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Maritime transport, shipping and ports

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Currently, more than 90% of the globally traded goods are transported by sea. In 2010, 8.4 billion tons of goods were transported by sea-going ships. By the end of 2010, the world merchant fleet consisted of 104,304 ships (over 100 GT), equalling a total of 1,043.01 million GT (*International Shipping facts and figures, IMO 2012* ²²⁵⁴⁸⁵). In 2009, the merchant fleet of the European Union (EU) consisted of 11,621 ships (over 100 GT), 177 of which were Belgian (*EU transport in figures 2011* ²²⁵⁴⁹⁰).

The Belgian sea ports are situated at some of the busiest trade routes worldwide, with over 150,000 ship movements a year (*Goffin et al. 2007* ¹¹⁴²²⁵, *Vermeersch & Desnouck 2009* ¹³⁵⁶⁹⁶), in the so-called Le Havre-Hamburg range (with Antwerp, Ghent, Zeebrugge, Rotterdam, Amsterdam, Bremen, Hamburg, Dunkirk and Le Havre as the main sea ports). Ostend has also been taken into account in the figures of the Flemish sea ports (*Notteboom 2003* ³⁸⁴¹¹). The total traffic in the Le Havre-Hamburg range in 2012 was 1,102 million tons, with the Flemish ports accounting for a market share of 23.3% (Source: *Flemish Port Commission*).

Maritime transport and shipping in the Belgian part of the North Sea (BNS) will be discussed in detail below. When discussing ports in this theme, only sea ports (with the main purpose of handling sea-going ships) are taken into account, whereas fishing ports (mooring for fishing boats, cf. theme Fishing) and the marinas (mooring for recreational boats, cf. theme Tourism and recreation) are not considered (*Jargon list website Flemish Port Commission*).

2.1 Policy context

On the international level, shipping and maritime transport are covered by several international treaties and resolutions of the International Maritime Organization (*IMO, IMO brochure* ²¹⁴⁶⁹⁹). The *United Nations Convention on the Law of the Sea, UNCLOS*, 1982 can be considered as the primary piece of legislation. This convention can be regarded as the constitution of the sea, including the general rights and obligations of nations (flag states, coastal states, port states). Furthermore, the IMO is responsible for a significant amount of other conventions about, *inter alia*, safety at sea, traffic regulations and pollution prevention (see *list at IMO website*), that will be further discussed in detail in the section Sustainable use.

The European Union (EU) also takes policy initiatives related to the ports in the EU (more information: *website Flemish Port Commission, VHC*), maritime transport in the EU, maritime safety and pollution prevention. The publication Harbour Light (*Merckx et al. 2012* ²²⁰⁴¹¹) provides an overview of the European regulations that are important with regard to the ports (more information: *website Flemish Port Commission, VHC*). Besides the regulations of the EU, the *Bonn Agreement* regulates the collaboration between the North Sea coastal states in case of pollution by oil and other harmful substances (*brochure 40 years of the Bonn Agreement* ²¹⁴⁶⁹⁷, *Goffin et al. 2007* ¹¹⁴²²⁵).

In Belgium, maritime transport is a federal matter, covered by the *FPS Mobility, Directorate-General (DG) Maritime Transport (Policy document Energy, Environment and Mobility 2012* ²²⁶⁴⁵⁶, *Policy document Economy, Consumers and the North Sea 2013* ²²⁶⁴⁵⁵, other federal actors are listed in table 1). The DG Maritime Transport ensures that the ships sailing under a Belgian flag or ships entering at Belgian ports, meet the international maritime regulations concerning shipping safety, such as the construction and equipment standards, but also the crew standards and the environmental regulations, both technically and administratively. The DG Maritime Transport represents Belgium within the IMO. The navigation regulations that have to be observed are listed on the website of the *FPS Mobility and Transport*.

The *law of 8 August 1980* defines that waterways and their appurtenances, ports and their appurtenances, pilotage and fairway services towards the ports, as well as rescue and towing services at sea are the responsibility of the Flemish Region, within the policy domain of *Mobility and Public Works* (MOW) (see list of Flemish actors in table 1).

The port policy is stipulated by the *Ports Decree (2 March 1999)* (*Flemish Policy Document Mobility and Public Works 2009-2014* ²²⁶⁴⁵⁸). The Flemish Port Commission (*VHC*) has both an advisory and an informative function related to the socio-economic aspects of port projects, while the *Milieu- en Natuurraad van Vlaanderen (Minaraad)* provides advice on environmental aspects of port projects of over 10 million euros which require funding. The initiative *Flanders Port Area* aims to promote the collaboration between the four Flemish sea ports. In this context, the Flemish sea ports of Antwerp, Ghent, Ostend and Zeebrugge and the Flemish port associations have concluded a cooperation agreement with 30 points of collaboration in order to strengthen the competitiveness on an international level.

Table 1. Overview of the Flemish and Federal partners of the Coast Guard.

FLEMISH PARTNERS OF THE COAST GUARD	FEDERAL PARTNERS OF THE COAST GUARD
<i>Vloot</i>	Federale politie (<i>Shipping police</i>)
<i>Water and Port Policy Division</i>	<i>FPS Home Affairs</i>
<i>Afdeling Internationaal Milieubeleid</i>	<i>FPS Foreign Affairs</i>
<i>Maritime Acces Department</i>	<i>FPS Economy, S.M.E.s, Self-Employed and Energy</i>
<i>Shipping Assistance Division</i>	<i>FPS Finances (Belgian Customs)</i>
<i>Coastal Division</i>	<i>FPS Mobility and Transport (DG Maritime transport)</i>
<i>Pilotage</i>	<i>FPS Health, Food Chain Safety and Environment (Marine Environment Department)</i>
<i>Dienst Zeevisserij</i>	<i>Ministry of Defence</i>
	POD Duurzame Ontwikkeling
	<i>PPS Science Policy (Management Unit of The North Sea Mathematical Models (MUMM), scientific service of the Royal Belgian Institute of Natural Sciences (RBINS))</i>

The coordination and the consultation between federal, Flemish as well as regional authorities (see table 1) and the Province of West Flanders (*cooperation agreement of 8 July 2005*) is carried out by the *Coast Guard*. The organisational structure of the coast guard consists of a policy-making body, a consultation body and a secretariat. The policy-making body coordinates the collaboration between the different partners and advises the responsible ministers (article 6 of the *cooperation agreement of 8 July 2005*). The consultation body of the coast guard investigates certain files and gathers information for the policy body (article 12 of the *cooperation agreement of 8 July 2005*).

The coast guard centre is the operational section of the coast guard and consists of two services, which collaborate intensively: the Maritime Rescue and Coordination Centre (*MRCC*) in Ostend and Maritime Security Centre Belgium (*MIK*) in Zeebrugge. Their tasks were stipulated in the *Decree of 16 June 2006*, the *Agreement of the Flemish government of 26 October 2007* and the *Royal Decree of 6 February 2009*.

An overview of the legislation concerning marine usage, shipping and ports is also available in the coastal codex, themes *shipping* and *port and industry*.

2.2 Spatial use

In the BNS, a large part of the traffic is taking place in frequently used routes. For these routes, a routing system (*ship's routing, IMO*) was adopted within the *IMO*:

- The **traffic separation scheme North Hinder**, dealing with East-West traffic in the northern part of the exclusive economic zone (EEZ). This traffic separation scheme is part of a larger traffic separation scheme through the English Channel and the Strait of Dover, and is used by ships sailing between the Southern part of the North Sea and the Northern part of the North Sea or the connection to the Baltic Sea. This is one of the busiest shipping routes worldwide.
- **Traffic separation scheme Westhinder**. In Dunkirk, this traffic separation scheme is connected to the East-West traffic route and is used by ships travelling from and to the Belgian ports (the sea ports as well as the Scheldt ports). More than 90% of shipping traffic on this route has its destination or departure in a Scheldt port, and will thus navigate to or from the Scheldt estuary. At the end of this route, a precautionary area (defined by the IMO) is indicated, where ships subject to compulsory pilotage can be boarded by a pilot. To do so in a safe way, the **anchorage area Westhinder**, as well as the anchorage area Oost Dijck, have been demarcated, complemented by an area to be avoided between the anchorage area Westhinder and the traffic separation scheme Westhinder. The anchorage area Westhinder is a possible refuge for ships that need assistance.
- A **deepwater route** is connected to the anchorage area Westhinder. This is a route with a greater depth, allowing large vessels to navigate to the coastal ports or to the Scheldt estuary. These ships have limited manoeuvrability, which means that a safe passage requires a strictly delimited route with specific regulations.

MAP WITH INDICATIONS OF THE IMO FAIRWAYS AND OTHER IMPORTANT SHIPPING ROUTES

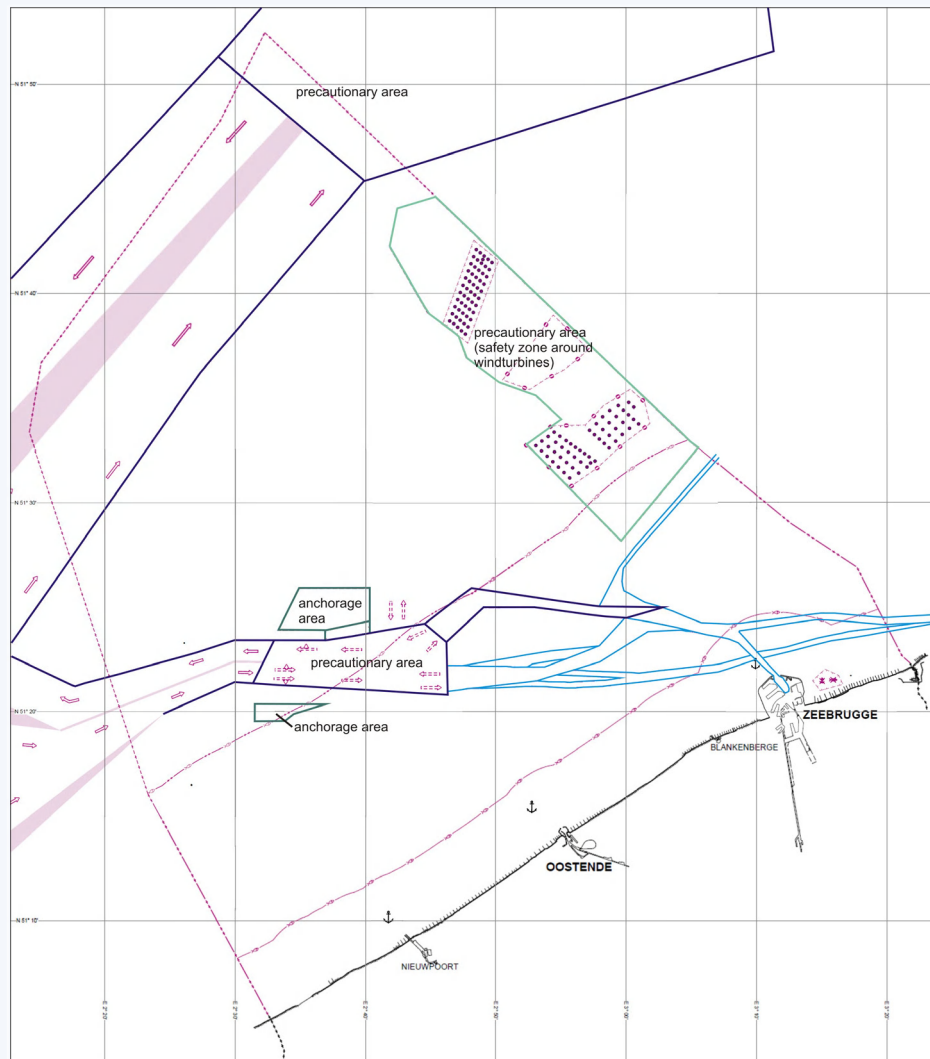


Figure 1. Map with the IMO fairways (dark blue) and other important shipping routes (light blue) (*Continental Shelf & Flemish Hydrography 2013* 227521).

Furthermore, the concession area for the installation of offshore electricity production is surrounded by a safety zone of 500 meters (this zone does not enter the Dutch EEZ boundary). This area is indicated by the IMO as a **precautionary area**. In addition, a safety zone of 500 meters is demarcated around every construction within the concession areas (*Royal Decree of 11 April 2012*, see also theme *Energy (including cables and pipelines)*).

In addition to the frequently used routes, for which IMO has created routing systems, there exist **other important and frequently used shipping routes** in the BNS towards the ports or the Scheldt area. These routes are used by ships as they are marked and/or dredged, guaranteeing a safe shipping depth. Most of these routes are also pilotage routes. Therefore, the maritime pilot on board the ship will advise the captain to take these routes. Most of the merchant ships are subject to compulsory pilotage. Only when the captain has a valid pilotage exemption certificate, or when the ship itself is exempt, it is not necessary to take aboard a maritime pilot to navigate the ship from and to the Belgian ports. The most obvious example of ships with the aforementioned exemption are ferries that frequently

call at a Belgian port. They choose the most economical and the fastest routes. For the ferries which sail to the north of England, a frequently used route runs along the west side of the zone reserved for offshore electricity production. Beyond this reserved zone, the route curves northwards to the precautionary area at the end of the traffic separation scheme North Hinder, in order to avoid crossing the traffic separation scheme as this involves extra traffic regulations. These ferries also have a limited depth, and can therefore easily navigate in shallow water.

The most important frequently used routes, where no IMO routeing system is applied, are:

- The **Westpit route**. This is a route along the south side of the reserved area for offshore electricity production and has an east-west orientation. This route is used by vessels navigating between Belgian ports and ports to the north of Belgium: e.g. ships heading for Antwerp or Ghent use this route (only smaller ships can use the Oostgat Channel to navigate to Antwerp or Ghent). All traffic from and to Zeebrugge uses the Westpit Channel; ships coming from the north or heading northwards use this route. This is a very busy route with large ships that have large depths (this accounts for about 4,500 shipping movements in 2012). The intensity of the traffic in this route will still increase in the next years, due to the development of wind farms at sea. At the moment, deep draft ships can still use the routes in the middle of the offshore wind farm area, but once the development of this area has started, this will no longer be possible. Last year, about 1,500 deep ships navigated through the wind farm zone from and to the Belgian ports. In the future, these ships will also have to use the Westpit route. The Westpit route will become one of the most important shipping routes for ships going from and to the Belgian ports, because the other routes are much longer and therefore economically unfavourable.
- The **route of the pilotage station Westpost to Zeebrugge and Vlissingen**. This route departs from the Westhinder precautionary area, south of the deepwater route, delimited by IMO, and passes *Wielingen*, *Scheur*, *Vaargeul*, *Ribband* and *Zand*. It is used by ships sailing from and to the port of Zeebrugge, to the Scheldt Estuary or to the Westpit route. The traffic coming from the south, with a Belgian port as destination, will navigate via this route when the ship is not bound to the deepwater route demarcated by the IMO. This route is frequently used as well because most ships with the latter destinations are subject to compulsory pilotage. Hence, they will also navigate through this route.
- **Other frequently used routes to the coastal ports**. The ships bound for the port of Ostend navigate from the precautionary area Westhinder to the port of Ostend, passing the buoys A1 and KB. Ships sailing from Ostend to Vlissingen or vice versa use the coastal route. This route is only 1 nautical mile off the coast. To Nieuwpoort and back, ships navigate via *Kleine Rede*. The ships navigating directly to Nieuwpoort, use the route via *Negenvaam*, from the buoy A1. These are mostly smaller ships, such as ferries or coastal ships, navigating via the 'Short Sea Shipping' routes. These ships usually do not have a maritime pilot aboard, and therefore do not need to navigate via the pilotage routes. The captain usually chooses the shortest way, avoiding the busy traffic at the other shipping routes.
- The **Outer Routes**: These are the routes that lead to Dover or Calais via the buoy KB. They are mainly used by the ferries with a fixed shipping line between the United Kingdom and a Belgian port. The captain often holds a certificate and is therefore not subject to compulsory pilotage. They navigate via the most economical routes. This concerns about 2,000 ships a year.

(Source: [FPS Mobility and Transport](#), [DG Maritime Transport](#))

A full list of the navigation regulations ships need to observe, is provided on the website of the [FPS Mobility and Transport](#). Information concerning the shipping in the BNS is communicated via the [Notices to Mariners](#) (BaZ, more information: general provisions [BaZ 2013 nr. 1](#) ²²⁵⁴⁴⁹).

In the draft of the Marine Spatial Plan ([Ontwerp van koninklijk besluit tot vaststelling van het marien ruimtelijk plan, 2013](#) ²²⁷⁵²⁷), as proposed by the Minister competent for the North Sea, some spatial policy choices concerning maritime transport and shipping have been formulated (See also theme **Maritime Spatial Planning**):

- The investigation of the possibility of extra ship routeing systems and starting the procedure for registration of these systems by IMO;
- No burdening of the important traffic flows;
- The conservation of the number of safe shipping routes between the Belgian coast and the British Isles;
- Not obstructing the possibilities for temporary emergency waiting berths in the reserved areas in the deeper sea;
- A fixed tugboat station in view of the service Westpit, Ferry, and the rest of the BNS.

2.2.1 Port zones

The demarcation of the different port zones was stipulated in the *Royal Decree of 2 February 1993* and in the *Decision of the Flemish Government of 13 July 2001* ([Maes et al. 2004](#) ⁷⁰⁹³⁶ ([MARE-DASM project BELSPO](#))). The total surface and the water surface of the Flemish sea ports are represented in table 2.

Table 2. Overview of the Flemish sea ports and their total surface and water surface (Source: [Flemish Port Commission](#)).

PORTS	TOTAL SURFACE	WATER SURFACE
Port of Ostend	658 ha	199 ha
Port of Ghent	4,667 ha	623 ha
Port of Zeebrugge	2,847 ha	1,010 ha
Port of Antwerp	13,057 ha	2,011 ha

In the draft of the Marine Spatial Plan ([Ontwerp van koninklijk besluit tot vaststelling van het marien ruimtelijk plan, 2013](#) ²²⁷⁵²⁷), as proposed by the Minister competent for the North Sea, space is provided for the expansion of the ports of Zeebrugge and Ostend (see also theme **Maritime Spatial Planning**).

2.3 Societal interest

2.3.1 Employment

The total employment in the Belgian ports (= the Flemish sea ports of Antwerp, Zeebrugge, Ghent and Ostend, and the ports of Liège and Brussels) declined to 256,382 full-time equivalents (FTE) in 2011 (figure 2). This figure can be divided into 115,600 direct FTE and 140,782 indirect FTE. The Flemish sea ports account for 87.7% of this employment, with Antwerp accounting for more than half (51.9%), followed by Ghent (23.0%), Zeebrugge (8.6%) and Ostend (4.2%). This difference in employment is partly related to the type of industry and shipment of goods in the different ports (See below). In 2011 the total employment in the ports equalled 9.8% of the total Flemish employment and 6.4% of the Belgian employment. Until 2008, there was a slow increase in the number of FTE in the Belgian ports, followed by a decrease from 2009, as a result of the global economic crisis ([Mathys 2013](#) ²²⁷⁵²⁵).

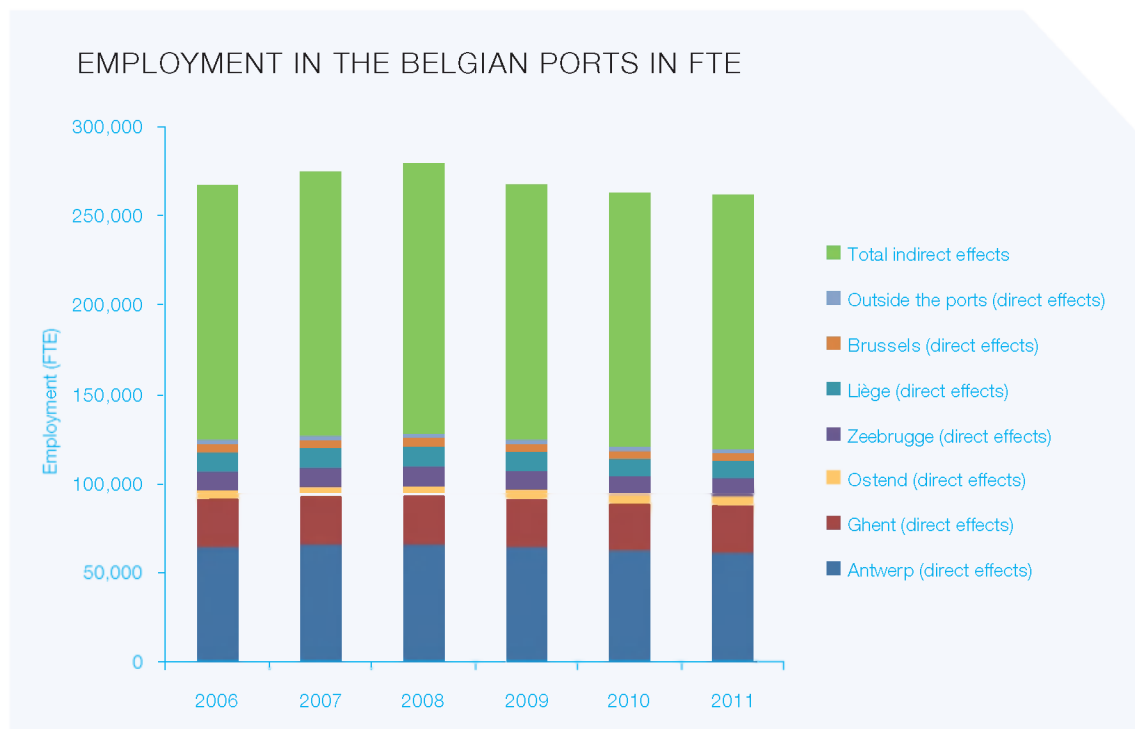


Figure 2. The direct and indirect employment in the Belgian ports between 2006 and 2011 ([Mathys 2013](#) ²²⁷⁵²⁵).

The economic importance of the Belgian ports in 2011 ([Mathys 2013](#) ²²⁷⁵²⁵) presents a social balance of the employment in the ports (composition of the staff, education, rotation of the staff, working time, type of contract, wage costs, promotion measures and training). The workforce in the ports in 2011 largely consisted of males (84%). Blue-collar

workers constitute the majority of the port staff, with 53% in 2011, followed by white-collar workers (43%) and other staff (4%).

2.3.2 Added value

The total added value of the Belgian ports equalled 30,859.4 million euros in 2011. A distinction can be made between the direct (16,482.0 million euros) and indirect added value (14,377.4 million euros) (figure 3). Between 2006 and 2011, the total added value of the ports grew by 1.6%. The Flemish sea ports accounted for 87.9% of the direct added value in 2011, with Antwerp accounting for more than half of the direct added value (58.6%), followed by Ghent (20.6%), Zeebrugge (5.8%) and Ostend (2.9%) (Mathys 2013²²⁷⁵²⁵).

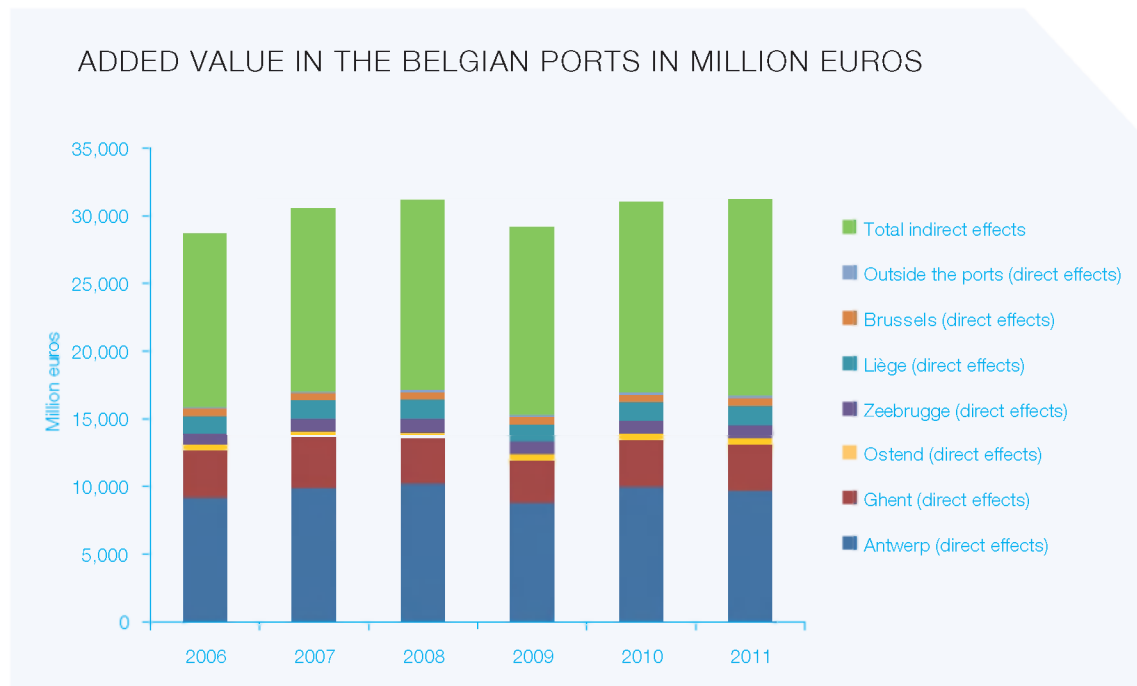


Figure 3. The direct and indirect added value in the Belgian ports (in million euros) between 2006 and 2011 (Mathys 2013²²⁷⁵²⁵).

2.3.3 Shipment of goods

After a decrease in 2009, due to the worldwide economic crisis, cargo traffic in the Flemish ports increased to more than 265 million tons in 2011, followed by a decrease to approximately 257 million tons in 2012 (figure 4). In terms of shipment of goods, Antwerp remains by far the most important port with 184.135 million tons in 2012. Cargo traffic in Zeebrugge, Ostend and Ghent was 43.544, 3.196 and 26.303 million tons respectively. In 2012, cargo traffic in the Flemish ports accounted for 23.3% of the total amount in the Le Havre-Hamburg range (Source: Flemish Port Commission).

In 2012, the port of Antwerp was the leader in the handling of containers (104.060 million tons) (more information on intermodal container traffic: Notteboom 2006¹⁰⁶⁴³², Merckx & Neyts 2009¹⁴⁰⁴⁷¹), dry bulk (19.106 million tons), liquid cargo (45.276 million tons) and break bulk cargo (7.534 million tons). Zeebrugge is the most important port with regard to roll-on/roll-off traffic with 12.549 million tons (Source: Flemish Port Commission, more information on car traffic: Notteboom 2010²⁰⁰⁶²¹).

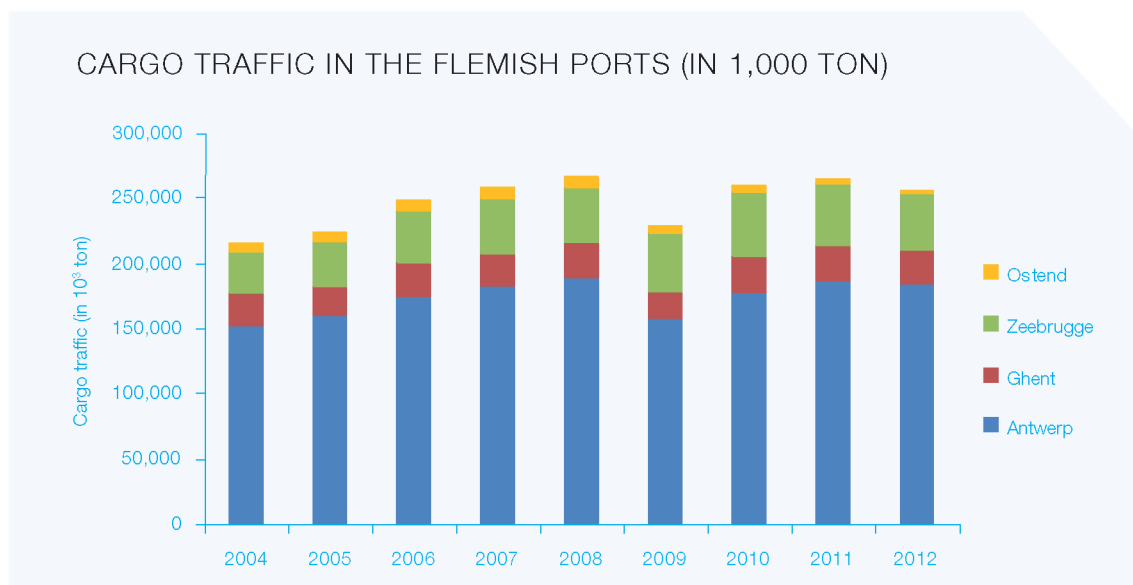


Figure 4. Cargo traffic in the Flemish ports (in 1,000 tons) (Source: [Flemish Port Commission](#)).

2.3.4 Passenger traffic

In 2012 a total of 810,539 passengers embarked or disembarked in the Flemish ports. Zeebrugge accounted for the majority of this figure with 713,152 passengers, followed by Ostend (93,472 passengers), Antwerp (2,777 passengers) and Ghent (1,138 passengers). Since the 1980s, passenger traffic in the Flemish ports has known a substantial decrease given that more than 5 million passengers embarked or disembarked in 1980 (Source: [Flemish Port Commission](#)). This decline is due to the opening of the Channel Tunnel, the closure of the *Regie voor Maritiem Transport* (RMT) ferry service and the cancellation of certain ferry lines ([Notteboom 2004](#)⁶⁷⁵⁷⁰).

2.3.5 Investments

In 2011, direct investments in the Belgian ports equalled 3,393.8 million euros, a decrease of 8.7% in comparison to 2010. In total, 3,139.2 million euros have been invested in the Flemish sea ports. The majority of these investments were destined for the port of Antwerp (2,339.3 million euros), followed by Ghent (439.1 million euros), Zeebrugge (268.2 million euros) and Ostend (92.6 million euros). Moreover, 302.7 million euros have been invested in maritime companies outside the Belgian port areas ([Mathys 2013](#)²²⁷⁵²⁵). Public expenditures in the Flemish ports in 2012 equalled 338.3 million euros, 217.4 million euros (64.3%) of which were allocated to maritime access. Besides maritime access, 73.1 million euros were spent on the port of Antwerp, 8.4 million euros on Ghent, 29.3 million euros on Zeebrugge and 10.0 million euros on Ostend (Source: [Flemish Port Commission](#)).

2.4 Impact

Shipping traffic has a large number of effects on the marine environment. Table 3 gives an overview of the different types of impact and their relevant literature.

Moreover, the installation and operation of the ports also has certain effects on the environment. These effects are *inter alia* indicated in the environmental impact assessments (EIAs) of the strategic plans of the ports (See table 4, non-exhaustive list, see also [database LNE departement](#)).

Table 3. Overview of the effects of shipping on the environment.

IMPACT	LITERATURE
Oil pollution and pollution by other pollutants and toxic materials, due to accidental, operational or illegal discharge	Schallier 2001 ²⁴⁵³⁹ , Seys & Kerckhof 2003 ³⁵²³⁴ , Maes et al. 2004 ⁷⁰⁹³⁶ (MARE-DASM project BELSPO), Seys 2004 ²¹⁴⁶⁴⁴ , Schrijvers & Maes 2005 ⁷⁸²⁹⁵ (GAUFRE project BELSPO), Le Roy et al. 2006 ¹⁰¹⁰⁶⁸ (RAMA project BELSPO), Lescrauwaet et al. 2006 ¹⁰⁵²⁰⁰ , Volckaert et al. 2006 ¹⁰³⁰³⁸ (MIMAC project BELSPO), Goffin et al. 2007 ¹¹⁴²²⁵ , Schallier et al. 2008 ²¹³⁵⁸⁴ , OSPAR QSR 2010 ¹⁹⁸⁸¹⁷ , André et al. 2010 ²⁰⁰⁶¹³ , Dittman et al. 2012 ²¹⁹⁸⁵⁵ , Lagring et al. 2012 ²¹³⁵⁸⁴ , Maebe et al. 2012 ²²¹⁵²⁸
Air pollution, caused by particles in the emissions of marine engines (NO _x , SO _x , CO ₂ , etc.)	Maes et al. 2004 ⁷⁰⁹³⁶ (MARE-DASM project BELSPO), Schrijvers & Maes 2005 ⁷⁸²⁹⁵ (GAUFRE project BELSPO), Goffin et al. 2007 ¹¹⁴²²⁵ , Maes et al. 2007 ¹¹⁷⁰⁴³ (ECOSONOS project BELSPO), Gommers et al. 2007 ²¹⁴⁶²⁹ (MOPSEA project BELSPO), OSPAR QSR 2010 ¹⁹⁸⁸¹⁷ , Bencs et al. 2012 ²²⁶⁵⁵⁴ (SHIPFLUX project BELSPO)
Waste dumping	Schallier 2001 ²⁴⁵³⁹ , Lescrauwaet et al. 2006 ¹⁰⁵²⁰⁰ , Goffin et al. 2007 ¹¹⁴²²⁵ , Claessens et al. 2010 ¹⁹⁷⁴³⁴ , OSPAR QSR 2010 ¹⁹⁸⁸¹⁷ , André et al. 2010 ²⁰⁰⁶¹³ , Van Franeker et al. 2011 ²⁰⁹²⁸⁹ , AS-MADE project BELSPO
Leaching of polluting anti-fouling substances (e.g. tributyltin (TBT))	Maes et al. 2004 ⁷⁰⁹³⁶ (MARE-DASM project BELSPO), Schrijvers & Maes 2005 ⁷⁸²⁹⁵ (GAUFRE project BELSPO), Goffin et al. 2007 ¹¹⁴²²⁵ , OSPAR QSR 2010 ¹⁹⁸⁸¹⁷ , Claessens et al. 2010 ¹⁹⁷⁴³⁴
Introduction of non-indigenous species due to their attachment to the keel or the discharge of ballast water	Maes et al. 2004 ⁷⁰⁹³⁶ (MARE-DASM project BELSPO), Schrijvers & Maes 2005 ⁷⁸²⁹⁵ (GAUFRE project BELSPO), Goffin et al. 2007 ¹¹⁴²²⁵ , OSPAR QSR 2010 ¹⁹⁸⁸¹⁷
Pollution and physical impact due to the loss of ships or cargo	Schallier 2001 ²⁴⁵³⁹ , Seys & Kerckhof 2003 ³⁵²³⁴ , Le Roy et al. 2006 ¹⁰¹⁰⁶⁸ (RAMA project BELSPO), Goffin et al. 2007 ¹¹⁴²²⁵ , De Baere et al. 2010 ¹⁹⁷⁴³⁶ , OSPAR QSR 2010 ¹⁹⁸⁸¹⁷
Other physical impact, such as noise and collisions with marine mammals	Maes et al. 2004 ⁷⁰⁹³⁶ (MARE-DASM project BELSPO) ⁷⁰⁹³⁶ , OSPAR QSR 2010 ¹⁹⁸⁸¹⁷ , André et al. 2010 ²⁰⁰⁶¹³ , compilation national reports ASCOBANS
Impact on other users (safety, spatial impact, etc.)	Maes et al. 2004 ⁷⁰⁹³⁶ (MARE-DASM project BELSPO), Schrijvers & Maes 2005 ⁷⁸²⁹⁵ (GAUFRE project BELSPO), Le Roy et al. 2006 ¹⁰¹⁰⁶⁸ (RAMA project BELSPO), Volckaert et al. 2006 ¹⁰³⁰³⁸ (MIMAC project BELSPO)

Table 4. An overview of the documents concerning the EIAs of the Flemish sea ports.

PORTS	EIAs
Ostend	plan MER strategisch plan haven Oostende (kennisgevingsnota) 2004 ⁶⁵⁷⁹⁸ Richtlijnen milieueffectrapportage Strategisch plan haven Oostende Goedkeuring milieueffectrapportage Strategisch plan haven Oostende plan MER kustverdediging en maritieme toegankelijkheid Oostende 2007 ²¹⁴⁶³³
Antwerp	Richtlijnen milieueffectrapportage Strategisch plan haven van Antwerpen Kennisgeving plan MER Strategisch plan haven van Antwerpen 2006 ²²⁷⁵¹¹ plan MER strategisch plan haven van Antwerpen (niet-technische samenvatting) 2008 ²¹⁴⁷¹⁵ Goedkeuring MER Strategisch plan haven van Antwerpen 2009 ²²⁵⁶¹⁶ kennisgeving Verruiming vaargeul Beneden-Zeeschelde en Westerschelde 2006 ¹⁰⁴⁶⁰⁰ tussentijds strategisch plan haven van Antwerpen 2006 ¹³²⁴²¹
Zeebrugge	plan MER strategisch plan haven van Zeebrugge 2004 ²¹⁴⁶³⁵ kennisgeving project MER van het strategisch haveninfrastructuurproject (SHIP) in de westelijke achterhaven van Zeebrugge 2011 ²²⁵⁶⁰⁸ Richtlijn milieueffectrapportage van het strategisch haveninfrastructuurproject (SHIP) in de westelijke achterhaven van Zeebrugge 2011 ²²⁷⁵¹⁶
Ghent	nota-plan MER strategisch plan haven van Gent

2.5 Sustainable use

2.5.1 Long term vision of the Flemish sea port policy

Between 2002 and 2005 a *Long term vision of the Flemish sea port policy* ²²⁵⁴⁸³ was conceived (more information: *guidelines for EIA Long term vision* ²²⁷⁵¹², *approval EIA Long term vision 2006* ²²⁵⁶¹⁴). This is a strategic vision for the Flemish sea port policy, in which recommendations concerning the goals of the sea port policy and the policy strategies to achieve these goals are formulated.

One of the most important conclusions of the Long term vision is that the sea port policy needs to have wider purposes than only the economic efficiency and competitiveness. In the Long term vision, the sea port policy focuses on broader societal purposes, such as economic prosperity, social well-being and environmental quality.

The long term vision offers five policy strategies. They all focus on raising the societal value of the Flemish sea ports.

- Responding to the synergy between sea ports and logistics;
- Enabling sea ports in the context of sustainable industry and transport;
- Enabling sea ports in the knowledge economy;
- Responding to the European policy, in a proactive way;
- Optimising the internal structure of the governmental policy with respect to the sea ports.

2.5.2 Sustainable development of the port area

In order to implement the Flemish coalition agreements of 1999 and 2004, each Flemish sea port developed a strategic plan that had to visualise the long term vision (up to 2030) for the port development. The final result should consist of a target scenario and an action plan. The policy objectives of these strategic plans are: the careful use of space and environment, sustainable mobility, clear and liveable borders between the port and the surrounding area, and respect for the presence of important natural values in and around the ports. The strategic plans include the long-term port development plans and the associated compensation measures for nature.

EIAs (see also **Impact**) and spatial safety reports are drafted regarding all aspects of the strategic plans. The spatial interpretation of the objectives of strategic plans is guaranteed through regional spatial implementation plans (GRUP). Hence, these strategic plans are important for the final demarcation of the Flemish sea port areas.

Since 1999, every port area in Flanders needs to draft a strategic plan and a spatial implementation plan (RUP) based on maximum protection of the surrounding residential areas, the conservation and strengthening of the ecological infrastructure in and outside of the port area, and a smart use of space (more information: *website Flemish spatial structure plan*). The spatial development and accessibility of the sea ports are also discussed in the Green Paper and in the White Paper of the new Spatial Policy Plan, where the sea ports are regarded as important gateways with a strategic importance for the economy. The importance of the ports and their connection to other nodes within the Trans-European Network (*TEN-network*) is emphasised in the *Green Paper Flanders 2050 (2012)* ²²⁵⁴⁸⁹. The ports constitute important international gateways for goods and are well connected to inland nodes via different modes (water, railways, roads and pipelines), making the transport system as efficient as possible.

When nature is lost due to the port developments, this is usually compensated by the creation and delimitation of new nature reserves. The ecological compensation areas are usually demarcated in consultation with the Flemish Land Company (*VLM*). Examples of these nature compensation projects can be seen in the southern part of the port of Zeebrugge (*website VLM*) or in the Sea Scheldt basin, as stipulated in the Sigmaphan (see theme **Scheldt Estuary**). The environmental legal context with regard to the port policy, management and operation is discussed in detail in *Van Hooydonk et al. (2003)* ²¹⁴⁸⁰⁵. An overview of the legislation concerning the ports is given in the coastal codex, theme *Port and industry*.

2.5.3 Sustainable development of EU maritime transport

The strategic goals and recommendations concerning the maritime transport policy of the EU until 2018 have been elaborated in *COM (2009) 8*. The key values are sustainable development, economic growth and open markets with fair competition and strict environmental and social standards.

In the White Paper 'Roadmap to a Single European Transport Area' COM (2011) 144, 40 concrete initiatives have been elaborated, in order to achieve a competitive and economical European transport system (COM (2006) 314). The development of the ports is essential in order to handle larger cargo volumes by means of short sea shipping in the EU as well as via shipping to the rest of the world. The ports play a crucial part regarding logistical facilities, and need efficient hinterland connections. The Motorways of the Sea constitute the maritime element of this transport system. On a national level, the European regulations have been implemented in the *Royal Decree of 30 September 2005* concerning the promotion of combined transport.

The European Commission (EC) conducts an active policy to promote short sea shipping (SSS) (see *inter alia*, COM (2004) 453 on short sea shipping, SEC (2007) 1367 on the Motorways of the Sea and COM (2009) 10 on establishing a European maritime transport space without barriers). This type of transport, using short sea lanes, is indeed a safer and more environmentally friendly alternative to road transport (Maelfait 2006¹⁰⁶⁴³⁸, Goffin et al. 2007¹¹⁴²²⁵⁹). The EU finances different programmes that contribute to the promotion of SSS, such as *Marco Polo*, *TEN-T* and *Motorways of the sea*. Motorways of the sea are regular, frequent and direct connections of high quality, reducing the transport times. SSS is the most important transport mode within the concept of the Motorways of the Sea. In Flanders, the Flemish government established the *Short Sea Promotion Centre* in 1998. Since 1999, this neutral and non-commercial advisory body has gathered the SSS statistics of the 4 Flemish ports and of shipping traffic from rivers towards the sea (statistieken 2012).

On the informal Transport Council of October 2010 in Antwerp, the Belgian chairmanship and the EC proposed the *Blue Belt project* to the European ministers of Transport. Within the scope of the broader European goals to stimulate marine and maritime growth, the Blue Belt project aims to reduce the administrative burden for maritime transport to a level comparable to other modes of transport (air transport, railway transport or road transport) (COM (2012) 573).

2.5.4 Safety measures at sea: construction, equipment and crew of sea-going ships

Maritime safety, the prevention of shipping disasters, and the safety of life at sea are settled in a few international treaties, such as the *SOLAS Convention* (International Convention for the Safety of Life at Sea), *COLREG* (The International Regulations for Preventing Collisions at Sea, 1972, IMO), the *STWC Convention* (International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, IMO) and the *SAR Convention* (International Convention on Maritime Search and Rescue, IMO) (see also Policy Context).

The *SOLAS Convention* of 1974, complemented by the Protocol of 1978, is constantly being amended. The Protocol was amended in 1981 and replaced by the Protocol of 1988. The Protocol of 1988 improved and harmonised the obligations with regard to inspection and research, and introduced new models of safety certificates which are required by the *SOLAS Convention*, the *MARPOL Convention* and the *International Convention on Load Lines*. The annexes to the *SOLAS Convention* include the requirements concerning the construction of the ship (Chapter II), fire protection, fire detection and fire extinction (Chapter II-1), life-saving appliances and arrangements (Chapter III), radio communications (Chapter IV), safety of navigation (Chapter V), the safe carriage of cargoes (Chapter VI), the safe transport of dangerous goods (Chapter VII) and the safety of nuclear ships (Chapter VIII). With the amendment in 1994, three new chapters were added to the *SOLAS Convention*: Chapter IX on management for the safe operation of ships, Chapter X on Safety measures for high-speed craft, Chapter XI - Regulation 1 on special measures to enhance maritime safety, and Chapter XI - Regulation 2 on special measures to enhance maritime security. By the end of 2000, Chapter V of the *SOLAS Convention* was revised and stipulated the obligation to install a 'voyage data recorder' (VDR) and an 'automatic identification system' (AIS). This AIS is a satellite application that allows the automatic identification of a ship at sea and provides information on the ship to other ships as well as to the authorities ashore. The implementation and the surveillance of the safety measures is a competence of the FPS Mobility and Transport (*inter alia* via maritime inspection regulation – *Royal Decree of 20 July 1973* and often revised). The *Shipping Assistance Division* (Agency for Maritime and Coastal Services) guarantees safe and easy shipping in the maritime fairways from and to the Belgian sea ports, by organising and offering Vessel Traffic Services (VTS).

The *International Convention on Standards of Training, Certification and Watchkeeping for Seafarers* (STCW, 1978) targets the safety of human life and goods, as well as the protection of the marine environment. The convention includes a few regulations, which refer directly to the prevention of marine pollution and focus on the required knowledge and the responsibilities during watchkeeping. This convention imposes minimal standards with regard to training, and a certificate of competence for seafarers. Formerly, each flag state set these requirements independently which resulted in large differences in the competence of the seafarers. Article X of the convention enables parties to the convention to control ships of non-party states, without any favourable treatment. In this

context, IMO drafted inspection procedures which put more focus on the human elements with regard to maritime safety and the prevention of marine pollution. In 1995, a new international code concerning the standards of training, certification and watchkeeping for seafarers was elaborated. The inspection is not preferably performed anymore by the authorities of the flag states (for ships sailing under the Belgian flag: FPS Mobility and Transport). The inspection can be carried out by any party to the convention when a ship is situated in the port of a party to the convention (also FPS Mobility and Transport). The IMO also has an inspection task. The parties to the convention are obliged to provide detailed information to the IMO, on anything related to the execution of the convention (such as the training courses and certification procedures). The implementation and the supervision of the crew regulations is a matter of the FPS Mobility and Transport, via *inter alia* the maritime inspection regulations in the *Royal Decree of 20 July 1973* (and often revised).

Since the *Directive 94/58/EC* on the minimum level of training of seafarers, the EU has also implemented a regulation concerning the minimum level of training of seafarers, on community ships, and ships calling at community ports, in view of enhanced safety at sea.

The Belgian Port State Control (FPS Mobility and Transport) inspects foreign ships that call at Belgian ports to check whether they meet all international regulations of the IMO and International Labour Organisation (ILO). When ships do not meet these standards, departure can be refused, or special conditions can be imposed. E.g. when a ship has a defect that endangers the safety of the ship and the crew, and which cannot be repaired in a Belgian port, Belgian Port State Control can enforce an obligation to navigate to the closest shipyard (for the regional collaboration on Port State Control, see *Memorandum of Understanding on Port State Control (Paris MOU)*).

2.5.5 Pollution prevention

The *MARPOL Convention* (MARPOL 73/78) aims to prevent the accidental and deliberate discharge of oil and other polluting substances by ships. This is achieved by means of strict operational discharge conditions, a discharge prohibition, or by means of technical measures concerning the construction and equipment of the ship. *MARPOL 73/78* consists of two protocols and six technical annexes, each treating one type of pollution. Annex I contains regulations for the prevention of pollution by oil. Annex II includes regulations for the control of pollution by noxious liquid substances in bulk. Annex III discusses the prevention of pollution by harmful substances carried by sea in packaged form. Annex IV treats the prevention of pollution by sewage from ships. Annex V concerns the prevention of pollution by garbage from ships. In Annexes I, II and V, special marine areas can be indicated, where stricter discharge conditions may apply. With the Protocol of 1997, a new Annex VI was ratified, concerning the prevention of air pollution from ships. In addition to these annexes, two original protocols exist: Protocol II concerning the arbitration of disputes and Protocol I about the regulations on the reporting of incidents involving noxious substances. The annexes are constantly subject to amendments.

After the shipping disaster with the oil tanker Erika in 1999, a series of measures have been issued by Europe, known as the Erika I (COM (2000) 142), II (COM (2000) 802) and III (COM (2005) 585) measures, in order to enhance maritime safety. This series of measures include the *Directive on common rules and standards for ship inspection and survey organisations and for the relevant activities of maritime administrations* (94/57/EC), the *Directive on reporting formalities for ships arriving in and/or departing from ports of the Member States* (2010/65/EC), the *Directive establishing a Community vessel traffic monitoring and information system* (2002/59/EC), the *Port State Control Directive* (2009/16/EC), the *Regulation on double-hull oil tankers* and the *Regulation establishing a European Maritime Safety Agency, EMSA*. The international regulations concerning shipping safety and protection of the marine environment are also implemented by the Port State Control services (*Port State Control Directive*). Furthermore, maritime safety is increased by initiatives such as *SafeSeaNet* (EMSA) which offers a centralised European information platform for the sharing of maritime data between the responsible authorities.

As a result of the accident with the oil tanker Prestige off the Spanish coast in November 2002, the phasing-out of single-hull oil tankers (set by *Regulation 417/2002*) has been accelerated again by the EU, by means of *Regulation 1726/2003* and *Regulation 530/2012*. The IMO has implemented this accelerated phase-out in Europe. *Regulation 1726/2003* states that from 2010 onwards, single-hull oil tankers sailing under the flag of a Member State as well as other oil tankers cannot enter the ports or offshore terminals of a Member State anymore.

The implementation of international and European legislation in federal legislation can be consulted in the coastal codex, theme [shipping](#).

2.5.6 Measures concerning pollution prevention and mitigation

Within the measures concerning the prevention and combating of pollution from ships, a distinction can be made between accidental and operational discharges. [UNCLOS](#) provides the general international legislative framework, dealing with problems such as marine pollution (part XII). In case of accidental or operational pollution of the marine environment due to shipping, the [MARPOL Convention \(1973/1978\)](#) is the most important international convention (see above). Apart from these two conventions, other important IMO conventions exist, such as the [OPRC Convention](#) (Oil Pollution Preparedness, Response and Co-operation), the [HNS Convention](#) (Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances), the [CLC Convention](#) (International Convention on Civil Liability for Oil Pollution Damage), the [FUND Convention](#) (International Fund for Compensation for Oil Pollution Damage), etc. (see list at [IMO website](#)).

The [Bonn Agreement](#) regulates the collaboration between the coastal states of the North Sea with regard to the detection, reporting and combating of pollution in the North Sea, caused by oil and other pollutants from ships and offshore installations.

In the context of the [OSPAR Convention](#), certain biological indicators have been set, e.g. the degree of oil contamination in guillemots is considered a proxy for oil pollution in the marine environment. This indicator is a so-called EcoQO or Ecological Quality Objectives. The Research Institute for Nature and Forest (INBO) annually reports the degree of oil contamination of the birds washed ashore on the Belgian beaches ([Verstraete et al. 2007](#)¹¹⁶⁹⁴⁷, [2008](#)¹²⁷⁴⁹⁷, [2009](#)¹⁴²⁴⁹⁹). The statistics can also be consulted on the following [website about beached birds](#).

On a European level, the [Marine Strategy Framework Directive \(2008/56/EC\)](#) (MSFD) defines the concentrations of pollutants as one of the descriptors of the environmental status. Pollution from ships has been identified as a pressure without a distinction between accidental and operational pollution (more information: [Law et al. 2010](#)²⁰²⁴⁹²). The European Maritime Safety Agency ([EMSA](#)) aims to reduce the risk of maritime accidents, marine pollution from ships and the loss of life at sea. EMSA has a network of European ships at its disposal for combating oil pollution in European waters ([Regulation 1406/2002](#), [website EMSA](#)).

On the Belgian level, the [law of 6 April 1995](#) provides the legal framework for the implementation of the [MARPOL Convention](#). In case of serious pollution, the Emergency Plan North Sea regulates the intervention in the BNS ([Ministerial Decree of 19 April 2005](#)). Since the Erika shipping accident (1999), the Belgian government has a wider range of specific instruments at its disposal to combat oil pollution ([website FPS Health, Food Chain Safety and Environment](#)). In 2005, an intervention plan was drafted for the shelter and care of birds beached due to oil pollution at sea ([Intervention Plan Birds, 2007](#)¹⁰⁷⁰⁷⁶). A new instrument in the fight against oil pollution is the OSERIT model (Oil Spill Evaluation Response Integrated Tool, conceived by MUMM (Direction Natural Environment, RBINS)), that allows to simulate the impact of oil pollution, as well as the identification of the polluter via backtracking ([Dulière & Legrand 2011](#)²⁰²⁷⁷⁷, [OSERIT project BELSPO](#)).

On an international level, operational discharges are tackled by a network of police experts and prosecutors called NSN (North Sea Network of Prosecutors and Investigators) under the umbrella of OSPAR. In the context of the [Bonn Agreement](#), aerial surveillances have been organised in the BNS since 1991 in order to stop illegal discharges from ships. The observation programme is executed by MUMM (Direction Natural Environment, RBINS) in collaboration with the Belgian Army. In total, 250 flight hours are performed above the BNS each year, *inter alia* in the context of aerial surveillance of marine pollution ([website MUMM](#)). The results of the aerial surveillance of 2011 have been reported in [De Montpellier et al. \(2012\)](#)²¹⁷⁰⁹⁷. The Belgian Army also performs surveillance flights above the BNS, with so-called UAVs (unmanned aerial vehicles). Since the beginning of the aerial surveillance in 1991, a declining trend in the number of oil discharges and in the estimated oil volume has been observed (figure 5). It seems that the measures within the European directive on port reception facilities for ship-generated waste and cargo residues ([Directive 2000/59/EC](#)) and the [MARPOL Convention](#), as well as the enhanced surveillance, have a positive effect ([Goffin et al. 2007](#)¹¹⁴²²⁵, [André et al. 2010](#)²⁰⁰⁶¹³, [Lagring et al. 2012](#)²¹³⁵⁸⁴, [Maebe et al. 2012](#)²²¹⁵²⁸). The degree of oil contamination of beached birds (see above) also serves as an indicator for operational discharges.

At a European level, the penalties for infringements with regard to the pollution from ships are regulated by the [Directive 2005/35/EC](#). The European Maritime Safety Agency ([EMSA](#)) coordinates the European collaboration and harmonisation of the European policy in the fight against illegal pollution from shipping. Via the [CleanSeaNet](#), EMSA has developed an additional instrument to trace oil pollution from shipping by means of satellite images.

NUMBER OF OBSERVED OIL DISCHARGES FOR EACH FLIGHT HOUR IN THE BNS (1991-2011)

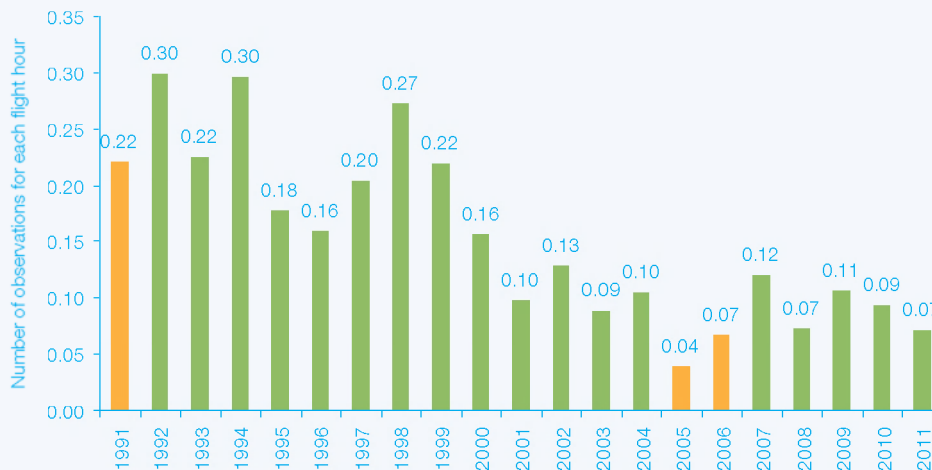


Figure 5. Number of observed oil discharges for each flight hour of the observation programme in the BNS (1991, 2005 and 2006 were transitional years, indicated in red) (MUMM, [Maebe et al. 2012](#)²²¹⁵²⁸).

2.5.7 Measures against the disposal of waste from ships

The [MARPOL Convention \(1973/1978\)](#) regulates which waste can be discharged into the marine environment by ships (see above). The problem of ship-generated waste is discussed by *Directive 2000/59/EC* concerning the port reception facilities for ship-generated waste and cargo residues. This directive wants to oblige the ships to bring their waste to the ports in a sustainable way. In the *MSFD (2008/56/EC)*, the presence of marine litter was regarded as one of the descriptors of the condition of the marine environment and was identified as a physical pressure on the environment. The criteria and methodological standards concerning the determination of the good environmental status (GES) with regard to marine litter were discussed in [Galgani et al. \(2010\)](#)¹⁹⁹⁵⁵⁵.

In Flanders, the policy with respect to the waste management of ships in the ports is stipulated in subsection 12 of the Flemish regulation on waste prevention and management ([VLAREA](#)). The waste management of ships in the Flemish ports between 2004 and 2006 is discussed by [Goffin et al. \(2007\)](#)¹¹⁴²²⁵. An exhaustive study of the waste streams in the ports was conducted in the context of the ECOWARE project ([Maes & Buyse 2000](#)⁵⁰⁸²). The waste stream of fishing ships was discussed in [Maes & Douvere \(2004\)](#)²¹⁴⁶²⁷ and [Belpaeme \(2006\)](#)¹⁰¹⁴⁵⁵. In the 'Fishing for Litter' project, fishermen have been reimbursed for collecting marine sourced litter ([Bonne & Tavernier 2007](#)¹²²¹⁶⁸). Furthermore, there is a new European project called 'Waste Free Oceans', in which the industry pays fishermen for fishing litter ([Vanagt et al. 2012](#)²¹⁸⁵³³).

2.5.8 Measures against air pollution from shipping

The air pollution, generated by sea-going ships is regulated in the Annex VI of the [MARPOL Convention \(1973/1978\)](#). This annex reduces the sulphur content of the fuel to a maximum of 4.5% and 1.5% in certain areas ('Emission Control Areas', ECAs). The convention prohibits the emission of substances damaging the ozone layer, such as CFCs, and imposes emission limits for nitrogen. Besides the aforesaid convention, the EU has also implemented a series of measures in order to combat air pollution generated by ships. *Directive 2005/33/EC* stipulates that the sulphur content of shipping fuels is now subject to similar restrictions as the ones set in Annex VI of *MARPOL 73/78* (see above). In addition, the directive imposes a maximum sulphur content of 0.1% for gasoline fuels, used by the auxiliary engines in the European ports. In 2008, Annex VI of *MARPOL* was amended (entering into force on 1 July 2010), reducing the sulphur content in shipping fuel to 3.50% from 1 January 2012 onwards, and 0.50% after 1 January 2020. For ships in ECAs, the sulphur content is reduced to 1% from 1 July 2010 onwards and to 0.10% after 1 January 2015 (see also *Directive 2012/33/EU*).

An amendment of Annex VI of *MARPOL* in 2012 introduced a new Chapter 4 concerning a better energy efficiency technology (Energy Efficiency Design Index – EEDI) for newly-constructed vessels and a shipping energy efficiency management plan for all ships over 400 BT. In the long term, shipping will thus contribute to the reduction of the emission of greenhouse gases.

The EC has also launched a new climate plan ([IP/08/80](#) ²¹⁴⁷⁸¹), in which Europe makes a commitment to reduce the emission of greenhouse gases by at least 20% by 2020. On a national level, the measures against air pollution from ships are settled in the *Royal Decree of 27 April 2007* (implementation of the *MARPOL Convention* and the European measures on the Belgian level).

Ships switching to the use of Liquefied Natural Gas (LNG) as an alternative fuel and the availability of cold ironing facilities are important measures against air pollution from shipping. LNG is by far the most important and environmentally friendly alternative for heavy fuel oil. The emission of sulphur and particulate matter from LNG is insignificant, and the NO_x and carbon emissions are 85 to 90% and 15 to 20% lower, respectively. In all Flemish sea ports, preparations are executed to allow LNG supply in the future. On the other hand, the cold ironing facilities ensure that ships no longer need their engines or generators while in the port. In several Flemish ports and on the quays of the inland waterways, onshore power facilities will be installed for boats, inland ships and sea-going vessels. Ships using an environmentally friendly fuel can submit a dossier to the Public Waste Agency of Flanders ([OVAM](#)), in the context of the European *Directive 2000/59/EC*. An overview of the legislation with regard to shipping is given in the coastal codex, theme [shipping](#).

2.5.9 Measures against the introduction of non-indigenous species

In order to combat the introduction of non-indigenous species by means of the ballast tanks of ships, the [Ballast Water Convention](#) (IMO, 2004) forces ships to draft a 'Ballast Water and Sediment Management Plan' and to keep aboard a 'Ballast Water Record Book', reporting all ballast operations. The management of ballast water must take place according to the standard procedures (see [website IMO](#)) and with regard to the water treatment, systems recognised by IMO should be used. Until the ratification of this convention, OSPAR advises to adopt certain measures concerning the ballast water of ships on a voluntary basis ([OSPAR general guidance 07/2010](#) ²²⁷⁵¹⁷). Prior to the IMO *Ballast Water Convention*, the 1997 IMO resolution ([A.868\(20\)](#) ¹¹⁵⁸³¹) provided guidelines for the control and treatment of ballast water in order to reduce the transfer of harmful aquatic organisms and pathogens.

The International Council for the Exploration of the Sea ([ICES](#)) has established two working groups in order to investigate biological invasions and non-indigenous species: the ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors ([WGBOSV](#)) and the Working Group on Introduction and Transfers of Marine Organisms ([WGITMO](#)). In 2010, ICES also organised a workshop on harmful phytoplankton potentially transported by ballast water ([Report 2010](#) ²¹⁴⁶⁵⁰). In 2005, ICES published a new version of the 1995 '[Code of Practice](#)' ⁷⁸⁷⁸⁹ on the introduction and transfer of marine organisms.

At the European level, the introduction of non-indigenous species was recognised as a biological pressure and was included as a descriptor of the environmental status in the *MSFD (2008/56/EC)*. The criteria and methodological standards for the determination of a GES with regard to non-indigenous species were discussed in [Olenin et al. \(2010\)](#) ²⁰²⁴⁸⁵. At the moment, no general European instrument to tackle invasive species exists. *COM (2008) 789* presents policy options for a European strategy with respect to invasive species.

In Belgium, the intentional as well as the accidental introduction of non-indigenous species (through ballast water) is forbidden by the *law of 20 January 1999*, and the *Royal Decree of 21 December 2001* in implementation of the latter law. In the context of the [Belgian Forum on Invasive Species](#), a protocol has been elaborated (invasive species environmental impact assessment (ISEIA), [Bransart 2009](#) ²²⁵⁶⁰⁹) in order to evaluate the impact of non-indigenous organisms on the environment, and the possibility of spread and colonisation. The non-indigenous species in the BNS are reported to the ICES working group ([WGITMO](#)) by MUMM. An overview of all alien species in the BNS is given by [Kerckhof et al. \(2007\)](#) ¹¹⁴³⁶⁵ and the [list](#) of the '[VLIZ alien species consortium](#)' (more information: [Vandepitte et al. 2012](#) ²¹⁷⁷³⁶).

2.5.10 Measures against harmful anti-fouling substances

On 5 October 2001 in London, the *IMO* accepted the '*International Convention on the Control of Harmful Anti-fouling Systems on Ships*' which entered into force on 17 September 2008. This convention prohibits the use of harmful tributyltin compounds (TBT) in anti-fouling paint for ships and offers a mechanism to combat the future use of other harmful substances in anti-fouling systems. This convention resulted from the IMO resolution (A.895(21)) that calls for a legal instrument which completely forbids the use of TBT in anti-fouling paints by 1 January 2003 and which prohibits the presence of TBT in anti-fouling paint on hulls (which can be leached in contact with sea water) by 1 January 2008 (*Goffin et al. 2007*¹¹⁴²²⁵). Organic tin compounds were included in the *OSPAR List of Chemicals for Priority Action 2009*²²⁷⁵¹⁸ (more information: *OSPAR background document on organic tin compounds*²¹⁴⁸⁰⁴).

At the European level, the use of organic tin compounds in anti-fouling substances of ships is prohibited by the *Directive 2002/62/EC*, which was preceded by the *Directives 89/677/EC* and *99/51/EC*. In *Regulation 782/2003* the measures of the IMO convention were implemented in the European legislation. In the *Water Framework Directive (2000/60/EC)* organic tin compounds are included in the list of priority substances and certain other pollutants. In Belgium, the *IMO Convention on the Control of Harmful Anti-fouling Systems on Ships* was implemented by the *law of 16 January 2009* and the *Decree of 9 May 2008*. An overview of the legislation concerning shipping is given in the coastal codex, theme *shipping*.

2.5.11 Safety on ships sailing to and from ports as well as in ports

Federal as well as Flemish instances have certain competencies with regard to the safety and security on ships sailing to and from Belgian ports as well as in Belgian ports (see also *Policy context*).

The Belgian port state control (FPS Mobility and Transport) inspects foreign ships that call at Belgian ports to investigate whether they meet the international IMO and ILO standards. Ships that do not meet these standards cannot leave the port unless the shortcomings have been resolved (for regional collaboration see: the Memorandum of Understanding on Port State Control (*Paris MOU*)).

The *Shipping Assistance Division* (Agency for Maritime and Coastal services) is responsible for safe and smooth shipping on the maritime fairways from and to the sea ports by organising and offering Vessel Traffic Services (VTS).

Important aspects of accidents or emergency situations at sea are part of the tasks of the *Coast Guard Centre*, which consists of the Maritime Rescue and Coordination Centre (*MRCC*) and Maritime Security Centre Belgium (*MIK*). The governor of the Province of West Flanders is the general coordinator of the Emergency Plan North Sea (*Ministerial Decree of 19 April 2005*). The MRCC is the first contact point for ships in need and also coordinates the emergency actions (more information: *Decree of 16 June 2006* and the *decision of the Flemish government of 26 October 2007*, *Ministerial Decree of 19 April 2005* – emergency plan North Sea and the *law of 27 July 2011*). In the case of MIK, the navy, the maritime police and customs collaborate in order to ensure that the law is being complied with at sea (the *Royal Decree of 6 February 2009*).

A list of the European regulations concerning the safety at sea and in the sea ports is given in Harbour Light (*Merckx et al. 2012*²²⁰⁴¹¹) and on the *website of the VHC* (more information: *eurlex website*). In the coastal codex, themes *shipping* and *port and industry*, the implementation of the international and European legislation can be consulted.

2.5.12 Measures against underwater noise from shipping

On the international level, recommendations have been formulated in the context of the Marine Environment Protection Committee (*MEPC*) of the IMO by means of resolutions which limit the effects of underwater noise on cetaceans. In the context of *ASCOBANS*, measures against the impact of underwater noise from shipping on small cetaceans are discussed (*resolution ASCOBANS 2003*²⁰⁶⁷⁹⁰, *resolution ASCOBANS 2006*²⁰⁶⁷⁹²).

On the European level, the problem of underwater noise was included in the *MSFD (2008/56/EC)* where underwater noise and other forms of energy were identified as descriptors for a good environmental status (*Tasker et al. 2010*²⁰²⁴⁹³).

Legislation reference list

Table with international agreements, conventions, etc.

INTERNATIONAL AGREEMENTS, CONVENTIONS, ETC.			
Abbreviations (if available)	Title	Year of conclusion	Year of entering into force
<i>CLL</i>	International Convention on Load Lines	1966	
<i>CLC</i>	International Convention on Civil Liability for Oil Pollution Damage	(1969) - 1992	(1975) - 1996
<i>FUND</i>	International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	1992 – (2003)	1996
<i>COLREG</i>	Convention on the International Regulations for Preventing Collisions at Sea	1972	1977
<i>MARPOL</i>	International Convention for the prevention of pollution from ships, as modified by the Protocol of 1978 relating thereto	1973	1978
<i>SOLAS</i>	International Convention for the Safety of Life at Sea	1974	1980
<i>STWC</i>	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers	1978	1984 (major revisions in 1995 and 2010)
<i>SAR</i>	International Convention on Maritime Search and Rescue	1979	1985
<i>UNCLOS</i>	United Nations Convention on the law of the sea	1982	1994
<i>Paris MOU</i>	Paris Memorandum of Understanding on Port State Control	1982	
<i>Bonn Agreement</i>	Agreement for cooperation in dealing with pollution of the North Sea by oil and other harmful substances	1983	1989
<i>HNS Convention</i>	The International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea	1984	
<i>OPRC</i>	International Convention on Oil Pollution Preparedness, Response and Co-operation	1990	1995
<i>ASCOBANS</i>	Agreement on the conservation of small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas	1991	1994
<i>OSPAR Convention</i>	The Convention for the Protection of the marine Environment of the North-East Atlantic	1992	1998
	<i>International Convention on the Control of Harmful Anti-fouling Systems on Ships</i>	2001	2008
<i>BWM Convention</i>	International Convention for the Control and Management of Ships' Ballast Water and Sediments	2004	

Table with European legislation. The consolidated version of this legislation is available on [Eurlax](#).

EUROPEAN LEGISLATION			
Abbreviations (if available)	Title	Year	Number
Directives			
	Council Directive of 21 December 1989 amending for the eighth time Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations	1989	677
	Council Directive of 22 November 1994 on common rules and standards for ship inspection and survey organizations and for the relevant activities of maritime administrations	1994	57
	Council Directive of 22 November 1994 on the minimum level of training of seafarers	1994	58
	Commission Directive 1999/51/EC of 26 May 1999 adapting to technical progress for the fifth time Annex I to Council Directive 76/769/EEC on the approximations of the laws, regulations, and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations (tin, PCP and cadmium)	1999	51
	Directive port reception facilities for ship-generated waste and cargo residues	2000	59
Water Framework Directive (WFD)	Directive establishing a framework for Community action in the field of water policy	2000	60
	Directive on the minimum level of training of seafarers	2001	25
	Directive on national emission ceilings for certain atmospheric pollutants	2001	81
	Directive establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC	2002	59
	Directive adapting to technical progress for the ninth time Annex I to Council Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations (organostannic compounds)	2002	62
	Directive amending Directive 1999/32/EC as regards the sulphur content of marine fuels	2005	33
	Directive on ship-source pollution and on the introduction of penalties for infringements	2005	35
	Directive on ambient air quality and cleaner air for Europe	2008	50
Marine Strategy Framework Directive (MSFD)	Directive establishing a framework for community action in the field of marine environmental policy	2008	56
PSC Directive	Directive on port State Control	2009	16
	Directive on reporting formalities for ships arriving in and/or departing from ports of the Member States and repealing Directive 2002/6/EC	2010	65
Regulations			
	Regulation on the accelerated phasing-in of double hull or equivalent design requirements for single hull oil tankers and repealing Council Regulation (EC) No 2978/94	2002	417
	Regulation establishing a European Maritime Safety Agency	2002	1406
	Regulation on the prohibition of organotin compounds on ships	2003	782
	Regulation amending Regulation (EC) No 417/2002 on the accelerated phasing-in of double-hull or equivalent design requirements for single-hull oil tankers	2003	1726

EUROPEAN LEGISLATION (continuation)			
Abbreviations (if available)	Title	Year	Number
	Regulation establishing the second Marco Polo programme for the granting of Community financial assistance to improve the environmental performance of the freight transport system (Marco Polo II) and repealing Regulation (EC) No 1382/2003	2006	1692
	Regulation on the accelerated phasing-in of double-hull or equivalent design requirements for single-hull oil tankers	2012	530
Other (Decisions, Communications, White Papers, etc.)			
Erika I	Communication from the Commission to the European Parliament and the Council on the safety of the seaborne oil trade	2000	142
Erika II	Communication from the Commission to the European Parliament and the Council on a second set of community measures on maritime safety following the sinking of the oil tanker Erika	2000	802
	Communication from the Commission on Short Sea Shipping	2004	453
Erika III	Communication from the Commission: Third package of legislative measures on maritime safety in the European Union	2005	585
	Communication from the Commission: Keep Europe moving - Sustainable mobility for our continent Mid-term review of the European Commission's 2001 Transport White Paper	2006	314
	Commission staff working document (SEC): Report on the Motorways of the Sea State of play and consultation	2007	1367
	Communication from the Commission: towards an EU strategy on invasive species	2008	789
	Communication from the Commission: Strategic goals and recommendations for the EU's maritime transport policy until 2018	2009	8
	Communication from the Commission: Communication and action plan with a view to establishing a European maritime transport space without barriers	2009	10
	Commission recommendation on the safe implementation of the use of low sulphur fuel by ships at berth in Community ports	2009	1020
	White Paper: Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system	2011	144
	Communication from the Commission: Single Market Act II Together for new growth	2012	0573

Table with Belgian and Flemish legislation. The consolidated version of this legislation is available on [Belgisch staatsblad](#) and the [Justel-databases](#).

BELGIAN AND FLEMISH LEGISLATION	
Date	Title
Laws	
Bijzondere wet van 8 augustus 1980	Bijzondere wet tot hervorming der instellingen
Wet van 20 januari 1999	Wet ter de bescherming van het mariene milieu in de zeegebieden onder de rechtsbevoegdheid van België
Wet van 6 april 1995	Wet betreffende de voorkoming van de verontreiniging van de zee door schepen
Wet van 16 februari 2009	Wet houdende instemming met het Internationaal Verdrag van 2001 betreffende de controle op schadelijke aangroeiwerende systemen op schepen, en met de Bijlagen, gedaan te Londen op 5 oktober 2001
Wet van 27 juli 2011	Wet betreffende de bevoegde instantie voor de opvang van schepen die bijstand behoeven
Royal Decrees	
KB van 20 juli 1973	Koninklijk besluit houdende zeevaartinspectiereglement
KB van 2 februari 1993	Koninklijk besluit tot vaststelling van de lijst van de havens en hun aanhorigheden overgedragen van de Staat aan het Vlaamse Gewest.
KB van 21 december 2001	Koninklijk besluit betreffende de soortenbescherming in de zeegebieden onder de rechtsbevoegdheid van België
KB van 30 september 2005	Koninklijk besluit betreffende de bevordering van het gecombineerd goederenvervoer
KB van 27 april 2007	Koninklijk besluit betreffende de voorkoming van luchtverontreiniging door schepen en de vermindering van het zwavelgehalte van sommige scheepsbrandstoffen
KB van 6 februari 2009	Koninklijk besluit tot oprichting en organisatie van het maritiem informatiekruispunt
KB van 11 april 2012	Koninklijk besluit tot instelling van een veiligheidszone rond de kunstmatige eilanden, installaties en inrichtingen voor de opwekking van energie uit het water, de stromen en de winden in de zeegebieden onder Belgische rechtsbevoegdheid
Decrees	
Havendecreet (2 maart 1999)	Decreet houdende het beleid en het beheer van de zeehavens
Decreet van 16 juni 2006	Decreet betreffende de begeleiding van de scheepvaart op de maritieme toegangswegen en de organisatie van het Maritiem Reddings- en Coördinatiecentrum
Decreet van 9 mei 2008	Decreet houdende instemming met het Internationaal Verdrag betreffende de controle van schadelijke aangroeiwerende systemen op schepen, opgemaakt in Londen op 5 oktober 2001
Ministerial Decrees	
MB van 19 april 2005	Ministerieel besluit tot vaststelling van het « Rampenplan Noordzee »
Other	
Besluit van de Vlaamse regering van 13 juli 2001	Besluit van de Vlaamse regering houdende de aanduiding van de voorlopige begrenzing van de havengebieden
Besluit van de Vlaamse regering van 26 oktober 2007	Besluit van de Vlaamse Regering betreffende het Maritiem Reddings- en Coördinatiecentrum
Besluit van de Vlaamse regering van 26 oktober 2007	Besluit van de Vlaamse Regering betreffende de begeleiding van de scheepvaart
Samenwerkingakkoord van 8 juli 2005	Samenwerkingsakkoord tussen de Federale Staat en het Vlaamse Gewest betreffende de oprichting van en de samenwerking in een structuur Kustwacht