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3 SHIPPING

3.1 DESCRIPTION

Each year, more than 420000 routed ship movements are registered in the North Sea. This number does not include fishing boats or recreational vessels. The majority of the registered movements take place in the southern part of the North Sea. This southern part, therefore, can be seen as one of the busiest shipping areas in the world. It is consequently very vulnerable to accidents and wreckage. The shipping routes along the Belgian coast and on the Belgian part of the North Sea can be divided into three major schemes

- **Category I: West-East bound transit**: Each year, about 150000 ships pass through the Strait of Dover (400 each day) (OSPAR 2000). This does not include crossings (600 each day). The West-East traffic route is used by ships travelling from and to European ports in the southern part of the North Sea and the Baltic Sea, entering or leaving the North Sea via the English Channel. This route is part of the major traffic separation scheme in which counter-current traffic streams are divided by making use of lanes and other regulations. A small part of this major scheme covers the northern strip of the Belgian part of the North Sea.
- **Category II: the Westhinder-separation scheme** is being used by ships travelling from and to ports in Belgium and ports along the Westerscheldt estuary. Those entering the Belgian ports link up with the West-East bound transit in the north. It consists of a western and southern lane and also covers a refuge area in the north. This scheme finds its origin at the end of the Strait of Dover, adjacent to Dunkerk in the French exclusive economic zone, and leads all the way into the Belgian territorial sea.
- **Category III: Other shipping.** Besides these major systems, a variety of other shipping traffic exist with vessels that are not bound to specific routing systems. They are generally under a length of 80 metres except for ferries and other cross channel shipping. An example is the shipping traffic between Belgian ports and the UK, crossing the official traffic separation schemes on a daily basis. Coastal shipping (coasters, whether inland or not, supply vessels, anti pollution vessels, tug boats … etc) also belongs to this category with an area south of the main traffic separation scheme as scope. Recreational and fishing vessels are dealt with under the relevant sections.

3.2 SUBUSES AND DESCRIPTION

Shipping can in fact be subdivided in different sub-uses:

- **The actual transport along the shipping routes**: To limit the number of accidents, collisions and wreckage, a traffic separation scheme called the "Strait of Dover and adjacent waters traffic separation scheme", has been approved by IMO and routes were officially identified on nautical charts, taking into account IMO conventions and regulations, such as COLREG.
- **Places of refuge and anchorage**: Along the Westhinder shipping route, ships are able to anchor at designated areas. This mostly happens while waiting for a pliot or a permission to actually enter a port. Other areas are designated as places of refuge in case of heavy storms at sea or in case of leakage. Yet others can be used for offshore bunkering. Combinations of these

different uses are possible, although no offshore bunkering in the Belgian part of the North Sea (BPNS) takes place at the moment. To start offshore bunkering in the BPNS one needs a permit. In order to receive a permit an environmental impact assessment is required.

- **The ports**: The berthing and anchoring in ports is a sub-use too. Port activities, however, do not make up part of the actual use of the BPNS and are therefore excluded from this study.

3.3 TRANSIT SHIPPING

3.3.1 Description

The West-East traffic route or North Hinder route is made up of ships travelling from and to European ports in the southern part of the North Sea, and entering or leaving the North Sea via the English Channel. A small part of this major scheme covers the northern strip of the Belgian part of the North Sea => coordinates are set under international legislation (see Legislation).

3.3.2 Legislative framework

Legislation

(Cliquet et al. 2004 ; Maes and Cliquet 2005)

International legislation and Belgian implementation:

Traffic separation schemes, shipping routes and traffic regulations were set by international conventions and IMO regulations:

- Convention on the International Regulations for Preventing Collisions at Sea (COLREG), London, 20 October 1972
    - Implementation in Belgium:
        - Law of 24 November 1975 on the approval of the Convention on the International Regulations for Preventing Collisions at Sea, *BS* 12 June 1976.

- International Maritime Organization, Ships' Routeing, London, IMO, 8th Edition, 2002

3.3.3 Existing situation

3.3.3.1 Spatial delimitation

The actual route that is used by West-East bound ships will coincide with the routes as set by the international conventions as mentioned above (Map I.3.3a).

3.3.3.2 Type and intensity

The actual use in frequency and intensity of this transit zone is being studied by other BELSPO projects (ECOSONOS "Emissions of CO2, SO2 and NOx from Ships" and RAMA "Risk Analysis of Marine Activities in the Belgian Part of the North Sea"). This data is not available for the Belgian part of the North Sea. It will need to be collected, making use of transfer data from France or the UK.

3.3.4 Interactions

3.3.4.1 Suitability for user

Details – if applicable – can be found in the chapter that is specifically dedicated to "Suitability".

3.3.4.2 Impact on other users

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction among users".

3.3.4.3 Impact on environment

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction between users and the environment".

Biological

Ballast water and introduction of harmful aquatic species is a possible impact (mainly in coastal waters and estuaries). Globally, it is estimated that about 10 billion tonnes of ballast water is transferred each year. The water taken on board for ballasting a vessel may contain aquatic organisms, including dormant stages of microscopic toxic aquatic organisms - such as dinoflagellates, which may cause harmful algal blooms after their release. In addition, pathogens such as the bacterium Vibrio cholerae (cholera) have been transported with ballast water. As ships travel faster and faster, the survival rates of species carried in ballast tanks have increased. As a result, many introductions of non-indigenous organisms in new locations have occurred, often with disastrous consequences for the local ecosystem - which may include important fish stocks or rare species.

Regulations concerning harmful aquatic organisms in ballast water:

- The Marine Environment Protection Committee - 44th session (6-13 March 2000) proposed new regulations to address the environmental damage caused by the introduction of harmful aquatic organisms in ballast water, used to stabilise vessels at sea.
- Current options for preventing the spread of harmful aquatic organisms in ballast water are based on IMO Resolution A. 868(20) (Guidelines for the control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens) and include:
  - exchanging ballast water in deep ocean, where there is less treath for marine life and where organisms are less likely to survive, if feasible for technical and safety reasons;
  - various (filtration, thermo, chemical, and radiation) treatment of the ballast water en route to kill the living organisms;
  - delivering ballast water to port reception facilities.
- On 13 February 2004, the International Convention for the Control and Management of Ships' Ballast Water and Sediments was approved in IMO. This Convention has not entered into force yet.

Chemical

Oil pollution:

Oil pollution (poly-aromatic carbohydrates or PACs) of which Bap (benzoapyreen 44 mg/kg oil) and Flu (fluorantheen 240 mg/kg oil) for direct disposal and 0.001 mg BaP/kg oil and 0.13 mg Flu/kg oil for indirect pollution via air emissions (Compaan and Laane 1992; Wijffels 1993; Wulffraat and Evers 1993).

- From bilge and sludge (Baan et al. 1998)
  - total of 1500 g/km
  - BaP: 0.025 g/km
  - Flu: 0.15 g/km

The study of movements in the transit zone that is in progress (ECOSONOS and RAMA, see above), and the knowledge of the length of the transit in km, will give the possibility to calculate the exact travelled distance in the transit zone. However, this data is not yet available.

- From ballast water and washing tanks
  - A total of 68500 ton/year is produced for the entire North Sea of which 42% is disposed of (= 28770 tons oil) (Baan et al. 1998). The surface ratio of the Belgian part of the North Sea (3600km²) against the entire North Sea (750000km²) = 0.0048 or 0.48% (http://www.mumm.ac.be/EN/NorthSea/facts.php). An extrapolation would therefore add up to about 328.8 tons produced oil for the Belgian part of which 138.1 tons are disposed of.
  - BaP: 1266 tons disposal in the entire North Sea (Baan et al. 1998) and an extrapolation would therefore add up to about 6.08 tons for the Belgian part.
  - Flu: 6905 tons disposal in entire North Sea (Baan et al. 1998) and an extrapolation would therefore add up to about 33.14 tons for the Belgian part.
- From air emission and its atmospheric deposition (Baan et al. 1998) but specific for Wadden Sea => 100% of the PACs end up in sea
  - total of 9 10^{-7} g/km
  - BaP: 9 10^{-10} g/km
  - Flu: 1.17 10^{-7} g/km

The study of movements in the transit zone that is in progress, and the knowledge of the length of the transit in km, will give the possibility to calculate the exact travelled distance in the transit zone. However, this data is not yet available.

As from August 1999, the North Sea, the seas around Ireland and their approaches have been established under the name North West European waters as a Special Area under MARPOL Annex I (oil) (OSPAR 2000).

PCB-153:

PCB-153 from air emission and its atmospheric deposition (Baan et al. 1998) => 100% of PCBs end up in sea of which 7% is PCB-153

- total PCB of 5 10^{-10} g/km
- PCB-153: 3.5 10^{-11} g/km

The study of movements in the transit zone that is in progress, and the knowledge of the length of the transit in km, will give the possibility to calculate the exact travelled distance in the transit zone. However, this data is not yet available.

Heavy metals:

Heavy metals from air emission and atmospheric deposition (Baan et al. 1998) => only vanadium and nickel are supposed to be of significance but no data is available (Wulffraat and Evers 1993).

Antifouling substances:

Anti-fouling paints are used to coat the hulls of ships to prevent sea life such as algae and molluscs attaching themselves to the hull - thereby slowing down the ship and increasing fuel consumption. In the early days of sailing ships, lime and later arsenic were used to coat ships' hulls, until the modern chemicals industry developed effective anti-fouling paints using metallic compounds. These compounds slowly "leach" into the seawater, killing barnacles and other marine life that have attached to the ship. But studies have shown that these compounds persist in the water, killing sea life, harming the environment and possibly entering the food chain. One of the most effective anti-fouling paints, developed in the 1960s, contains the organotin tributylin (TBT), which has been proven to cause deformations in oysters and sex changes in whelks (Evers and Meerendonk 1993; RIZA 1993).

Antifouling substances from vessels (Baan et al. 1998)

- Cu: 1.5 g/km
- TBT: 0.6 g/km

The study of movements in the transit zone that is in progress, and the knowledge of the length of the transit in km, will give the possibility to calculate the exact travelled distance in the transit zone. However, this data is not yet available.

Within the IMO, a general ban on the use of organotin compounds in anti-fouling paints has been agreed. The target is to prohibit the application and to require their removal or at least prevent the leaching of TBT into the water by the year 2008. Within the EC, controls on other TBT applications have been increased with the revision of Directive 76/769/EEC.

Regulations concerning antifouling substances:

- In 1990 IMO's Marine Environment Protection Committee (MEPC) adopted a resolution which recommended that Governments adopt measures to eliminate the use of anti-fouling paint containing TBT on non-aluminium hulled vessels of less than 25 metres in length and eliminate the use of anti-fouling paints with a leaching rate of more than four micrograms of TBT per day.
- In November 1999, IMO adopted an Assembly resolution that called on the MEPC to develop an instrument, legally binding throughout the world, to address the harmful effects of anti-fouling systems used on ships. The resolution called for a global prohibition on the application of organotin compounds that act as biocides in anti-fouling systems on ships by 1 January 2003, and a complete prohibition by 1 January 2008.
- The new International Convention on the Control of Harmful Anti-fouling Systems on Ships (TBT-Convention) adopted on 5 October 2001 (entry into force 12 months after 25 States representing 25% of the world's merchant shipping tonnage have ratified it) defines "*anti-fouling systems*" as "*a coating, paint, surface treatment, surface or device that is used on a ship to control or prevent attachment of unwanted organisms*".
  - Annex I attached to the Convention states that by an effective date of 1 January 2003, all ships shall not apply or re-apply organotin compounds which act as biocides in anti-fouling systems. By 1 January 2008 (effective date), ships either: (a) shall not bear such compounds on their hulls or external parts or surfaces; or (b) shall bear a coating that forms a barrier to such compounds leaching from the underlying non-compliant anti-fouling systems.
- Council Directive 76/769/EEC of 27 July 1976 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 *Official Journal L* 262, 27 September 1976, amended by:

- Council Directive 89/677/EEC 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 *Official Journal* L 398, 30 December 1989. This Directive introduced a ban on the use of anti-fouling paints with organotin compounds for vessels of less than 25 metres (article 21).
- 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) (Text with EEA relevance) *Official Journal L* 142, 5 June 1999. This Directive extended the ban for vessels of all lengths especially used on inland waters and lakes.
- Directive 2002/61/EC of the European Parliament and of the Council of 19 July 2002 amending for the nineteenth time Council Directive 76/769/EEC relating to restrictions on the marketing and use of certain dangerous substances and preparations azocolourants) *Official Journal L* 243, 11 September 2002. This Directive extended the ban to vessels of all lengths and used on any water.

- Regulation (EC) No 782/2003 of the European Parliament and of the Council of 14 April 2003 on the prohibition of organotin compounds on ships *Official Journal L* 115, 9 May 2003. This regulation adopts the TBT-Convention of 2001 as mentioned above (as from January 2003 and July 1 2008 off).

Zinc:

Zinc from zinc anodes (Baan et al. 1998)

- Zn: 0.7 g/km

The study of movements in the transit zone that is in progress, and the knowledge of the length of the transit in km, will give the possibility to calculate the exact travelled distance in the transit zone. However, this data is not yet available.

NOx:

NOx from air emission and its atmospheric deposition (Baan et al. 1998) => 40% of the total NOx in the air emission will end up in sea:

- total NOx of 730 g/km
- NOx: 292 g/km to sea

The study of movements in the transit zone that is in progress, and the knowledge of the length of the transit in km, will give the possibility to calculate the exact travelled distance in the transit zone. However, this data is not yet available.

Regulations concerning NOx emissions:

- A Protocol adopted at the Conference of the Parties in September 1997 introduced a new Annex VI, amending MARPOL 73/78. Annex VI is in force since 19 May 2005 and deals with regulations for the prevention of air pollution from ships. Annex VI sets limits on emissions of nitrogen oxides (NOx) from diesel engines. A mandatory NOx Technical Code, developed by IMO, defines how this is to be done.
- European legislation is in the process of being drafted.

Geological/Physical

Oil slicks:

Oil slicks from vessels lead to:

- total oil disposal of 1500 g/km from sludge and bilge, and of 28770 tons from ballast water and washing tanks
- an average oil slick of 0.5m² for 1 kg oil per day (thickness of 0.3mm).

The study of movements in the transit zone that is in progress, and the knowledge of the length of the transit in km, will give the possibility to calculate the exact travelled distance in the transit zone. However, this data is not yet available.

Hydrological

No hydrological impact is significant enough to be mentioned here.

3.3.4.4 Impact on socio-economy

Economic

Figures on turnover and income to Belgium generated from this traffic are not yet available.

Social

Figures on Belgian employment are not available and possibly not relevant.

3.4 PLACES OF REFUGE AND ANCHORING FOR TRANSIT SHIPPING

In the past, offshore bunkering took place on the Belgian part of the North Sea. The Law on the Protection of the Marine Environment (1999) requires a permit for these activities. No offshore bunkering company, however, has been granted a permit to date. One company applied for a permit, based on a mandatory environmental impact assessment (EIS). The EIS did not satisfy the administration (MUMM) who demanded a new EIA. In reaction, the offshore bunkering company moved its activities to British waters. This means that no offshore bunkering sites are in use thus far.

3.5 WESTHINDER SHIPPING

3.5.1 Description

The Westhinder separation scheme is being used by ships travelling from and to ports in Belgium and along the Westerscheldt estuary. It links up with the West-East bound transit in the north. It consists of a western and southern lane and also covers a refuge area in the north. This scheme finds its origin at the end of the Strait of Dover, adjacent to Dunkerk, and leads all the way into the Belgian territorial waters => co-ordinates are set under international legislation. The separation scheme ends at the Westhinder refuge site where ships have to wait until they are piloted (for ships over 80 metres in length) to either the Westerscheldt or the Belgian coastal ports. Buoys also mark certain coordinates along these routes.

3.5.2 Legislative framework

Legislation

(Cliquet et al. 2004 ; Maes and Cliquet 2005)

International legislation and Belgian implementation:

Traffic separation schemes, shipping routes and traffic regulations were set or approved by international conventions and IMO regulations:

- Convention on the International Regulations for Preventing Collisions at Sea (COLREG), London, 20 October 1972
    - Implementation in Belgium:
        - Law of 24 November 1975 on the approval of the Convention on the International Regulations for Preventing Collisions at Sea, *BS* 12 June 1976.

- International Maritime Organization, Ships' Routeing, London, IMO, 8th Edition, 2002.

- United Nations Convention on the Law of the Sea, Montego Bay, 10 December 1982.
    - Implementation in Belgium:
        - Law of 18 June 1998 on the approval of the Convention on the Law of the Sea of 10 December 1982 and the Agreement relating to the implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982 of 28 July 1994, *BS* 16 September 1999.

3.5.3 Existing situation

3.5.3.1 Spatial delimitation

The actual route that is used by ships over 80 metres in length, going to or coming from the Belgian ports, will coincide with the routes set by the international conventions, as mentioned above (Map I.3.3a).

3.5.3.2 Type and intensity

The identification of the type of shipping was focused on merchant shipping. Location and intensity data of this kind of shipping were collected making use of the IVS SRK database from the Vessel Traffic Services. Data used for the analysis covered the period from April 2003 through to March 2004. In total, 55 351 movements were registered during that period by the VTS in the studied area. For this project, overall shipping density and intensity in the analysed area, and during the analysed period, was registered and set out on a map. Furthermore, a detailed database is presently being finalised that will allow analysis of shipping patterns based on different classes. These classes are based on vessel type (8 classes), route segment and direction (112 classes) and cargo type (15 classes). The distinction between cargo types is based on the IMDG and IMO classes. The database also includes additional data such as cargo, ship characteristics, sailing speed, ETA …etc. These aspects, however, are not within the scope of this project. The number of ships is expressed in units (Map I.3.3b):

- per direction (to or from Belgian coast, possibly to certain harbours)

- per period of one year => data available for the period between April 2003 through to April 2004
- excluding recreational vessels, fishing vessels and all vessels below 80 metres except those that do report their entrance in the area controlled by the VTS (f.e. vessels carrying dangerous goods)

This adds up to a total of 2 921 941.18 travelled km for the studied period.

3.5.4 Interactions

3.5.4.1 Suitability for user

Details – if applicable – can be found in the chapter that is specifically dedicated to "Suitability".

3.5.4.2 Impact on other users

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction among users".

3.5.4.3 Impact on environment

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction between users and the environment".

Biological

Ballast water and introduction of harmful aquatic species is a possible impact.

See for detailed explanation and legislation under "Transit shipping".

Chemical

Oil pollution:

Oil pollution (PACs) of which Bap (benzoapyreen 44 mg/kg oil) and Flu (fluorantheen 240 mg/kg oil) for direct disposal and 0.001 mg BaP/kg oil and 0.13 mg Flu/kg oil for indirect pollution via air emissions (Compaan and Laane 1992; Wijffels 1993; Wulffraat and Evers 1993):

- From bilge and sludge (Baan et al. 1998)
  - total of 1500 g/km => total of 4382.91 tons for the studied period
  - BaP: 0.025 g/km => total of 73.05 kg for the studied period
  - Flu: 0.15 g/km => total of 438.29 kg for the studied period
- From ballast water and washing tanks
  - A total of 68500 ton/year is produced for the entire North Sea of which 42% is disposed of (= 28770 tons oil) (Baan et al. 1998). The surface ratio of the Belgian part of the North Sea (3600 km²) against the entire North Sea (750000 km²) = 0.0048 or 48% (http://www.mumm.ac.be/EN/NorthSea/facts.php). An extrapolation would therefore add up to about 328.8 tons oil produced for the Belgian part of which 138.1 tons are disposed of.
  - BaP: 1266 tons disposal in entire North Sea (Baan et al. 1998) and an extrapolation would therefore add up to about 6.08 tons for the Belgian part.
  - Flu: 6905 tons disposal in entire North Sea (Baan et al. 1998) and an extrapolation would therefore add up to about 33.14 tons for the Belgian part.

- From air emission and its atmospheric deposition (Baan et al. 1998 but specific for Wadden Sea) => 100% of PACs end up in sea
- total of 9 10^{-7} g/km => total of 2.63 g for the studied period
- BaP: 9 10^{-10} g/km => total of 2.63 mg for the studied period
- Flu: 1.17 10^{-7} g/km => total of 0.34 g for the studied period

See for detailed explanation and legislation under "Transit shipping".

PCB-153:

PCB-153 from air emission and its atmospheric deposition (Baan et al. 1998) => 100% of PCBs end up in sea of which 7% is PCB-153

- total PCB of 5 10^{-10} g/km => total of 1.5 mg for the studied period
- PCB-153: 3.5 10^{-11} g/km => total of 0.1 mg for the studied period

See for detailed explanation and legislation under "Transit shipping".

Heavy metals:

Heavy metals from air emission and its atmospheric deposition (Baan et al. 1998) => only vanadium and nickel are supposed to be of significance but no data is available (Wulffraat and Evers 1993).

See for detailed explanation and legislation under "Transit shipping".

Antifouling substances:

Antifouling substances from vessels (Baan et al. 1998)

- Cu: 1.5 g/km => total of 4.38 tons for the studied period
- TBT: 0.6 g/km => total of 1.75 tons for the studied period

See for detailed explanation and legislation under "Transit shipping".

Zinc:

Zinc from zinc anodes (Baan et al. 1998)

- Zn: 0.7 g/km => total of 2.05 tons for the studied period

See for detailed explanation and legislation under "Transit shipping".

NOx:

NOx from air emission and its atmospheric deposition (Baan et al. 1998) => 40% of the total NOx in the air emission will end up in sea:

- total NOx of 730 g/km => total of 2133.02 tons for the studied period
- NOx: 292 g/km to sea => total of 853.21 tons for the studied period

See for detailed explanation and legislation under "Transit shipping".

Geological/Physical

Oil slicks:

Oil slicks from vessels lead to:

- total oil disposal of 1500 g/km from sludge and bilge, and of 138.1 tons from ballast water and washing tanks => total of 5714 + 138.1 tons for the studied period = 5852.1 tons
- an average oil slick of 0.5 m² for 1 kg oil per day (thickness of 0.3 mm)

Hydrological

No hydrological impact is significant enough to be mentioned here.

3.5.4.4 Impact on socio-economy

Economic

Ports:

The economic value (maritime cluster and non-maritime cluster) of the Flemish ports of Ostend, Zeebrugge, Antwerp and Gent (Douvere, in press) can be calculated, but this also includes public service and general service turnover from shipping < 80 metres (see Coastal and cross channel shipping). The added value for the year 2002 is:

- Ostend € 324 million
- Gent € 2942.9 million
- Zeebrugge € 687 million
- Antwerp € 7012.9 million

Shipping itself:

Figures on the level of shipping itself are not available

Social

Ports:

Employment (maritime cluster and non-maritime cluster) in the Flemish ports of Ostend, Zeebrugge, Antwerp and Gent (Douvere, in press) can be calculated, but this also includes public service and general service employment from shipping of <8 0 metres (see Coastal and cross channel shipping) for the year 2002 is:

- Ostend 4095 employees
- Gent 28501 employees
- Zeebrugge 9783 employees
- Antwerp 60563 employees

Shipping itself:

Figures on the level of shipping itself are not available.

3.6 PLACES OF REFUGE AND ANCHORING FOR WESTHINDER SHIPPING

3.6.1 Description

Article 20 of Directive 2002/59/EC asks the member state – amongst other things – to deliver places of refuge to vessels in distress. Because the BPNS is intensively used, the only place of refuge in that part of the North Sea that can be offered is the Westhinder refuge site (Rampenplan Noordzee 2004). The

Westhinder refuge and anchoring site is situated north of the end of the traffic separation scheme. Ships above 80 metres in length are required to wait until vacancy becomes available in the port of arrival or until high tide allows for safe entrance into the port of Antwerp. They are then piloted from the refuge site to the port of arrival.

- Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC, *Official Journal L* 208, 5 August 2002.

3.6.2 Legislative framework

Legislation

(Cliquet et al. 2004 ; Maes and Cliquet 2005)

International legislation and Belgian implementation:

The Westhinder refuge and anchorage site is approved by international conventions and IMO regulations.

- Convention on the International Regulations for Preventing Collisions at Sea, London, 20 October 1972.
    - Implementation in Belgium:
        - Law of 24 November 1975 on the approval of the Convention on the International Regulations for Preventing Collisions at Sea, *BS* 12 June 1976.
- International Maritime Organization, Ships' Routeing, London, IMO, 8th Edition, 2002.

3.6.3 Existing situation

3.6.3.1 Spatial delimitation

The actual place of refuge that is used by ships above a certain length (80 metres) going to Belgian ports will coincide with the place of refuge set by the international conventions as mentioned above. An anchorage is established north of the scheme and is bounded by a line connecting the following geographical positions (Map I.3.3a):

- 51°23'.50 N 2°33'.00 E
- 51°26'.00 N 2°35'.00 E
- 51°26'.00 N 2°41'.00 E
- 51°23'.50 N 2°41'.00 E

3.6.3.2 Type and intensity

Using the same IVS SRK database from the Vessel Traffic Services, as was used for shipping intensity and frequency, allows us to get an idea of intensity and frequency of use of the Westhinder place of refuge. Data for the analysis period runs from April 2003 through to March 2004 (Map I.3.3c). Units are expressed as:

- average number of vessels waiting in the area of refuge per day and per year => data available for the period between April 2003 through to April 2004
    - 2.36/day
    - 862.5/year
- average number of waiting hours per vessel in the area of refuge

- 6.22 hours/vessel

- average number of waited hours per day and per year for all vessels
  - 14.7 hours/day = 0.61 waiting days
  - 5364.75 hours/year = 223.5 waiting days

3.6.4 Interactions

3.6.4.1 Suitability for user

Details – if applicable – can be found in the chapter that is specifically dedicated to "Suitability".

3.6.4.2 Impact on other users

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction among users".

3.6.4.3 Impact on environment

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction between users and the environment".

Biological

Ballast water and introduction of harmful aquatic species is a possible impact though no ballast water is known to be discharged in this area.

See for detailed explanation and legislation under "Transit shipping".

Chemical

Antifouling substances:

Antifouling from vessels (Baan et al. 1998)

- Cu: 300g/24h per vessel (between 10000 and 30000 tons) => this adds up to a release of 300 x 223.5 days = 67.05 kg Cu in the studied year
- TBT: 50g/24h per vessel (between 10000 and 30000 tons) => this adds up to a release of 50 x 223.5 days = 11.18 kg TBT in the studied year

See for detailed explanation and legislation under "Transit shipping".

Zinc:

Zinc from zinc anodes (Baan et al. 1998)

- Zn: 200g/24h per vessel) => this adds up to a release of 200 x 223.5 days = 44.7 kg Zn in the studied year

See for detailed explanation and legislation under "Transit shipping".

Hydrological

No hydrological impact is significant enough to be mentioned here.

3.6.4.4 Impact on socio-economy

Economic

See under "Westhinder shipping".

Social

See under "Westhinder shipping".

3.7 COASTAL AND CROSS CHANNEL SHIPPING

3.7.1 Description

Ships under a certain tonnage (in general < 80 metres long) are not bound to specific routeing systems. They are free to move anywhere on the condition that they do not strand (therefore taking into account the buoys that delimitate the sand flats) and that they do not disturb the official traffic separation schemes. The "priority to the right" rule counts except for ships using the traffic separation scheme. They always have priority. Shipping linked with fishing and recreation will be dealt with under the relevant chapters. Two sectors can be distinguished:

- The coastal shipping using the area south of the Westhinder traffic separation scheme
- The cross channel shipping linking Belgian ports with UK ports. When ferries are above 80 metres they will need to make use of the traffic separation scheme as mentioned above. Crossing routes are variable and are chosen in terms of weather and traffic.

3.7.2 Legislative framework

(Cliquet et al. 2004 ; Maes and Cliquet 2005)

International legislation and Belgian implementation:

Vessels under 80 metres are not restricted to certain routes but have to take international traffic rules into account (priority of separation scheme, priority of the right, indication of buoys … etc).

- Convention on the International Regulations for Preventing Collisions at Sea, London, 20 October 1972.
    - Implementation in Belgium:
        - Law of 24 November 1975 on the approval of the Convention on the International Regulations for Preventing Collisions at Sea, *BS* 12 June 1976.
- International Maritime Organization, Ships' Routeing, London, IMO, 8th Edition, 2002.

3.7.3 Existing situation

3.7.3.1 Spatial delimitation

The actual route that is used by ships above 80 metres will coincide with the routes as set by the international conventions as mentioned above. The vessels < 80 metres will adapt their routes – either coastal or cross channel – according to the weather and traffic at that moment.

3.7.3.2 Type and identification

No data is available on frequency and intensity of vessels under 80 metres of length that do not make use of the traffic separation scheme or the Westhinder scheme.

3.7.4 Interactions

3.7.4.1 Suitability for user

Details – if applicable – can be found in the chapter that is specifically dedicated to "Suitability".

3.7.4.2 Impact on other users

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction among users".

3.7.4.3 Impact on environment

Details – if applicable – can be found in the chapter that is specifically dedicated to "Interaction between users and the environment".

Biological

No biological impact is significant enough to be mentioned here.

Chemical

No chemical impact is significant enough to be mentioned here.

Geological/Physical

No geological/physical impact is significant enough to be mentioned here.

Hydrological

No hydrological impact is significant enough to be mentioned here.

3.7.4.4 Impact on socio-economy

Economic

Figures on turnover and income to Belgium generated by this traffic are not yet available.

Social

Figures on employment in Belgium generated by this traffic are not yet available.

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