HELCOM

Ensuring safe shipping in the Baltic

Helsinki Commission

Baltic Marine Environment Protection Commission

Contents

Sergey Vlasov

HELCOM, ensuring safe shipping in the Baltic

Helsinki Commission (HELCOM)
Katajanokanlaituri 6 B, FI-00160 Helsinki, Finland
E-mail: info@helcom.fi
Web: www.helcom.fi

Editorial team:
Monika Stankiewicz, HELCOM Professional Secretary,
Nikolay Vlasov, HELCOM Information Secretary
Design and layout: Leena Närhi, Bitdesign, Vantaa, Finland
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Front cover photos: Nikolay Vlasov, HELCOM (top), Kaj Granholm, HELCOM (bottom)
Back cover photos: Nikolay Vlasov, HELCOM (top), Markku Arovaara (bottom)

Sergey Vlasov

HELCOM

The Helsinki Commission (HELCOM), an intergovernmental organization of the nine Baltic Sea coastal countries and the European Community, works to protect the Baltic marine environment from all sources of pollution and to ensure the safety of navigation and efficient response to pollution from shipping in the region.

One of the major subsidiary working groups of the Helsinki Commission - the Maritime Group (HELCOM MARITIME) develops measures to ensure safe navigation in the Baltic Sea area, limit sea-based pollution, including emissions, discharges, and transfer of alien species by ships. The Maritime Group also ensures that adopted regulations are observed and enforced effectively and uniformly through close international co-operation.

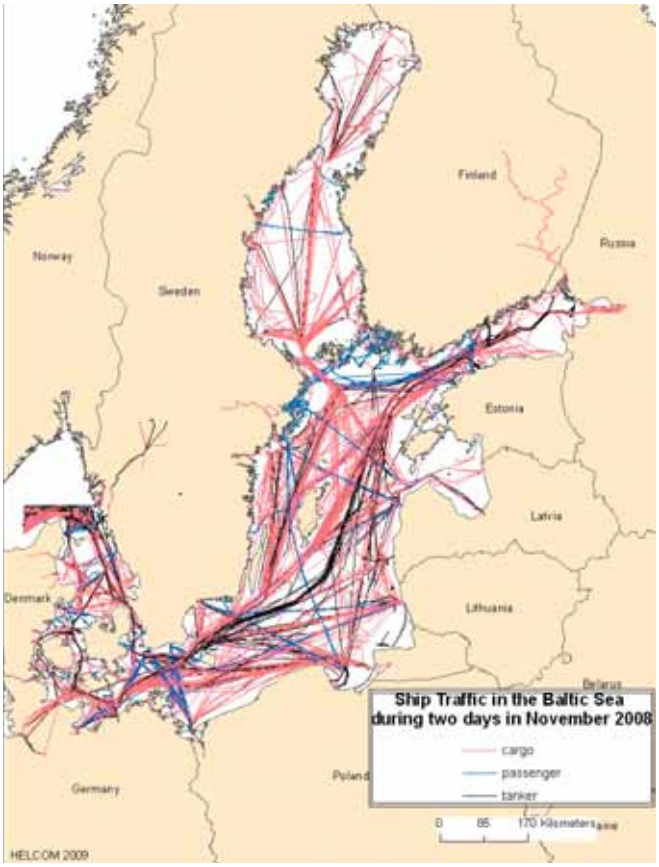
The Baltic Sea

The Baltic Sea is one of the heavily trafficked seas in the world, accounting for up to 15% of the world's cargo transportation. Both the number and the size of ships have grown in recent years, especially in respect to oil tankers, and this trend is expected to continue.

The Baltic's narrow straits and shallow waters, many of which are covered by ice for prolonged periods in winter, make navigation very challenging, and increase the risk of shipping accidents.

The main environmental effects 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 sewage discharges and nitrogen oxides (NOx) emissions.

Sergey Vlasov



Busy waters

According to the HELCOM Automatic Identification System (AIS) for monitoring maritime traffic, established in mid-2005, there are about 2,000 ships in the Baltic marine area at any given moment, and each month around 3,500–5,000 ships ply the waters of the Baltic.

The whole Baltic Sea area has been covered by land-based AIS stations since 1 July 2005 making the Baltic the first region in the world capable of real-time monitoring of ship traffic.

The task of the shore-based AIS network is to provide the competent authorities with a monitoring tool for supervision, risk analyses, search and rescue (SAR) operations, port state control, security and other safety-related tasks to ensure safe navigation in the Baltic Sea.

A more complete picture of shipping intensity in the Baltic can be illustrated by the number of ships, including their type, crossing the HELCOM AIS pre-defined lines as presented on pages 5,6.

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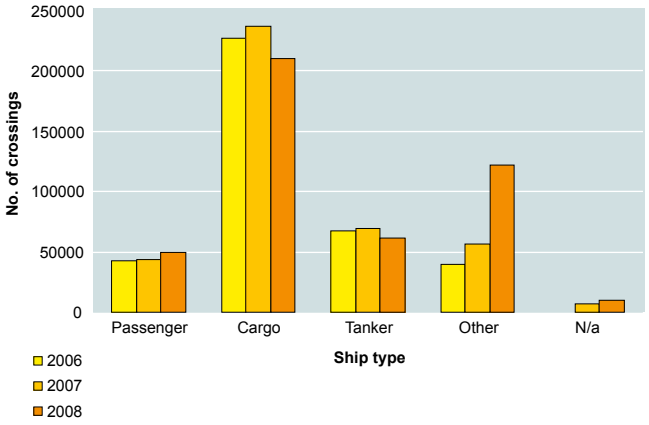
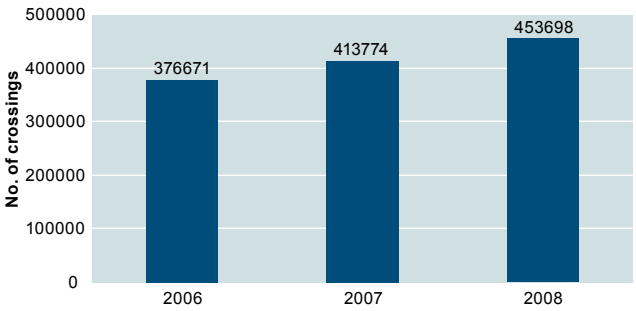
Nikolay Vlasov, HELCOM

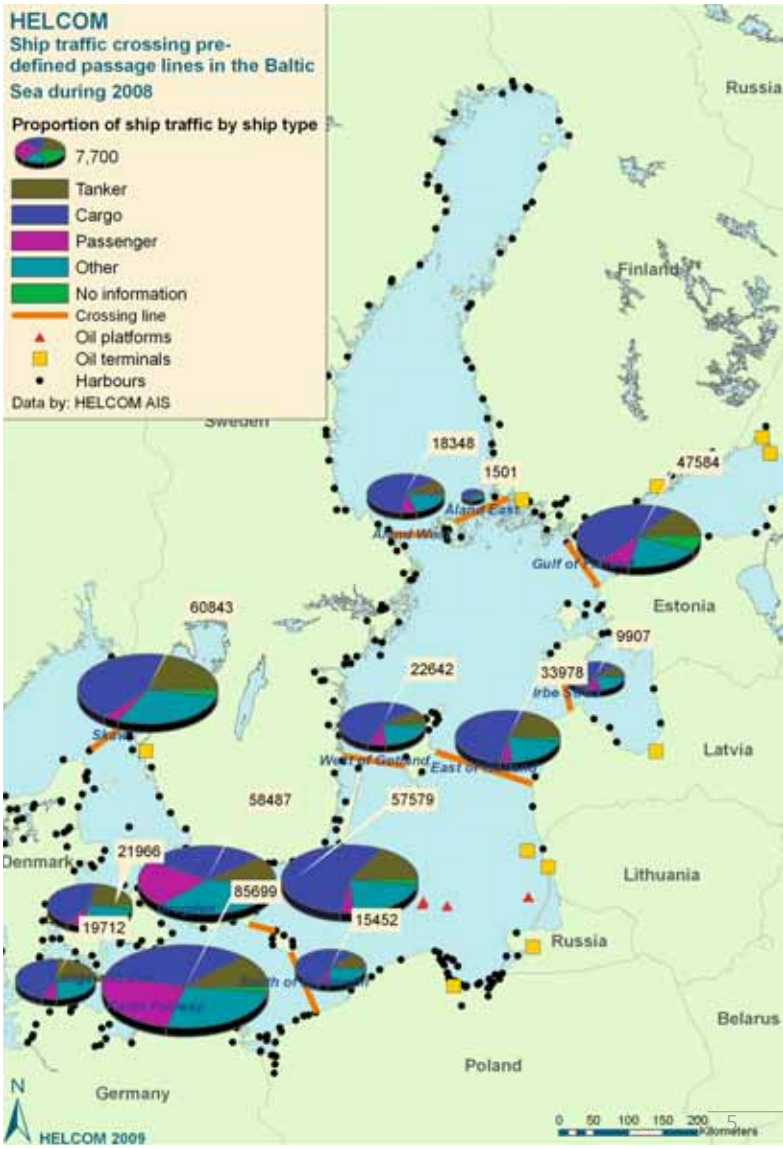
Forecasts indicate that due to long-term economic growth, especially in the eastern part of the Baltic region, the amounts of cargo shipped on the Baltic will grow 64% by 2020 from a level of 731 million tonnes in 2003.

Number of ships crossing predefined AIS passage lines in the Baltic Sea by ship type, 2006-2008



Number of ships crossing predetermined AIS passage lines in the Baltic Sea, 2006-2008



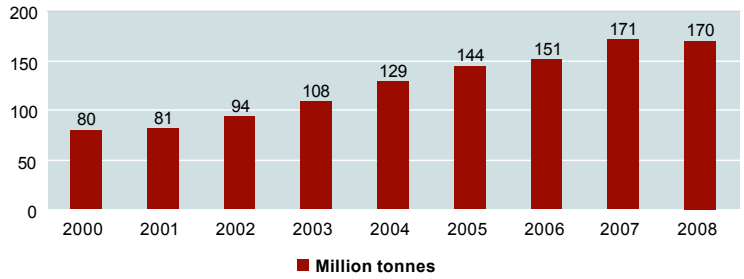


Mikhail Durkin, HELCOM

Number and percentage of ships crossing predefined AIS passage lines in the Baltic Sea, 2006–2008

	Passenger	Cargo	Tanker	Other	N/a	Total
2006	42731	226855	67458	39627		376671
%	11.3	60.2	17.9	10.5	0.0	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	100.0

Amount of oil transported via the Great Belt, 2000-2008



The transportation of oil and other potentially hazardous cargoes is growing steeply and steadily. More than 4.400 tankers loaded with oil left or entered the Baltic Sea in 2007. The oil being shipped on the Baltic reached 170 million tonnes in 2008 and a 40% increase is expected by the year 2015. The use of much bigger tankers is also expected to rise – there will be more tankers in the Baltic carrying 100,000-150,000 tonnes of oil.

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Ensuring maritime safety

The Baltic Sea States have agreed on certain safety measures in the Baltic Sea area, such as ship traffic monitoring, ship routeing systems; including numerous traffic separation schemes and deep water routes, ship reporting, pilotage, measures related to safety of winter navigation. 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. Web-based version of the Mariners' Routeing Guide for the Baltic Sea is available at www.helcom.dk/map.

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

- BELTREP in the Great Belt Traffic Area,
- GOFREP in the Gulf of Finland,
- GDANREP on the approaches to the Polish Ports in the Gulf of Gdańsk.

IMO also recommends that large ships navigating the waters 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.

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A transit route (Route T) through the Kattegat, the Great Belt and the Western Baltic has been established for deep draught ships entering the Baltic Sea. Five other deep water routes have been established. Also, 19 traffic separation schemes are established and adopted by IMO in some parts of the Baltic Sea area.

Pilotage services are established locally by the coastal states. Additionally, IMO recommends that, when navigating the Sound and Route T, pilotage services should be used by certain ships, including loaded oil tankers with a big draught. Certified Baltic deep sea pilots are available in all Baltic Sea States.


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Irina Gasilina

More safety – less accidents

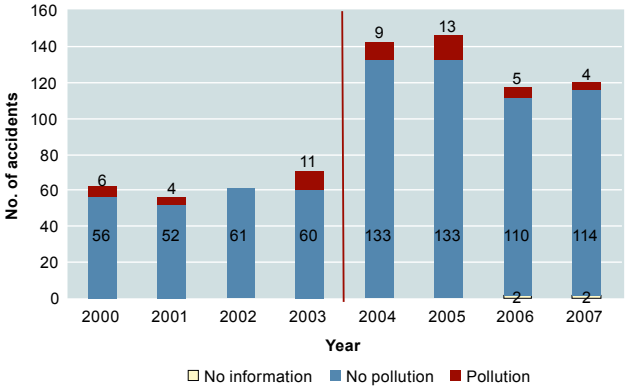
While every year there are more and more ships plying the waters of the Baltic Sea, the occurrence of ship-to-ship collisions, one of the most serious types of accidents at sea, has decreased sharply since 2005, especially in such a busy traffic area like the Gulf of Finland. On average there are about 120 accidents per year within the Baltic region with only a few accidents resulting in small-scale pollution.

The annual ship-to-ship collisions have decreased, despite an overall 10% increase in the ship traffic in the Baltic compared to 2006.The launch of HELCOM AIS in 2005, traffic separation schemes and ship reporting systems introduced in the Baltic (e.g. Gulf of Finland Reporting System - GOFREP) have had a positive effect on the safety of navigation and might have contributed to the reduced number of collisions over the recent years, especially in the Gulf of Finland.

Currently the most common type of accidents is groundings, accounting for almost a half of all the reported cases in 2007. Collisions are the second most frequent type of shipping accidents (33%). This includes collisions with vessels, fixed or floating structures, e.g. peers, navigation signs etc. In 2007 there were only 15 ship-to-ship collisions. That is 50% less than in 2005 and 2006. Other major types of accidents include fires (8%) and machinery damage (6%).

Most of the accidents usually occur in the south-western Baltic Sea. Cargo vessels (55%), tankers (13%) and passenger ferries (20%) are the main types of vessels involved in the accidents in 2007. This proportion more or less reflects the amount of different vessel types making up the Baltic Sea traffic during that year. However, a higher risk can be observed for passenger ships which made up 10% of the overall traffic while their share in accidents was as much as 20%. The main cause of accidents is not clear, due to the lack of information in 32% of all cases. However, human error

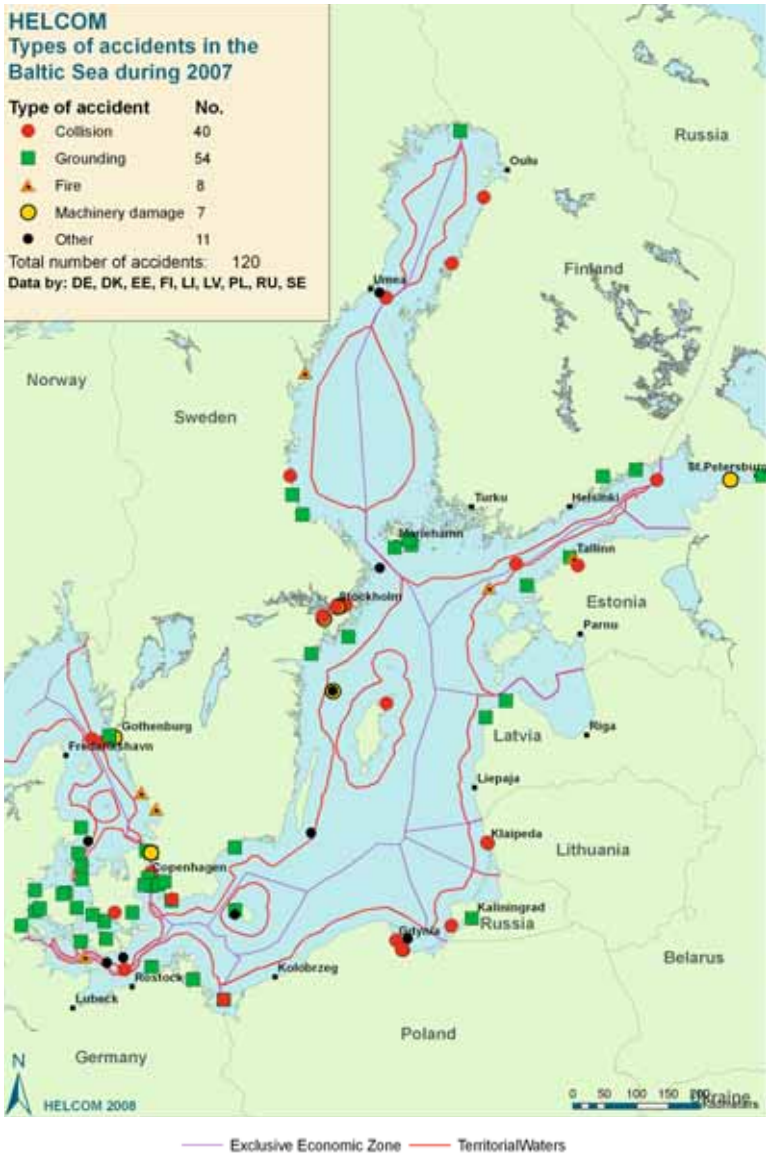
Number of accidents in the Baltic Sea, 2000-2007



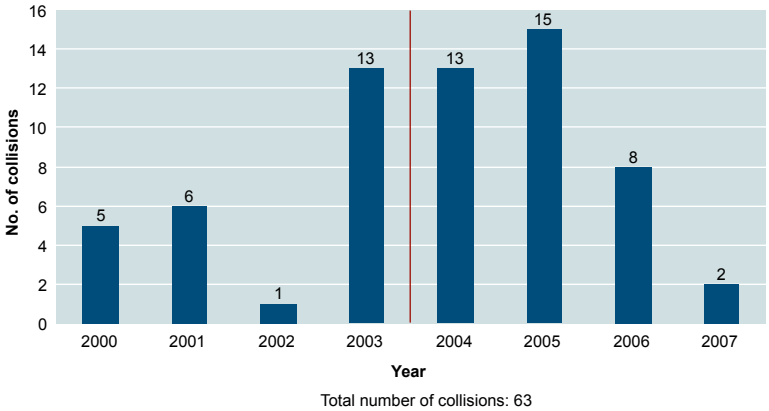
(32%) still seems to continue to be the main factor, followed by technical factors (20%).

Of all the oil spills during the past few years, the largest contained 12 tonnes of oil (following a grounding in heavy weather conditions in Latvia), the second largest was no more than 0.2 tonnes of oil (following a collision off Kaliningrad).

Fortunately, most of the accidents in the Baltic do not cause notable pollution, but even one large-scale accident would seriously threaten the marine environment. Over the past years, an average of 7% of all the reported accidents resulted in some kind of pollution. In 2007, this percentage was lower (3%). Two of the five most serious accidents in the Baltic marine area have occurred since 2001 – involving "Baltic Carrier" in 2001 (2,700 tonnes of oil spilt), and "Fu Shan Hai" in 2003 (1,200 tonnes of oil spilt).



Collision accidents in the Gulf of Finland, 2000-2007

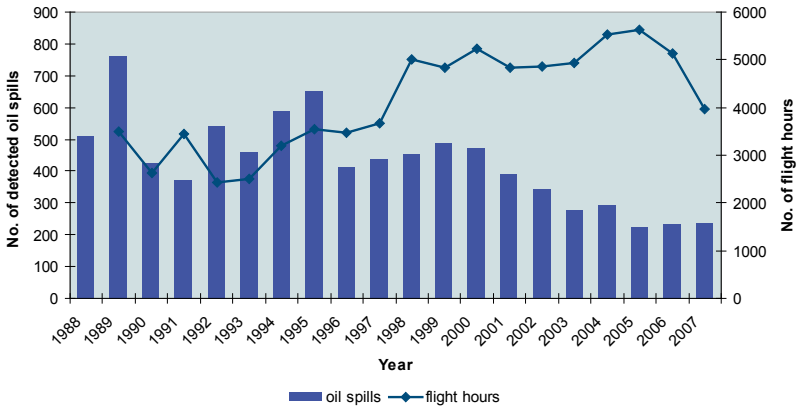


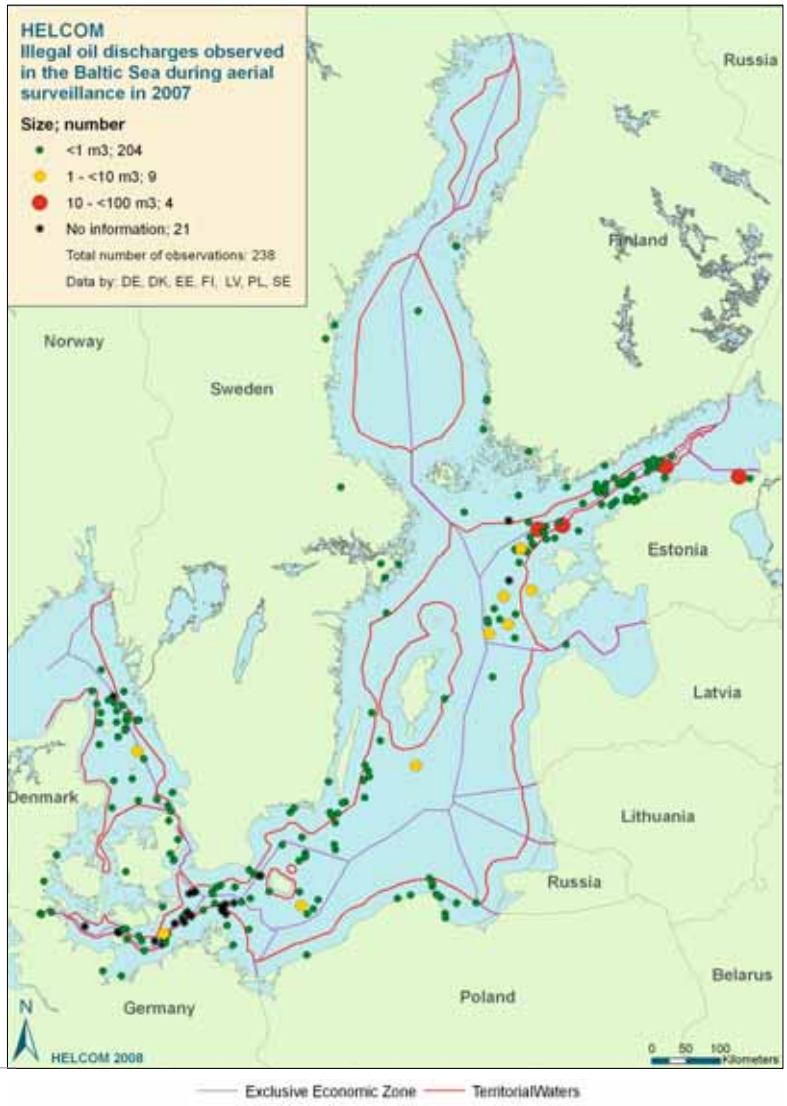
Total number of collisions: 63

Fighting illicit oil spills

Deliberate oil discharges from ships are one of the most serious problems in the Baltic Sea, requiring much attention from HELCOM. Illegal discharges have been regularly observed during surveillance flights over the Baltic Sea since 1988. One of the peak years was 1989, when 763 spills were detected during 3,500 flight hours. Since 1999, the number of discharges has been steadily decreasing.

The total number of flight hours and observed oil spills in the HELCOM area during aerial surveillance, 1988-2007





Currently the annual number of deliberate, illegal oil discharges from ships observed by national surveillance planes and satellites over the Baltic Sea area has dramatically decreased and remains at record lows - at around 240 incidents per 4,000 hours of surveillance flights. Most of the illegal oil discharges are detected along major shipping routes.

Up to 90% of the discharges are less than one cubic metre and even less than 100 litre. The total estimated volume of oil spills observed in 2007 was 125.4 cubic metres.

In the vast majority of cases of detected illegal discharges, the polluters remain unknown. Out of the total number of confirmed illegal discharges, the polluters are usually identified only in few cases.

Regular aerial surveillance flights have contributed significantly to the decrease in discharges because ships are aware that their illicit polluting activities can be detected. In 2007, this means of pollution control, was substantially strengthened thanks to the CleanSeaNet (CSN) satellite service launched by the European Maritime Safety Agency (EMSA). Satellite images can indicate 'candidates' for oil spills at sea, which can be later verified on site by a vessel or aircraft. The national satellite pictures, coupled with CSN, can detect illegal discharges at sea as well as provide support to response operations in the event of accidental oil spills. In 2007, 313 detections were made by satellite surveillance, out of which 54 were confirmed as mineral oil.

Both aerial and satellite surveillance have contributed to the enforcement of the Baltic Strategy. The main objectives of the Strategy, which was made operational by the HELCOM Ministerial Meeting in 1998, are to ensure ships' compliance with global and regional discharge regulations, and to eliminate illegal discharges of all wastes from all ships into the sea, and thus prevent the polluting of the Baltic Sea. Another Strategy objective is to ensure the environmentally sound treatment of ship-generated wastes when these wastes have been delivered to port reception facilities.

Today, a blanket ban covers all discharges into the Baltic Sea of oil or diluted mixtures containing oil in any form, including crude oil, fuel oil, oil sludge and refined products. Only if the oil content in the

effluent does not exceed 15 parts per million can the discharge be permitted. This prohibition stems from the international designation of the Baltic Sea as a 'special area' under the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78).

To uphold this prohibition, HELCOM requires all ships, with a few exceptions, to deliver all such oily wastes to reception facilities before leaving port. To further encourage delivery, the countries bordering the Baltic Sea have agreed that ships should not be charged for using such reception facilities, under the 'no-special-fee' system. Instead, costs are recovered from general harbour fees or general environmental fees.

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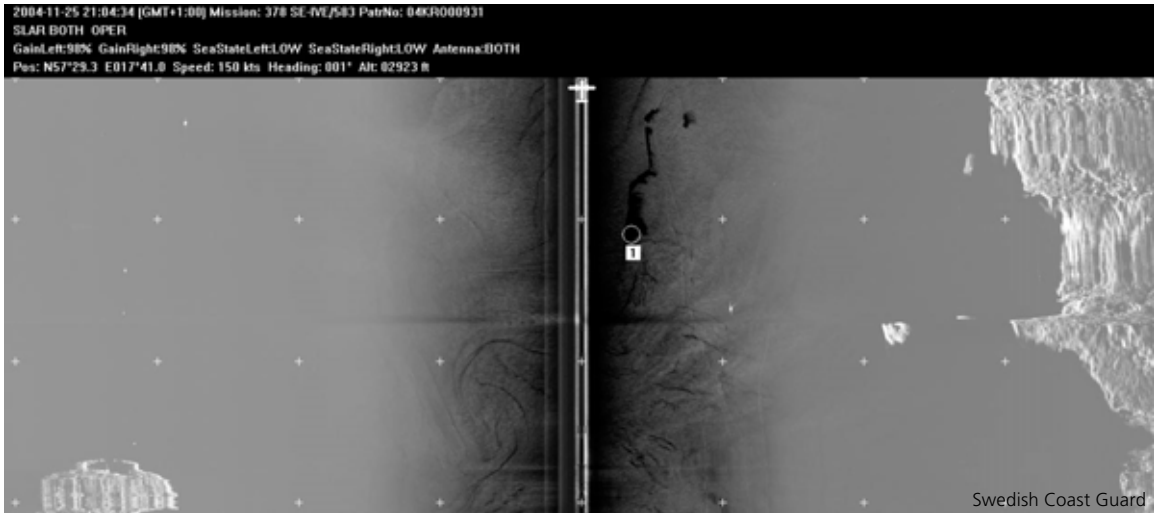
Swedish surveillance aircraft



Swedish Coast Guard

SLAR image indicating an oil spil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SLAR

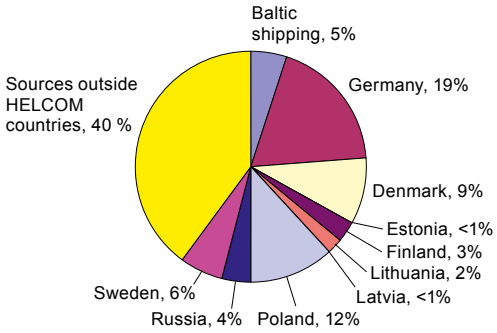

Swedish Coast Guard

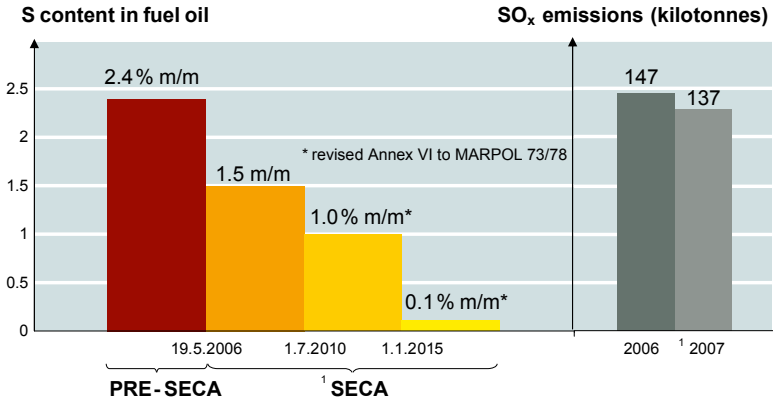
Photo of a detected oil spil

Tightening control on emissions

Atmospheric nitrogen deposition is one of the main contributors to the high nutrient concentrations that stimulate massive algae blooms in the Baltic. Shipping has its share in this deposition through emission of nitrogen oxides (NOx) mainly from the operation of diesel engines. Shipping is also a source of other air pollutants like sulphur oxides (SOx), resulting from combustion of marine fuels and directly depending on the sulphur content of the fuel, and carbon dioxide (CO_2).

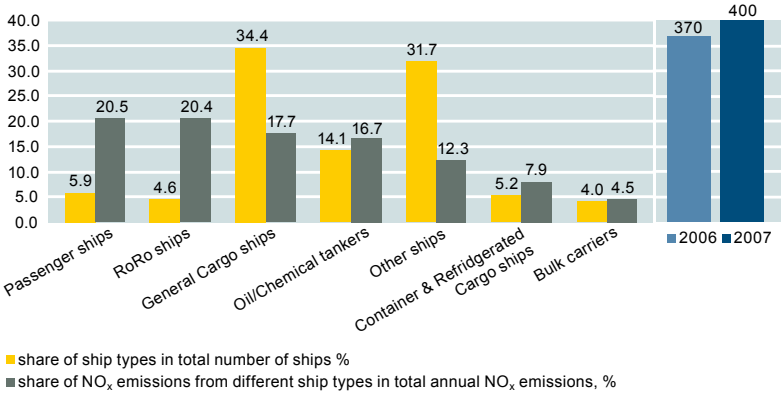
Average annual contribution of NOx emissions from HELCOM countries and shipping in the Baltic to the deposition of total nitrogen to the Baltic Sea in the period 2000 - 2006





Sulphur (S) content in fuel oil used onboard ships in the Baltic Sea before and after establishing the Baltic as a SOx Emission Control Area (SECA) and total SOx emissions (kilotonnes) from shipping in the Baltic in 2006 and 2007

Shares of total NOx emissions by ship type, compared to ships' share in the traffic in the Baltic Sea, 2006, and total NOx emissions (kilotonnes) from shipping in the Baltic in 2006 and 2007



share of ship types in total number of ships %
share of NO_x emissions from different ship types in total annual NO_x emissions, %

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 the International Maritime Organisation (IMO), the Baltic Sea has been designated as a SOx emission control area (SECA) under Annex VI to MARPOL 73/78.

Moreover, HELCOM countries submitted two joint documents to the 57th session of the IMO Marine Environment Protection Committee (MEPC) in 2008 calling for tighter international regulations to prevent a predicted sharp increase in NOx emissions from ships in the Baltic Sea as well as describing the Baltic region's experience as a SOx Emission Control Area (SECA).

The revised Annex VI to MARPOL 73/78, adopted by MEPC 58, puts new limits for the sulphur content of any fuel oil used on board ships within the Baltic SECA, and requires world-wide that marine diesel engines installed on ships constructed on or after 1 January 2011 to achieve a 15% reduction level of NOx in comparison to the current legislation. It also provides for establishing of NOx Emission Control Areas (NECA), requiring ships being constructed on or after 1 January 2016 and operating in a NECA to reduce their NOx emission by 80% in comparison to the current situation.

The biggest source of nitrogen and phosphorus entering the Baltic Sea is riverine load. However, for nitrogen, another major pathway is the emissions of NOx and ammonia (NH_3) to the air and their subsequent depositions to the sea.

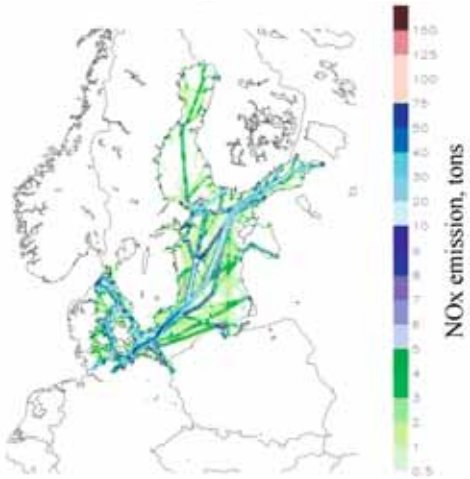
In 2006, as much as 43% of nitrogen reaching the sea came from the air. While in case of ammonia, roughly 90% of the emissions originated from agriculture, the main sources of nitrogen oxides were from road transportation, energy combustion and shipping.

Within 2000–2006, shipping in the Baltic was the second largest contributor (9 %) to the deposition of nitrogen oxide, and the fifth greatest contributor (5%) to total nitrogen deposition to the Baltic Sea basin. However, the contribution can reach up to 50% in some areas and seasons.

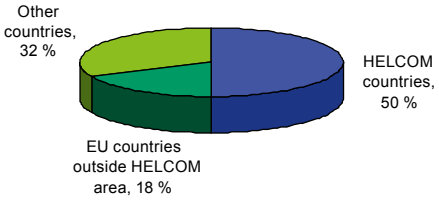
In 2007 the total annual NOx emissions was 400 kilotonnes. Half of these emissions were generated by ships flying the flags of the HELCOM countries, 18% from vessels flying a flag of EU Member States from outside the HELCOM area, and the remaining third came from ships under other countries' flags. This division was made by examining ships' Mobile Maritime Service Identity (MMSI) numbers and their country codes.

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

Total NOx emissions from shipping in the Baltic Sea, March 2007



Share of ship emissions in the Baltic based on flag state

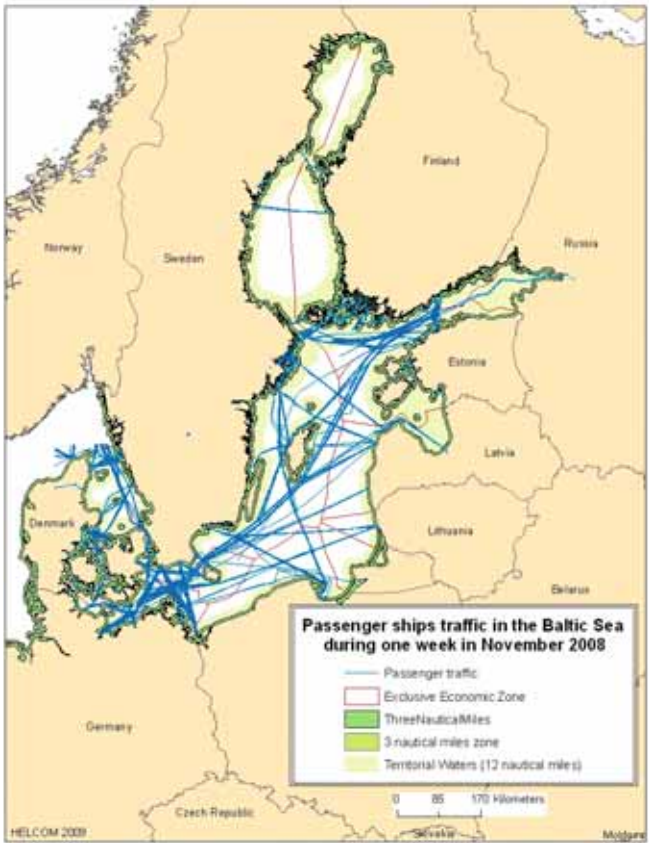


Sergey Vlasov

Nikolay Vlasov, HELCOM

Working towards stricter sewage discharge regulations

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. These loads, which are concentrated along shipping routes, are immediately available for uptake by planktonic algae adding to the severe eutrophication of the Baltic Sea.



The ship-borne nitrogen load represents approximately 0.04% of the total nitrogen load (744,900 tonnes), and the phosphorus load represents approximately 0.3% of the total phosphorus load (34,500 tonnes) into the Baltic Sea. Excessive loads of phosphorus and nitrogen have a detrimental impact on the marine environment. Phosphorus is directly responsible for the mass occurrences of blue-green algae which form foul-smelling, possibly toxic masses and make the water unfit for swimming. 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 of Finland- Espoo, Hamina, Kotka, and Porvoo.

According to Annex VI of MARPOL 73/78, the discharge of sewage into the sea is allowed if a ship is discharging comminuted and disinfected sewage at a distance of more than 3 nautical miles from the nearest land, or sewage which is not comminuted or disinfected at a distance of more than 12 nautical miles from the nearest land, provided that in any case, the sewage that has been stored in holding tanks shall not be discharged instantaneously but at a moderate rate when the ship is on route and proceeding at not less than 4 knots. All these discharge regulations equally apply to small ships, including fishing vessels, working vessels and pleasure craft, according to the HELCOM regula-

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tions. But the nutrient loads caused by nitrogen and phosphorus released from ships in sewage are currently not regulated.

In response to the need for new regulations on wastewater discharges from ships in the Baltic Sea, HELCOM has started work on a joint submission to the IMO, calling for the existing sewage treatment regulations to be extended to cover also nutrients. This initiative is part of the HELCOM Baltic Sea Action Plan with a target of eliminating the discharge of sewage from ships, especially from passenger ships and ferries.


Nikolay Vlasov, HELCOM

Protecting the sea from invasive alien species

Due to increasing shipping, more alien species are finding their way into the Baltic Sea than ever before. These non-indigenous invaders can induce considerable changes in the structure and dynamics of marine ecosystems. They may also hamper the economic use of the sea or even represent a risk to human health. Over 120 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. Most of these invasive species originate from freshwater or brackish-water environments, particularly from North America or the Ponto-Caspian region.

In order to reduce the risks of such species entering the HELCOM maritime area through ballast water exchange, the HELCOM countries have agreed to ratify by 2010, or at the latest by 2013, the 2004 International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Management Convention, BWMC). Before ratification can take place, certain steps must be taken as set out in the HELCOM Road Map drawn up to facilitate the implementation of the Convention.

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Nikolay Vlasov, HELCOM

As of 1 April 2008 HELCOM countries, together with OSPAR countries of the North-East Atlantic, have been applying General Guidance according to which vessels transiting the Atlantic or entering the North-East Atlantic from routes passing the West African Coast are requested to carry out ballast water exchange on a voluntary basis before arriving in the OSPAR area or passing through the OSPAR area and heading to the Baltic Sea. Vessels are expected to carry out ballast water exchange in waters of specific depth and distance from the coast.

Vessels leaving the Baltic and transiting through the OSPAR maritime area to other destinations will also be requested as of 1 January 2010 not to exchange their ballast water either in the Baltic or until the vessel was 200 nm off the coast off North-West Europe in waters greater than 200 m deep.

Additionally, to prepare for implementation of the Ballast Water Management Convention HELCOM has developed a list of non-indigenous, cryptogenic and harmful native species in the Baltic Sea.

Also, the Target Species that may impair or damage the environment, human health, property or resources in the Baltic Sea have been listed. The lists are to facilitate risk assessments which are required in order 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. The HELCOM Target Species list includes the relevant species from the North Sea region, the Ponto-Caspian region and the North American Great Lakes, as they are considered as high risk donor areas due to similar climate and salinity ranges as the Baltic Sea and records of donating alien species in the past.

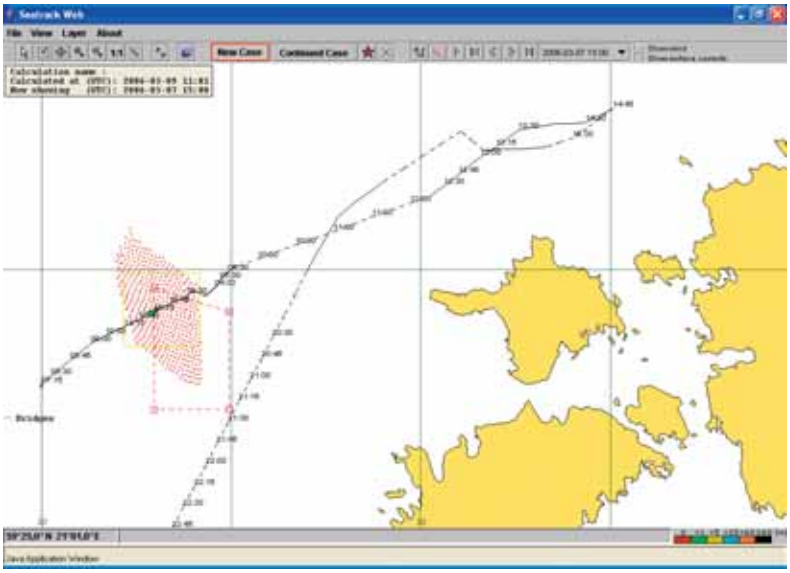
Elena Bulycheva

Identifying suspects of illegal discharges

The Seatrack Web oil drift forecasting system in combination with the HELCOM Automatic Identification System (HELCOM STW/AIS) has proved to be a very effective tool, substantially facilitating the efforts of the HELCOM countries to identify ships suspected of illegally discharging oil into the sea, and providing better evidence for the courts.

STW/AIS can be used for the backtracking simulation of detected oil spills. Based on an identified time window and area of interest, a database query is sent to an AIS database server. Ship tracks that match the query are extracted from the database, and subsequently plotted together with the oil spill backtracking trajectory in the Seatrack Web application.

In 2008, STW/AIS was upgraded to integrate satellite information to further increase the likelihood that polluters will be identified.



Snapshot from the HELCOM Seatrack Web showing an oil slick and its backtracking trajectory (in red) together with the route of a suspected ship

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Detecting non-compliant ships

A system to detect single hull tankers carrying heavy grade oil entering the Baltic Sea was put into operation on 15 October 2007. The system has been produced within the HELCOM/EMSA Single Hull Tanker Project, based on the HELCOM AIS. Its aim is to monitor ships' compliance with the provisions of the amended Annex I of the MARPOL 73/78 and the EC Regulation 1726/2003 on the carriage of heavy oil in single hull tankers.

More than 140 active single hull tankers have been detected in the Baltic Sea since the system was launched. Six of these vessels failed to answer calls from the VTS and were likely to be carrying heavy grade oil. The system has the potential to be employed in many other similar monitoring applications, including for example automated screening for banned vessels such as those identified under the 1982 Paris Memorandum of Understanding on Port State Control.

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