992 of an alien water flea species. These tiny animals soon started to clog up the gills of fish and fishing nets, leading to serious economic losses. By 1998, the species had spread as far as Stockholm and Gotland and later southwards as well as northwards to the Bothnian Sea.

In the southern Baltic Sea, non-native species have altered local ecosystems repeatedly. Many of the species have become established in polluted areas, where living conditions have driven native species to their tolerance limit. Invaders with higher pollution tolerance have replaced or outnumbered native species and even these have been replaced by more recent newcomers. The native fauna and flora of the Baltic Sea might better resist invaders in a good water quality, which puts further emphasis on the need to protect our sea area.

Existing regulations and regional cooperation

Eight Baltic Sea countries, members of the EU, have ratified the Convention on Biological Diversity (CBD). The Russian Federation has also ratified the CBD but is not a party to the Convention Protocol. The Convention's overall aim is to conserve biological diversity, halt its loss and call for the prevention, control or eradication of those alien species which threaten ecosystems, habitats or species. The Convention does not, however, provide a mechanism for a harmonised or consistent approach between and within areas under threat or taxon/functional group-specific guidance.

The EU Marine Strategy Framework Directive (MSFD) adopted in 2008 addresses the marine alien species more directly. The EU MSFD requires that on the basis of the initial assessment, the Member States shall

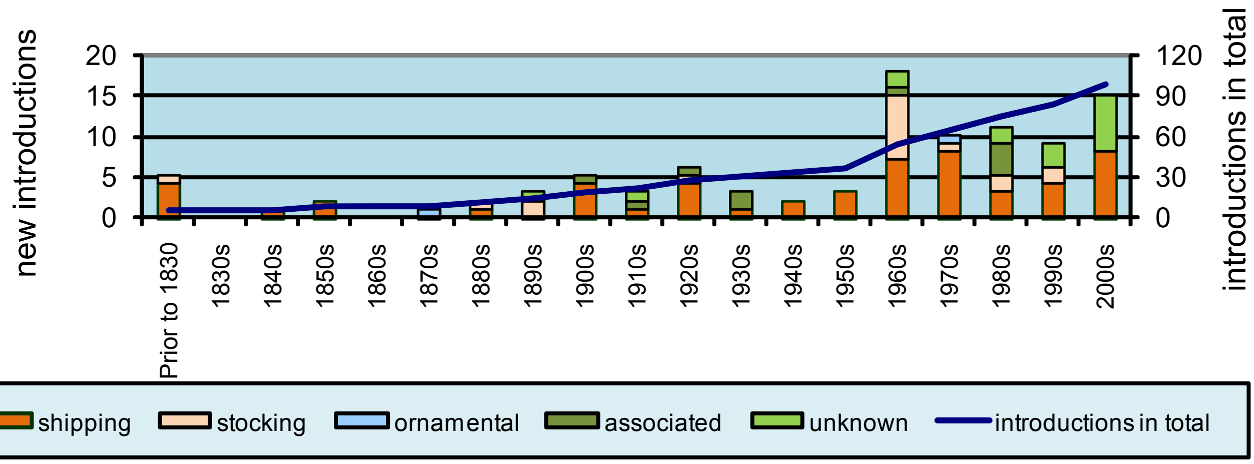


Figure 25. **Numbers of new alien species introduced (various vectors) into the Baltic Sea prior and since 1830, and the accumulating numbers of all encountered alien species. Source: HELCOM.**

establish and implement coordinated monitoring programmes for the ongoing assessment of the environmental status of their marine waters on the basis of the indicative lists of elements set out in Annex III, in which the 'Introduction of non-indigenous species and translocations' is noted in the section on Biological disturbance. Further, Article 9(1) in the MSFD requires that, in respect of each marine region or sub-region concerned, the Member Sates should determine, for the marine waters, a set of characteristics for a good environmental status on the basis of the qualitative descriptors listed in Annex I. The second of the Qualitative Descriptors for Determining the Good Environmental Status (GES) in Annex I is 'Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems'. The descriptor is closely related to several other GES descriptors in the MSFD because of the great variety of impacts which invasive alien species may have on native biodiversity, ecosystem functioning, seabed habitats as well as commercial marine resources.

At the global level, the Convention for Control and Management of Ships' Ballast Water and Sediments (BWM Convention) was adopted by IMO in 2004. The entry into force of this Convention would be the most important step towards the reduction of spreading non-indigenous species.

The Convention's aim is to prevent, minimise and ultimately eliminate the transfer of harmful aquatic organisms and pathogens via shipping, through the control and management of ships' ballast water and sediments. For the time being, of the Baltic Sea countries only Sweden has ratified the Convention.

In order to reduce the risk of alien species introductions to seas, the BWM Convention foresees application of Ballast Water Performance Standard as specified in Regulation D-2 of the Annex to the Convention as a long-term solution. In the transition period Standard D-1 (Ballast Water Exchange) as specified in the Annex to the Convention is also applicable.

The Convention sets the timetable according to which ships will be required to introduce the ballast water management once the Convention has entered into force (**Annex 3**). As from 2016, Standard D-1 is no longer permitted, and Standard D-2 has to be applied. This is also valid for already existing ships after their regular 'docking' after 2016, and under the condition that the Convention will be internationally in force by that time.

The requirements on ballast water management do not apply to ships that discharge ballast water to a reception facility; however, this alternative does not seem a viable option for the time being.

There are specific requirements related to depth and distance from the shore for the ballast water exchange according to IMO Guidelines (IMO 2005). Ballast water can only be discharged at least 200 nautical miles from the nearest land and in water at least 200 meters in depth; if this is not possible, as far as from but at least 50 nautical miles from the nearest land and in water at least 200 meters in depth.

These requirements cannot be met in the Baltic (**Map 9**) (next page). For such cases, according to the Convention, special areas for ballast water exchange could be designated and the IMO Guidelines on designation of areas for ballast water exchange (IMO 2006) should be followed in this respect.

Implementation of the HELCOM Baltic Sea Action Plan

The HELCOM BSAP contains a Road Map towards a harmonised implementation and ratification of the BWM Convention in the Baltic Sea area. It calls for the ratification of the Convention by all Baltic Sea countries as

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soon as possible but in all cases, not later than 2013. To date, only Sweden has ratified the Convention.

The Road Map includes 17 measures to be taken and a timetable for their implementation jointly agreed by the Baltic Sea countries, focusing on solving the most challenging requirements of the Convention from the Baltic Sea region point of view.

According to the Road Map, HELCOM has compiled a list of non-indigenous and cryptogenic species in the Baltic Sea. The aim of listing the species is to provide some basic background information for further consideration and selection of the species, which are of particular relevance in the context of the requirements of the BWMC and the related IMO Guidelines.

Additionally, HELCOM Target Species have been identified, which includes species in other regions that may impair or damage the environment, human health, property or resources. The Target Species list covers, as a first step, the relevant species from the North Sea region, the Ponto-Caspian region, and the North American Great Lakes, and is based on information from the Black Sea, the OSPAR and the Great Lakes Commissions.

The lists are to indicate which species are to be taken into account in the risk assessments required to make use of Regulation A-4 of the BWMC, allowing certain ships or routes to be exempted from the requirements of ballast water management.

In order to compile the needs of HELCOM actions and current legislation, information on spatial distribution of alien species currently found in the Baltic Sea is being developed showing, at the first stage, the numbers of alien species on national coastal and open sea water areas (division in line with the requirements of EU's Water Framework Directive). The work has been conducted as part of the HELCOM HOLAS project part-financed by the EU, Sweden and Germany.

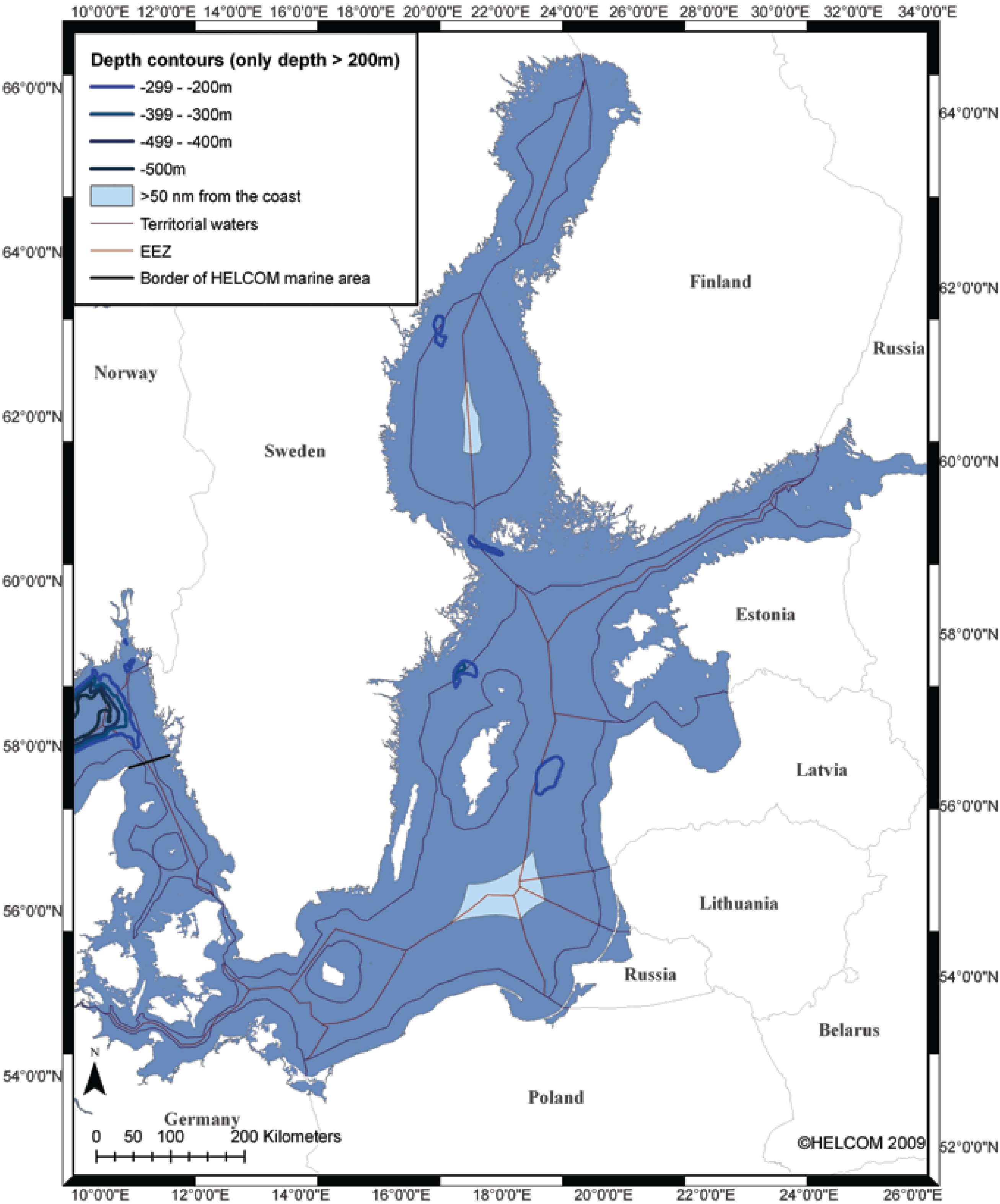
HELCOM HOLAS has also investigated whether ballast water exchange by ships involved in the regional voyages (within the Baltic Sea) can result in a reduced risk of alien species dispersal between sub-regions of the Baltic. As most of the alien species in the Baltic Sea have a wide tolerance in salinity, the ballast water management zones can not be regarded as an efficient environmental management tool for intra-Baltic shipping due to the species' great natural dispersal ability (HELCOM 2009c). Bearing in mind the other environmental factors determining the species' distribution, as well as some earlier considerations, the Baltic Sea countries have agreed that ballast water exchange is not a suitable management option, either for oceanic or intra-Baltic voyages.

Finally, the guidance on how to distinguish between high and low risk – a risk of secondary spreading of alien species through ballast water and sediments – by ships engaged in intra-Baltic voyages has been developed. The aim is to support transparent and consistent risk assessments of regional ship voyages and allow a unified Baltic Sea system on exemptions from applying ballast water management in accordance with the BWM Convention Regulation A-4.

Apart from building scientific knowledge to serve the implementation of the BWM Convention, the HELCOM and OSPAR countries jointly adopted the 'General Guidance on the Voluntary Interim Application of the D1 Ballast Water Exchange Standard in the North-East Atlantic' (IMO 2008b), which has been applicable from 1 April 2008.

According to the General Guidance, vessels transiting the Atlantic or entering the North-East Atlantic from routes passing the West African Coast are requested to conduct, on a voluntary basis, ballast water exchange before arriving at the OSPAR area or passing through the OSPAR area and heading to the Baltic Sea. Additionally, the Joint Notice to Shipping and the Instructions to Surveyors have been developed for use by both HELCOM and OSPAR countries.

Similarly, the HELCOM and OSPAR countries agreed that vessels leaving the Baltic and transiting through the OSPAR maritime area to other destinations are requested (since 1 January 2010) to apply the D1 Ballast Water Exchange Standard in the North-East Atlantic and the Baltic Sea areas in accordance with the BWM Convention (HELCOM 2009d). This is to avoid ballast water exchange within HELCOM and OSPAR areas until the vessel is 200 nm off the coast of northwest Europe in waters deeper than 200 m. IMO has been notified accordingly.



Map 9. Map of the Baltic Sea showing marine areas 50 nm from the nearest land and of the depth of 200 m and more.

Chapter VIII: Necessary steps to implement the HELCOM Baltic Sea Action Plan

To reach the strategic goal of HELCOM to have maritime activities in the Baltic Sea carried out in an environmentally friendly way, eight management objectives have been agreed upon in the HELCOM Baltic Sea Action Plan:

- Enforcement of international regulations - no illegal discharges
- Safe maritime traffic without accidental pollution
- Efficient emergency and response capability
- Minimum sewage pollution from ships
- No introductions of alien species from ships
- Minimum air pollution from ships
- Zero discharges from offshore platforms
- Minimum threats from offshore installations

To reach these objectives, specific actions and measures have also been agreed upon - some of which have already been implemented as outlined in the previous chapters.

In this chapter, the suggestions for further concrete measures to implement the BSAP are presented.

Ratification of international conventions

First, all the relevant compensation and liability conventions must be ratified by all HELCOM countries to achieve a fully harmonised and optimal compensation regime for damage costs related to shipping accidents in the Baltic Sea region. This requirement concerns those conventions currently in force as well as the recently adopted Nairobi Convention, HNS Convention and its Protocol.

Additionally, four HELCOM countries are recommended to denunciate the 1976 Convention on the Limitation of Liability for Maritime Claims (LLMC) in order to have a higher shipowner liability applied as provided for in LLMC Protocol 96.

The HELCOM countries are also recommended to make a reservation under LLMC Protocol 96 as to the claims in respect of raising, the removal and destruction of a sunken, stranded, wrecked or abandoned ship as well as to the claims in respect of the removal, destruction and rendering harmless the cargo of the ship so as higher liability limits than in LLMC Protocol 96 could be imposed on a shipowner in respect of these claims.

Moreover, all HELCOM countries should ratify Annex VI to the MARPOL Convention (Russia) and the AFS Convention (Finland and Russia).

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Improving the safety of navigation

The statistics on shipping accidents in the Baltic show increasing numbers of groundings and collisions. Very few areas show positive trends. This is mainly due to the growing density of shipping, which requires the Contracting Parties to put even more emphasis on ensuring the safety of navigation.

Therefore, further support is needed for hydrographic re-surveys of the Baltic Sea according to the revised Baltic Sea Re-survey Scheme by the IHO Baltic Sea Hydrographic Commission. The re-survey data are needed to produce reliable nautical charts, including Electronic Nautical Charts, which is in turn a pre-requisite for the use of the ECDIS onboard ships. ECDIS can substantially improve the safety of navigation.

In 2009, IMO adopted the phased-in introduction of a requirement to carry ECDIS by certain classes of ships, which will result in the majority of the ships in the Baltic Sea carrying ECDIS onboard by 2018 at the latest.

However, there is a group of smaller cargo ships, of 3,000 gross tonnage and upwards but less than 10,000 gross tonnage, which includes both the existing vessels and those to be built by 1 July 2014, that are not required to carry ECDIS.

It has been distinguished based on the unique AIS signals that there are approximately 1,262 such cargo ships in the Baltic (in 2008), making up around 18.5% of the overall number of ships and 29% of all ships regulated by SOLAS in the region (**Annex 4**). In total, 17.2% of those ships fly under the Baltic Sea countries' flag and 38.3% under the flag of EU countries outside HELCOM. ECDIS should be also carried onboard those ships; for this reason, the HELCOM countries are recommended to engage in discussions with shipping companies to agree on a voluntary ECDIS carriage.

The safety and efficiency of winter navigation in the Baltic Sea should be further advanced according to HELCOM Recommendation 28E/11.[5] These include providing sufficient icebreaking services to assist ships; advancing educational offers of high quality training programmes in navigation in ice conditions for seafarers; using qualified Baltic Sea pilots; and

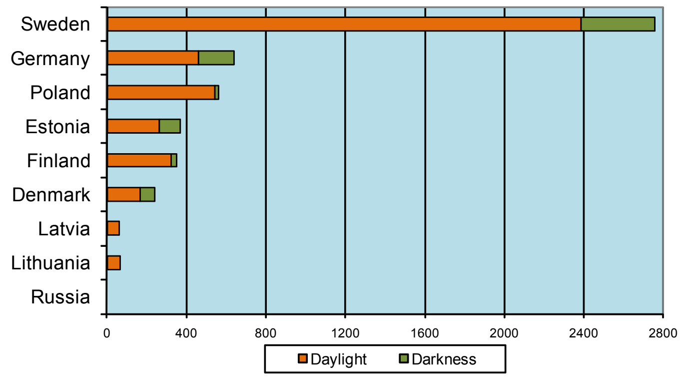

Figure 26. Number of flight hours of national surveillance by HELCOM countries during daylight and at nig**ht, 2009.**

encouraging shipping companies to use ships with crews trained for winter navigation.

Moreover, the Baltic Sea countries should continue the evaluation of the risks of maritime transport and activities and the identification of appropriate risk control measures for present and foreseen threats to the Baltic Sea environment by placing an emphasis on proactive preventive measures. The existing and new traffic management measures should be further developed to ensure that all systems and services assist the safe navigation of ships in the Baltic Sea in an optimised and uniform manner.

Enforcing the law

The enforcement of international rules by ships needs to be further strengthened. The HELCOM countries have been carrying out aerial surveillance of the Baltic Sea since 1988 to detect spills of oil and other harmful substances which can threaten the marine environment. If possible, the identity of a polluter should be established. The surveillance activity has also a deterring effect on polluters.

The annual numbers of illegal discharges of oil are decreasing; however, every single breach of the anti-discharge regulations is unacceptable. It is thus of vital importance to further strengthen the countries' ability to survey the Baltic Sea to detect illegal oil discharges also at night and in poor visibility when deliberate discharges are more likely to occur. In 2009, six countries carried out their flights at night (**Figure 26**) (HELCOM 2010).

[5]HELCOM Recommendation 28E/11 'Further measures to improve safety of navigation in ice conditions in the Baltic Sea'

Chapter VIII: Necessary steps to implement the HELCOM Baltic Sea Action Plan

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Although most parts of the Baltic with regular traffic zones are covered by national aerial surveillance, some Contracting States still do not carry out surveillance flights in accordance with the HELCOM Response Manual and the Recommendations.

The existing system to detect single-hull tankers banned to carry heavy oil can be used to monitor other non-compliant ships entering the HELCOM area. The work has already started to monitor ships banned under the Paris MoU on PSC in order to have relevant national authorities informed of high risk ships in the countries' waters in all Baltic Sea countries. The system should also be extended to ships non-compliant with the International Convention on the Control of Harmful Anti-fouling Systems on Ships (the AFS Convention).

Strengthening response capacities

The Contracting Parties should cooperate when providing a place of refuge for a ship in need of assistance according to the Mutual Plan for Places of Refuge[6] in order to avoid unnecessary risk for the ship and the environment. For the plan to become fully operational, countries are required to agree on the ways of 'fair sharing' the operation costs by state authorities in a place of refuge situation not met by the international compensation regime, and without prejudice to the 'Polluter Pays Principle'.

Each country should also designate a competent authority which has the power to take independent decisions concerning the accommodation of ships in need of assistance in order to facilitate rapid actions within this mutual plan for places of refuge.

The BRISK Project provides support to the countries to implement the HELCOM Baltic Sea Action Plan and HELCOM Recommendation 28E/12[7] in a timely manner. The risk assessment to be carried out within the project will eventually lead to developing investment plans to fill in the gaps in the existing response resources in each sub-region of the Baltic Sea. The Baltic Sea Region Programme 2007-2013 provides the possibility to apply for an extension phase to realise some of the needed investments; the HELCOM countries are thus encouraged to plan for such an extension phase.

The subject of oiled wildlife response needs to be integrated into oil pollution contingency plans either on a national or sub-national/local level, according to the HELCOM BSAP and guidelines of the new draft HELCOM Recommendation on wildlife response planning. There is a need for practical implementation of cross-border cooperation among the governmental and local authorities as well as other specialised stakeholders regarding oiled wildlife response and planning, and shoreline response. Some examples are the inclusion of shoreline and oiled wildlife response in national and international response exercises, and the work towards a more formalised contribution of specialised NGOs to wildlife response planning and response.

Moreover, the problem of chronic oil pollution on the bird population needs special attention; further, there is a need for guidelines on best

[6] Draft HELCOM Recommendation 'Mutual Plan for Places of Refuge in the Baltic Sea' submitted for adoption by the HELCOM Ministerial Meeting on 20 May 2010.

[7] HELCOM Recommendation 28E/12 'Strengthening of sub-regional cooperation in response field'.

practices on rehabilitation and euthanasia as well as a study on post-release survival to assist in developing oiled wildlife plans.

Reducing emissions and discharges from ships

The results of available studies made for HELCOM indicate that only 80% reduction in NOx emissions from shipping would lead to decreasing the NOx emissions in the Baltic by 2030. Therefore, if only the Baltic were to be established as a NOx Emission Control Area (NECA), a substantial reduction of NOx emissions from ships could be achieved in the long term. Such a reduction is needed due to the heavy eutrophication of the Baltic Sea.

In order to make the best use of the regulations of the revised Annex VI to the MARPOL Convention, the HELCOM countries have started the work to propose to IMO the designation of the Baltic Sea as an NECA. A Correspondence Group on the Designation of the Baltic Sea as a NOx Emission Control Area under the lead of Finland has been established to prepare the IMO application.

However, it will take 20-30 years for all ships operating in a given NECA area to be covered by the more stringent requirements. Therefore, some complementary voluntary measures could be implemented to bring the emission reduction quicker. For instance, economic incentives could be applied to promote the good environmental performance of ships and provide incentives for industry to go beyond regulatory requirements towards the use of best available technology. The application of economic incentives for ships to reduce NOx emissions would also allow addressing 'existing' ships and coming to a level playing field.

Economic incentives include differentiated: taxation of marine fuels, port and fairway dues and tonnage taxes. Environmental Differentiated Fairway Dues have been successfully implemented in Sweden, which resulted in the reduction of SO_2 by 50,000 tonnes and NOx by 41,243 tonnes in 2004. The socio-economic value of this reduction was calculated to be SEK 2.5 billion (EUR 277.8 million)[8] .

The Baltic Sea countries have submitted to IMO a proposal for designating the Baltic Sea as a Special Area for sewage discharges under Annex IV to the MARPOL Convention. The special area status will impose a ban on discharges of untreated wastewater from passenger ships and will trigger the need for enhanced port reception facilities (PRF) for sewage. The biggest cruise and ferry ports should be addressed with the need for the PRF upgrade in the first place.

The cruise industry considers port reception facilities to be adequate when a port can receive all wastewater effluent via a direct line/shoreside pipe connection at its cruise berth, which can then be effectively treated at the municipal wastewater treatment plant.

Helsinki, Stockholm and St. Petersburg have already arranged such facilities, and the remaining large passenger ports should also undertake the needed investments to upgrade their PRF for sewage. It has been estimated that by addressing five big cruise ports: Tallinn, Rostock, Copenhagen, Riga and Gdynia - in addition to Helsinki, Stockholm and St. Petersburg – some 95% of cruise sewage could be covered (Bain analysis).

Additionally, a full implementation of the 'no-special-fee' system for the delivery of ship-generated waste, including sewage, is needed. In some ports, cruise ferries are excluded from the 'no-special-fee' system and must pay extra for sewage delivery. Major ports in the Baltic Sea need to be addressed in the first place.

Preventing the spread of alien species

Sweden, as the only country in the Baltic Sea region, has ratified the Ballast Water Management Convention. All the remaining countries should ratify it by 2010, and by 2013 at the latest.

Altogether, over 100 alien species have become recorded in the Baltic Sea while about 70% of them have been able to form self-sustaining populations. These high numbers, however, do not provide a sufficient basis for the assessment of alien species' impacts on the structure and functioning of the Baltic ecosystems. The alien species which are known to have measurable

[8]HELCOM Recommendation 28E/13 'Introduction of economic incentives as a complement to existing regulations to reduce emissions from ships' and the attached Guidelines.

harmful impacts probably form only a small fraction of all the introduced species. Hence, alien species need to be analysed and classified according to the magnitude of their impacts on the environment and biodiversity. In this regard, those alien species which cause most harm on the environment and/or humans have priority both in terms of assessing the current and changing status of the Baltic Sea ecosystems (requirements from the EU Water Framework Directive, Marine Strategy Framework Directive, Baltic Sea Action Plan), and in devising targeted management action. The assessment of species' impact is also important for the implementation of the BWM Convention.

The HELCOM monitoring programme has not yet taken into account alien species in the Baltic Sea. The HELCOM BSAP includes an agreement by the HELCOM countries to adjust/extend by 2010 the HELCOM monitoring programmes to obtain reliable data on non-indigenous species in the Baltic Sea, including port areas. As a first step, species which are known to pose a risk of ecological harm and those that can be easily identified and monitored should be covered. Moreover, the evaluation of any adverse ecological impacts caused by non-indigenous species should be an inherent and mandatory part of the HELCOM monitoring system.

After the entry into force of the BWM Convention, its Parties are required to perform port baseline surveys on the environmental conditions and alien species present. In this way, the Port can act in a responsible manner towards other ports when ships take on ballast water from its waters, and in terms of the potential spread of introduced species from the port to adjacent coastal areas. Port baseline surveys are also practical in carrying out risk assessments required for granting any exemptions from the ballast water management. Some information on environmental conditions in ports is available; however, more regular surveys should be carried out in the ports of the HELCOM countries.

Another measure that needs implementation is linking the port surveys and monitoring to shore-ship communication systems, whereby ships can be alerted not to take up ballast water during outbreaks of harmful species and other risk conditions as in the case of algal blooms, for instance.

There is also a need to discuss and agree with the North Sea countries on common solutions and future actions regarding ballast water management on routes connecting the Baltic Sea ports with the North Sea ports to suit the needs of protecting both seas.

Nikolay Vlasov, HELCOM

Developing and testing regional approaches to Maritime Spatial Planning

Many of the sectoral solutions available (e.g. those available in the maritime traffic sector or fisheries sector) are less than optimal to reach the overall aims of the HELCOM Baltic Sea Action Plan. Due to this, the HELCOM BSAP, as well as the Ecosystem Approach underlying it, includes marine/maritime spatial planning (MSP) as an important new concept to promote cross-sectoral dialogue on the coexistence of human activities in a limited sea area, both at the national and international levels. Regional Maritime Spatial Planning has also been highlighted both in the EU Integrated Maritime Policy as well as the EU Strategy for the Baltic Sea Region as an important horizontal and cross-sectoral action aiming at more integrated management structures for European Seas.

To provide for optimum use of the Contracting Party's resources to fulfil the BSAP commitment to develop (by 2010) and test (by 2012) regional approaches to Maritime/Marine Spatial Planning using as an overarching principle the Ecosystem Approach, as well as deliver the EU calls for further work in this field, HELCOM should work for and actively participate in a single regional Baltic MSP process, to be implemented through a jointly chaired regional MSP working structure. Such joint work with HELCOM involvement is needed to provide for the cross-sectoral dialogue which is the essence of MSP, while ensuring that total pressure from human activities is compatible with good environmental status.

The competence and extensive maritime data available through HELCOM and its maritime working structures will be mobilised in the process to test the regional MSP principles to be adopted by HELCOM in 2010.

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ANNEX 1.

ANNEX 1. REQUIREMENTS OF THE SOLAS CONVENTION REGARDING THE CARRIAGE OF ELECTRONIC CHART DISPLAY AND INFORMATION SYSTEM ONBOARD SHIPS.

Type	Construction date	Implementation date
Passenger ships of 500 gross tonnage and upwards	Constructed before 1 July 2012	Not later than the fist survey* on or after 1 July 2014 (**)
	Constructed on or after 1 July 2012	When constructed
Tankers of 500 gross tonnage and upwards	Constructed before 1 July 2012	Not later than the fist survey* on or after 1 July 2015 (**)
	Constructed on or after 1 July 2012	When constructed

Cargo ships other than tankers

Cargo ships, other than tankers, 3,000 ≤ X <10,000 gross tonnage	Constructed on or after 1 July 2014	When constructed
Cargo ships, other than tankers, 10,000 ≤ gross tonnage	Constructed on or after 1 July 2013	When constructed
Cargo ships, other than tankers, 10,000 ≤ X <20,000	Constructed before 1 July 2013	Not later than the first survey* on or after 1 July 2018 (**)
Cargo ships, other than tankers, 20,000 ≤ X <50,000	Constructed before 1 July 2013	Not later than the first survey* on or after 1 July 2017 (**)
50,000 ≤ gross tonnage	Constructed before 1 July 2013	Not later than the first survey* on or after 1 July 2016 (**)

*Refer to the Unified interpretation of the term 'first survey' referred to in SOLAS regulations (MSC.1/Circ.1290). Administrations may exempt ships from the application of the ECDIS requirement when such ships will be taken permanently out of service within two years after the implementation date marked with (**) in the table above.

ANNEX 2.

ANNEX 2. THE STATUS OF RATIFICATION (X) OF THE INTERNATIONAL IMO CONVENTIONS RELATED TO COMPENSATION AND LIABILITY AS WELL AS OF DENUNCIATION (D) OF LLMC 1976 BY THE HELCOM COUNTRIES.

	DK	EE	FI	DE	LV	LT	PL	RU	SE
United Nations Convention on the Law of the Sea, UNCLOS 1982	X	X	X	X	X	X	X	X	X
International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties (INTERVENTION), 1969	X	X	X	X	X		X	X	X
Protocol relating to Intervention on the High Seas in Cases of Pollution by Substances other than Oil, 1973, as amended (INTERVENTION PROTOCOL 1973)	X	X	X	X	X		X	X	X
1992 Civil Liability Convention	X	X	X	X	X	X	X	X	X
1992 Fund Convention	X	X	X	X	X	X	X	X	X
2003 Supplementary Fund Protocol	X	X	X	X	X	X	X		X
Convention relating to Civil Liability in the Field of Maritime Carriage of Nuclear Material (NUCLEAR), 1971	X		X	X	X				X
Convention on Limitation of Liability for Maritime Claims (LLMC), 1976	d	X	d	d	X	X	X		d
LLMC Protocol 96	X		X	X	X	X		X	X
International Convention on Salvage, 1989	X	X	X	X	X	X	X	X	X
International Convention on Oil Pollution Preparedness, Response and Cooperation (OPRC), 1990	X	X	X	X	X	X	X	X	X
Protocol on Preparedness, Response and Cooperation to pollution Incidents by Hazardous and Noxious Substances, 2000 (OPRC-HNS Protocol)	X	X		X			X		X
International Convention on Civil Liability for Bunker Oil Pollution Damage, 2001	X	X	X	X	X	X	X	X	
Conventions to come into force									
Nairobi International Convention on the Removal of Wrecks, 2007									
International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (HNS), 1996						X		X	
2010 Protocol to the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea									

Glossary

AFS Convention – the 2001 International Convention on the Control of Harmful Anti-fouling Systems on Ships.

AIS – Automatic Identification System is a very high frequency (VHF) radio-based system which enables the identification of the name, position, course, speed, draught and cargo of ships.

BWE – ballast water exchange.

BWMC – the 2004 Convention for Control and Management of Ship' Ballast Water and Sediments of IMO.

CBD – Convention on Biological Diversity.

CEPCO – Coordinated Extended Pollution Control Operation.

CSN – CleanSeaNet satellite service of European Maritime Safety Agency.

DW Route – a Deep Water Route is a route in a designated marine area, within defined limits, which has been accurately surveyed for clearance of sea bottom and submerged obstacles to a minimum indicated depth of water.

EIA – Environmental Impact Assessment.

ECDIS – an Electronic Chart Display and Information System is a computer-based navigational information system which integrates information from digital charts, position information from GPS and other navigational sensors, like radar and AIS and others, into a single comprehensive and easily readable picture.

EEZ – Excusive Economic Zone is a sea zone, stretching from the seaward edge of the state's territorial sea out to 200 nautical miles from its coast, over which a state has special rights over the exploration and use of marine resources.

EMODNET – European Marine Observation and Data Network.

EMSA – European Maritime Safety Agency (www.emsa.europa.eu).

ENC – Electronic Navigational Chart is a digital sea chart.

GHG – green-house gas.

GPS – Global Positioning System.

GT – gross tonnage.

IHO – International Hydrographic Organization (www.iho-ohi.net).

IMO – International Maritime Organization (www.imo.org).

INF Cargo – packed irradiated nuclear fuel, plutonium and high-level radioactive wastes carried as cargo.

ITOPF – the International Tanker Owners Pollution Federation Limited (www.itopf.com).

MARIS – Maritime Accident Response Information System of HELCOM has been created to display different existing datasets into a common GIS format and under a single user interface http://www.helcom.fi/GIS/maris/en_GB/main/.

ANNEX 3 & 4.

ANNEX 3. REQUIREMENTS OF THE BALLAST WATER MANAGEMENT CONVENTION: BALLAST WATER EXCHANGE STANDARD (D1) AND BALLAST WATER PERFORMANCE STANDARD (D2).

Ships	Construction date	Ballast water capacity	Standard applied	Applicable date
Existing ships	Before 2009	1,500 m^3 ≤cap≥5,000 m^3	BWES (D1) or BWPS (D2)	Until 2014
			BWPS (D2)	On or after 2014
		Cap <1,500 m^3 or >5,000 m^3	BWES (D1) or BWPS (D2)	Until 2016
			BWPS (D2)	On or after 2016
New ships	On or after 2009	Cap <5,000,m^3	BWPS (D2)	On or after 2009
	On or after 2009 but before 2012	Cap≥5,000,m^3	BWES (D1) or BWPS (D2)	Until 2016
			BWPS (D2)	On or after 2016
	On or after 2012	Cap≥5,000,m^3	BWPS (D2)	On or after 2012

D 1. Ballast water exchange:
- at least 200 nautical miles from the nearest land and in water at least 200 meters deep; if it is not possible as far as from but at least 50 nautical miles the nearest land and in water at least 200 deep; and with an efficiency of at least 95% volumetric exchange or pumping through three times the volume of each ballast water tank.

In absence of such areas, suitable areas may be designated according to the IMO Guidelines.

D 2. Ballast water performance standard: approved systems with efficiency specified in Regulation D-2 of Annex to BWC (number of viable organisms per unit with specified dimensions).

ANNEX 4. NUMBER OF SHIPS ACCORDING TO TYPE AND GROSS TONNAGE AND THEIR SHARE IN THE TOTAL NUMBER OF SHIPS (%) REGULATED BY THE AMENDMENT TO SOLAS CHAPTER 5 IN THE BALTIC SEA, 2008. Source: Finnish Meteorological Institute based on HELCOM AIS.

Type	Number of ships of a given category and their share (%) in the total number of individual ships in the Baltic Sea	
Passenger ships of 500 gross tonnage and upwards	308 (7.11%)	
Tankers of 500 gross tonnage and upwards	1,511 (34.87%)	
Cargo ships other than tankers		
Cargo ships 10,000 ≤ X <20,000	383 (8.84%)	1,252 (28.89%)
Cargo ships 20,000 ≤ X <50,000	696 (16.06%)	
Cargo ships 50,000 ≤ gross tonnage	173 (3.99%)	
Cargo ships 3,000 ≤ X <10,000 gross tonnage	1,262 (29.12%)	
Total number of ships for categories above	4,333	
Total number of ships in the Baltic Sea, including other ship types and smaller vessels (only vessels that can be identified with confidence are included)	*6,822*	

MARPOL Convention – the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto.

MEPC – Marine Environment Protection Committee of IMO.

MSFD – EU Marine Strategy Framework Directive.

MSP – Maritime Spatial Planning.

Nairobi Convention – the 2007 Nairobi International Convention on the Removal of Wrecks.

NECA – NOx Emission Control Area means an area where the adoption of special mandatory measures for NOx emissions from ships is required according to Annex VI of the MARPOL Convention.

NLS – noxious liquid substances.

OPRC – the 1990 International Convention on Oil Pollution Preparedness, Response and Cooperation.

OPRC-HNS Protocol – the 2000 Protocol on Preparedness, Response and Cooperation to Pollution Incidents by Hazardous and Noxious Substances.

OSPAR – the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention) (www.ospar.org).

Paris MoU on PSC – the 1982 Paris Memorandum of Understanding on Port State Control (www.parismou.org).

PF Index – Pollution per Flight Hour Index comparing the total number of observed oil spills to the total number of flight hours.

PRF – port reception facilities for ship-generated wastes.

SECA – SOx Emission Control Area means an area where the adoption of special mandatory measures for SOx emissions from ships is required according to Annex VI of the MARPOL Convention.

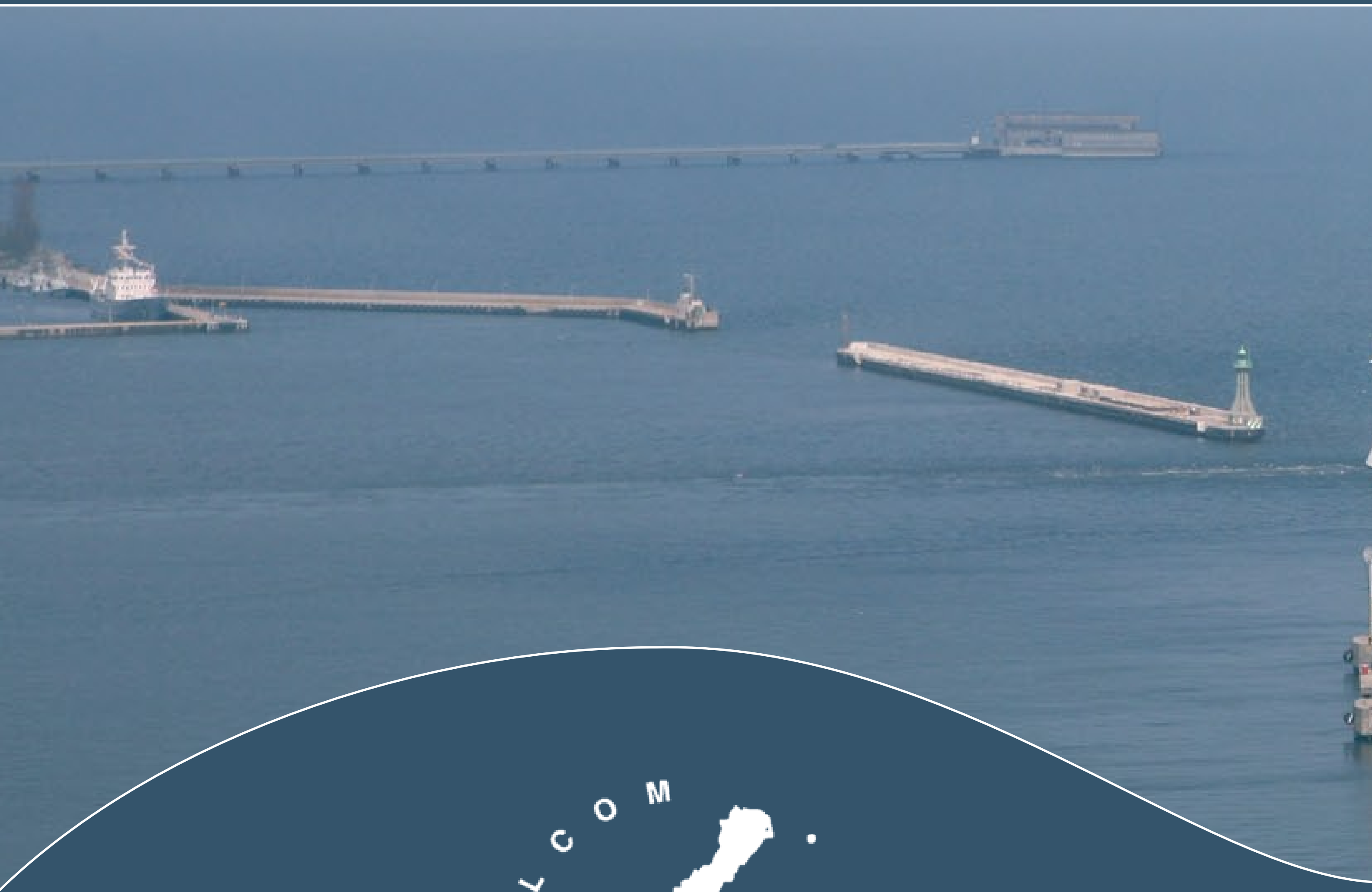
SOLAS Convention – the International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988.

TSS – a Traffic Separation Scheme is a traffic-management route-system ruled by the IMO used to regulate the traffic at busy, confined waterways. The traffic-lanes indicate the general direction of the ships in that zone; ships navigating within a TSS all sail in the same direction.

UNFCCC – the United Nations Framework Convention on Climate Change.

UNCLOS – the United Nations Convention on the Law of the Sea.

UNCTAD – United Nations Conference on Trade and Development



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