

## Sector Fiche: Shipping and Ports

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### 1 Basic Facts

Gross Value added	State of the sector	Presence across sea basins
€570 billion EU and Norway in 2015 <sup>1</sup>	Mature and growing <sup>2</sup>	Dispersed throughout all sea basins <sup>3</sup>

Land-sea interaction	Temporal aspect	Lifetime of installations
Through ports and hinterland connections	<ul style="list-style-type: none"> <li>Peak in cargo demand in winter<sup>4</sup></li> <li>Cruise shipping primarily in the warmer months</li> </ul>	N/A

#### Interaction with other uses

Conflicts especially with uses requiring fixed installations<sup>5</sup>

<sup>1</sup> Oxford Economics (2017).

<sup>2</sup> EUNETMAR (2013).

<sup>3</sup> EuroGraphics ( n.d).

<sup>4</sup> Stopford, M. (2009).

<sup>5</sup> Medhi, R. (in press).

## 2 Composition of the shipping and ports sector

The activities of the shipping and port sector can be broken down by: i) the origin/destination of the ships' journey, ii) the purpose of traffic as well as iii) the size of ports.

<b>By origin/destination of the route</b>	Short sea (SSS) (within Europe)		EU-wide, the ratio of SSS versus DSS was 59% to 41% in terms of total gross weight of goods transported. SSS distributes cargo between European countries as well as tranships cargo arriving from overseas to other destinations within Europe <sup>6</sup> . SSS competes with other modes of transportation, e.g. road and rail transportation <sup>7</sup> . For MSP, SSS and the European leg of DSS are of relevance.
	Deep sea (DSS) (intercontinental traffic)		
<b>By purpose of the traffic</b>	Cargo	Liquid bulk	Accounts for 38% of total cargo handled in main EU ports (in 2015) <sup>8</sup> .
		Dry bulk	Accounts for 23% of total cargo handled in main EU ports (in 2015) <sup>9</sup> .
		Containers	Accounts for 18% of the total cargo handled by main EU ports (in 2015) <sup>10</sup> .
		Ro-ro	Accounts for 12% of the total cargo handled by main EU ports (in 2015) <sup>11</sup> .
	Passenger	Ferries	In 2015, the number of passengers (dis-) embarking in EU ports amount 382 million <sup>12</sup> .
		Cruise	In comparison to ferry passengers, the number of cruise passengers is comparatively low with around 12 million in 2015. However, the cruise shipping has significant growth rates <sup>13</sup> .
	Service	e.g. to offshore wind farms, oil and gas platforms, aquaculture installations	In addition to handling cargo and providing passenger terminals, some ports have specialised to accommodate offshore service traffic. This may also constitute a survival strategy for small ports that find it hard to compete with bigger competitors.
<b>Size of ports</b>	A scale from very large (hubs) to small/regional ports		Ports vary in size and significance of the shipment of goods. There are big ports throughout the EU, but there is an especially dense accumulation of main ports in the North West of the EU <sup>14</sup> . Smalls ports can still be important, e.g. as employment providers in regions and as import or export interfaces for local industries <sup>15</sup> .

Figure 1: Composition of the shipping and ports sector

In this sector fiche, there will be an emphasis on cargo and passenger traffic types as well as on short sea shipping. However, service traffic and the European leg of deep sea shipping will be considered, too. Leisure boats and fishing activities also create traffic. These forms of navigation are not part of this sector fiche, but information can be found in the coastal and maritime tourism and fishing fiches.

<sup>6</sup> Eurostat (2017)

<sup>7</sup> Beyer et al. (2017).

<sup>8</sup> Eurostat (2017).

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> EUNETMAR (2013).

<sup>14</sup> Eurostat (2017)

<sup>15</sup> Beyer et al. (2017).

### 3 Relationship between shipping and ports and MSP

#### 3.1 What are present spatial needs of the shipping and ports sector?

Cargo and passenger transport follows a linear structure<sup>16</sup>. This means that they seek to take the direct route between two ports. Detours are possible, but costly, due to higher fuel expenses as well as labour costs<sup>17</sup>.

Sufficient space must be secured for overtaking as well as emergency manoeuvres<sup>18</sup>. This means that incompatible uses (especially offshore installations) should be sufficiently far away from the heavier trafficked areas.

In addition, ships can only sail in areas which are sufficiently deep for their draught<sup>19</sup>.

When planning for shipping in MSP, it must be ensured that sea traffic can operate safely also under adverse conditions. Heavy weather poses risks in the sense that it limits visibility. Furthermore, ships may need to deviate from the optimal course or even seek refuge in anchorage areas<sup>20</sup>.

#### 3.2 Which anticipated future developments of the industry are relevant to MSP?

Increasing freight volumes	Increasing vessel size	Increasing short sea shipping
<p>Increasing freight volumes generally mean an increase in ship traffic<sup>21</sup> and a resulting claim for more sea space. It is important to assess how an increase in freight volumes would play out in a particular geographic context (see increasing vessel size and increase in short sea shipping).</p>	<p>Vessel size is predicted to increase<sup>22</sup>. Bigger vessels have a bigger turning circle. If an area is frequently accessed by very large vessels, a wider area should be reserved for shipping in order to ensure safe navigation<sup>23</sup>. Furthermore, water depth in shallow areas (including in ports) limits the accessibility for vessels with a bigger draught. Some ports will adapt their infrastructure to accommodate very large carriers<sup>24</sup>. Canals and locks may also restrict the access of bigger ships to certain waterways. It needs to be assessed how traffic patterns will shift with an increasing number of very large vessels.</p>	<p>Short sea shipping is expected to increase, because feeder vessels will distribute the cargo that is brought to hubs by the very large vessels<sup>25</sup>. In addition, short sea shipping is politically supported at the EU level<sup>26</sup>. A spatial implication of more short sea shipping is an increased demand for space along the coastlines.</p>
Port infrastructure	Autonomous vessels	Climate change
<p>It is important to anticipate, which ports will be frequently accessed by what kind of ships in the future in order to determine which routes ships will use. Existing and planned port infrastructure is a decisive factor<sup>27</sup>. Apart from the ability to accommodate very large carriers, the offer of alternative bunkering technology as well as a port's general service offer may decide about the direction of traffic flows. Some small ports may even decline in importance in the competitive environment.</p>	<p>The spatial implications of autonomous vessels are difficult to foresee. In the trial phase, testbeds will be established that may be closed for conventional ships and other uses. In the foreseeable future, autonomous and manned vessels will coexist. Some experts say that in the beginning, autonomous vessels may require a separate lane. Others argue that autonomous shipping will require less safety distances, because technology will be more reliable than vessels operated by humans<sup>28</sup>.</p>	<p>Climate change is expected to result in more extreme weather conditions (including heavier rain and storms)<sup>29</sup>. Ships are obliged to adapt their routes to the weather conditions<sup>30</sup>. Thus, ships may need more space so that they can make detours in case of bad weather on their planned route. In addition, climate change may trigger an opening of the Arctic route during summer, which may alter sea traffic patterns in some areas<sup>31</sup>.</p>

<sup>16</sup> Gee, K., Kannen, A., & Heinrichs, B. (2011).

<sup>17</sup> Rawson, A. & Rogers, E. (2015).

<sup>18</sup> The Ministry of Infrastructure and the Environment & The Ministry of Economic Affairs (2014).

<sup>19</sup>The Nautical Institute (2013).

<sup>20</sup> Ibid.

<sup>21</sup> European Commission (2013).

<sup>22</sup> OECD (2015).

<sup>23</sup>The Ministry of Infrastructure and the Environment & The Ministry of Economic Affairs (2014).

<sup>24</sup> OECD (2015).

<sup>25</sup> European Commission. DG Mobility and Transport (2015).

<sup>26</sup> European Commission, DG Mobility and Transport (2011).

<sup>27</sup> Beyer et al. (2017).

<sup>28</sup> Meyer, N. (2017).

<sup>29</sup> Sarwar, G.M. (2006).

<sup>30</sup> IMO Resolution A.528, 13.

<sup>31</sup> Ibid.

## 4 Interaction with other sectors

Tourism and recreation	Pipelines and cables	Fishing	Offshore wind
 <ul style="list-style-type: none"> <li>Tourism creates traffic (leisure boating and sailing) which is a safety issue for other types of navigation<sup>32</sup>.</li> <li>Ports are a tourist attraction.</li> </ul>	 <ul style="list-style-type: none"> <li>Deepening of fairways poses a risk to pipelines and cables<sup>33</sup>.</li> <li>Anchoring vessels can damage pipelines<sup>34</sup>.</li> <li>Pipelines and cables are laid with special ships<sup>35</sup>.</li> </ul>	 <ul style="list-style-type: none"> <li>Fishing entails navigation, too. However, it does not follow the navigational patterns of cargo and passenger transportation<sup>36</sup>.</li> </ul>	 <ul style="list-style-type: none"> <li>Offshore wind turbines may interfere with radar operations<sup>37</sup>.</li> <li>Offshore wind parks may impair sight, especially on smaller boats<sup>38</sup>.</li> </ul>

		Service traffic to and from fixed installations		
Marine aggregates	Conservation	Oil and gas	Marine aquaculture	Marine renewables
 <ul style="list-style-type: none"> <li>Marine aggregates are extracted with specialised ships.</li> <li>There is usually no synergy between fairway dredging and mining of marine aggregates<sup>39</sup>.</li> </ul>	 <ul style="list-style-type: none"> <li>Impacts on air quality and noise may have negative impacts on marine biodiversity<sup>40</sup>.</li> </ul>	 <ul style="list-style-type: none"> <li>Installations may compel ships to make detours, which is costly<sup>41</sup>.</li> <li>The risk for collision increases a) with the structures and b) among vessels themselves, when traffic density increases as navigable space diminishes<sup>42</sup>.</li> <li>Service traffic follows different navigational patterns than cargo or passenger transportation<sup>43</sup>. They go back and forth between ports and fixed installations. Often times, they need to cross lanes that are frequently trafficked by other vessels. These crossing bring with them risk for collision.</li> <li>Operators of fixed installations benefit from existing harbours. Some harbours have deliberately occupied the niche of service traffic, e.g. the Danish port of Esbjerg<sup>44</sup>.</li> </ul>		

## 5 Recommendations for MSP processes in support of the sector

<b>Free space needed</b> <p>To support the shipping sector, MSP should keep free space needed for shipping (rather than limiting shipping activities to designated areas) now and in the future. Furthermore, MSP should make sure that safety zones to incompatible activities are sufficient.</p>	<b>Freedom of navigation</b> <p>The freedom of navigation principle applies<sup>45</sup>. This means that ships are generally free to sail wherever they want. Limitations to this principle are put in place on an exceptional level (see IMO shipping routes). Still, shipping routes can be designated in an MSP, but they do not strictly limit the activities of the sector to this space.</p>	<b>Existing IMO shipping routes</b> <p>MSP processes may instigated a debate about changing shipping routes. However, changing international shipping routes is a lengthy process<sup>46</sup> and existing IMO shipping routes should be considered in MSP processes.</p>
<b>Three dimensions</b> <p>Three dimensions need to be taken into account for assessing present spatial claims and estimating future ones:</p> <ul style="list-style-type: none"> <li>The trajectory, i.e. the coordinates of ships' movements</li> <li>Width of the space required (depending on traffic density and vessel size)</li> <li>Water depth in relation to ships' draught.</li> </ul>	<b>AIS data</b> <p>AIS data a prime source to identify the present spatial needs of shipping. From the data, the requirements of different navigation types (cargo, passenger, service, fishing) can be differentiated<sup>47</sup>.</p>	<b>Neighbouring states cooperation</b> <p>Neighbouring states should cooperate in order to ensure a mapping of shipping lanes designated in MSPs across borders<sup>48</sup>.</p>

<sup>32</sup> Meyer, N. (2017).

<sup>33</sup> Ruskule et al. (2014).

<sup>34</sup> Health and Security Executive (2009).

<sup>35</sup> Verfaillie, E. & Van Lancker, V. (n.d).

<sup>36</sup> Meyer, N. (2017).

<sup>37</sup> Rawson, A. & Rogers, E. (2015).

<sup>38</sup> Ibid.

<sup>39</sup> Randall, E., Drake, A. & Cenac, W. (n.d).

<sup>40</sup> World Wildlife Fund (WWF) (2012).

<sup>41</sup> Rawson, A. & Rogers, E. (2015).

<sup>42</sup> Mehdi, R. & Schröder-Hinrichs, J.-U. (2016).

<sup>43</sup> Meyer, N. (2017).

<sup>44</sup> Esbjerg Municipality (n.d).

<sup>45</sup> UNCLOS Article 87, 1a

<sup>46</sup> The Nautical Institute (2013).

<sup>47</sup> Fiorini, et al. (2016).

<sup>48</sup> Gee, K., Kannen, A., & Heinrichs, B. (2011).

## 6 Resources<sup>49</sup>

### 6.1 Legal framework

Organisation	Title	Link	Short explanation
IMO	United Nations Convention of the Law of the Sea (UNCLOS)	<a href="http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm">http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm</a>	UNCLOS defines rights and responsibilities of states to use the sea. Many of the provisions address navigation. Some very relevant in the MSP context are: <ul style="list-style-type: none"> <li>• Freedom of navigation (Art. 87(1)a))</li> <li>• Regulations on artificial installations and their safety in the exclusive economic zone (Art. 60(7))</li> </ul> Traffic separation schemes in the territorial sea (Art. 22) as well as in straits used for international navigation (Art. 41).
IMO	International Convention for the Safety of Life at Sea (SOLAS)	<a href="http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS)-1974.aspx">http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Safety-of-Life-at-Sea-(SOLAS)-1974.aspx</a>	SOLAS addresses safety issues in construction, equipment and operation of vessels. It provides a framework for establishing routing systems (mandatory and recommended ones) through the International Maritime Organization.
IMO	International Regulations for Preventing Collisions at Sea (COLREGs)	<a href="http://www.imo.org/en/About/conventions/listofconventions/pages/colreg.aspx">http://www.imo.org/en/About/conventions/listofconventions/pages/colreg.aspx</a>	COLREGS provide navigation rules to prevent collisions,
IMO	International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL)	<a href="http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx">http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx</a>	MARPOL attempts to prevent emissions from ships polluting the marine environment.

<sup>49</sup> The information provided under this section is non-exhaustive. The intention is to provide the reader with basic information on the sector.

## 6.2 Actors

Name	Link	Short explanation
International Maritime Organization (IMO)	<a href="http://www.imo.org">http://www.imo.org</a>	IMO is the global regulatory standard-setting authority for the safety, security and environmental performance of international shipping.
European Community Shipowners' Associations (ECSA)	<a href="http://www.ecsa.eu/">http://www.ecsa.eu/</a>	ECSA represents the national shipowners' associations of the EU and Norway.
European Sea Ports Organisation	<a href="http://www.espo.be/">http://www.espo.be/</a>	ESPO is the principal interface between European seaports and the European institutions and its policy makers. Represents the port authorities, port associations and port administrations of the seaports of 23 Member States of the European Union and Norway at EU political level.
Cruise Lines International Association (CLIA)	<a href="https://www.cruising.org/">https://www.cruising.org/</a>	CLIA is the world's largest cruise industry trade association, providing a unified voice and leading authority of the global cruise community.

## 6.3 Initiatives

Name	Link	Short explanation
NorthSEE and Baltic LINes	<a href="http://www.northsearegion.eu/northsee">http://www.northsearegion.eu/northsee</a>	The projects assess the status quo of shipping activities in the North Sea and in the Baltic Sea, respectively. They identify future trends and their spatial implications and find out how shipping can be taken up in maritime spatial plans to be developed.

## 6.4 Selected literature

Author	Title	Link	Short explanation
The Nautical Institute (2013)	The shipping industry in marine spatial planning. A professional approach	<a href="http://www.natuinst.org/en/forums/mso/">http://www.natuinst.org/en/forums/mso/</a>	The document provides an introduction into MSP, raises issues to consider and illustrates the interlinkage between MSP and shipping in case studies.
Meyer, N. (2017)	Shipping in the Baltic Sea. Past, present and future developments relevant for Maritime Spatial Planning	<a href="http://www.vasab.org/index.php/documents/doc_download/1275-baltic-lines-report-on-shipping-in-the-baltic-sea">http://www.vasab.org/index.php/documents/doc_download/1275-baltic-lines-report-on-shipping-in-the-baltic-sea</a>	The document assesses the status quo and shows expected future developments relevant to maritime spatial planning for the case of the Baltic Sea. The bulk of the information is relevant also for regions beyond the Baltic Sea.
Rawson, A. & Rogers, E. (2015)	Assessing the impacts to vessel traffic from offshore wind farms in the Thames Estuary	<a href="http://repository.scientific-journals.eu/bitstream//123456789/772/16-zn-am-43-115-rawson-rogers-org044.pdf?sequence=1">http://repository.scientific-journals.eu/bitstream//123456789/772/16-zn-am-43-115-rawson-rogers-org044.pdf?sequence=1</a>	This paper focuses on the safety dimension between offshore wind farms and shipping.
Beyer et al., (2017)	Towards an implementation strategy for the sustainable Blue Growth Agenda for the Baltic Sea Region.	<a href="https://publications.europa.eu/en/publication-detail/-/publication/60adf799-4f19-11e7-a5ca-01aa75ed71a1">https://publications.europa.eu/en/publication-detail/-/publication/60adf799-4f19-11e7-a5ca-01aa75ed71a1</a>	This study provides an overview on the drivers and barriers of the shipping industry in the Baltic Sea region. Most of the factors are relevant on a European scale.

## 7 List of acronyms

Acronym	Full title
<b>CLIA</b>	Cruise Lines International Association
<b>COLREGs</b>	International Regulations for Preventing Collisions at Sea
<b>DSS</b>	Deep Sea Shipping
<b>ECSA</b>	European Community Shipowners' Associations
<b>ESPO</b>	European Sea Ports Organisation
<b>IMO</b>	International Maritime Organization
<b>MARPOL</b>	International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978
<b>MSP</b>	Maritime Spatial Planning
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>SOLAS</b>	International Convention for the Safety of Life at Sea
<b>SSS</b>	Short sea shipping
<b>UNCLOS</b>	United Nations Convention of the Law of the Sea

## 8 List of references

Reference	Retrieved from
Beyer, C., Schultz-Zehden, A., Vollmann, T., Cahill, B., Ross, A. & Coornaert, C. (2017). <i>Towards an implementation strategy for the sustainable blue growth agenda for the Baltic sea region.</i>	<a href="https://publications.europa.eu/en/publication-detail/-/publication/60adf799-4f19-11e7-a5ca-01aa75ed71a1">https://publications.europa.eu/en/publication-detail/-/publication/60adf799-4f19-11e7-a5ca-01aa75ed71a1</a>
Els V. & Van Lancker, V. (2007). <i>Infrastructure in the BPNS: Cables and pipelines.</i> In F. Maes, J.-B. Calewaert, J. Schrijvers, V. Van Lancker, A. Vanhulle, P. Vanden Abeele, E. Verfaillie, S. Derous, A. Volckaert, S. Degraer & B. De Wachter, GAUFRE: towards a spatial structure plan for the sustainable management of the Belgian part of the North Sea. (32-43).	<a href="http://www.vliz.be/imisdocs/publications/76042.pdf">http://www.vliz.be/imisdocs/publications/76042.pdf</a>
Esbjerg Municipality. (n.d.). <i>New Energy: Esbjerg - a natural hub for the offshore and energy technology industries.</i>	<a href="http://www.esbjergkommune.dk/Files/Filer/Engelsk/New_Energy_Esbjerg.pdf">http://www.esbjergkommune.dk/Files/Filer/Engelsk/New_Energy_Esbjerg.pdf</a>
EUNETMAR (2013). <i>Study on Blue Growth, maritime policy and the EU Strategy for the Baltic Sea Region.</i>	<a href="https://www.sustainable-projects.eu/downloads/Final_Report_Revision_6_Dec_2013NEW_TEMPLATE.pdf">https://www.sustainable-projects.eu/downloads/Final_Report_Revision_6_Dec_2013NEW_TEMPLATE.pdf</a>
EuroGraphics. (n.d). <i>European Atlas of the Sea [Image].</i>	<a href="https://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/#lang=EN;p=w;bkgd=5;theme=85:0.75,41:0.75,86:0.75,43:0.75">https://ec.europa.eu/maritimeaffairs/atlas/maritime_atlas/#lang=EN;p=w;bkgd=5;theme=85:0.75,41:0.75,86:0.75,43:0.75</a>
European Commission (2013). <i>European Seaports 2030: Challenges ahead.</i>	<a href="http://europa.eu/rapid/press-release_MEMO-13-448_en.htm">http://europa.eu/rapid/press-release_MEMO-13-448_en.htm</a>
European Commission DG Mobility and Transport. (2011). <i>White Paper on transport: Roadmap to a single European transport area: Towards a competitive and resource efficient transport system.</i>	<a href="http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011DC0144">http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52011DC0144</a>
European Commission. DG Mobility and Transport (2015). <i>Analysis of recent trends in EU shipping and analysis and policy support to improve the competitiveness of short sea shipping in the EU.</i>	<a href="https://ec.europa.eu/transport/sites/transport/files/modes/maritime/studies/doc/2015-june-study-sss-final.pdf">https://ec.europa.eu/transport/sites/transport/files/modes/maritime/studies/doc/2015-june-study-sss-final.pdf</a>
Eurostat (2017). <i>Maritime transport statistics: Short sea shipping of goods.</i>	<a href="http://ec.europa.eu/eurostat/statistics-explained/index.php/Maritime_transport_statistics_-_short_sea_shipping_of_goods">http://ec.europa.eu/eurostat/statistics-explained/index.php/Maritime_transport_statistics_-_short_sea_shipping_of_goods</a>
Fiorinia, M., Capata, A., & Bloisic, D. (2016). <i>AIS data visualization for maritime spatial planning (MSP).</i> <i>International Journal of e-Navigation and Maritime Economy</i> , 45-60	<a href="http://www.sciencedirect.com/science/article/pii/S2405535216300201">http://www.sciencedirect.com/science/article/pii/S2405535216300201</a>
Gee, K., Kannen, A., & Heinrichs, B., (2011). <i>BaltSeaPlan vision 2030: Towards the sustainable planning of Baltic Sea space.</i>	<a href="http://www.baltseaplan.eu/index.php/BaltSeaPlanVision-2030;494/1">http://www.baltseaplan.eu/index.php/BaltSeaPlanVision-2030;494/1</a>
Health and Security Executive (2009). <i>Guidelines for pipeline operators on pipeline anchor hazards.</i>	<a href="http://www.hse.gov.uk/pipelines/pipeline-anchor-hazards.pdf">http://www.hse.gov.uk/pipelines/pipeline-anchor-hazards.pdf</a>

Reference	Retrieved from
IMO Resolution A.528, 13: <i>Recommendations on weather routing</i> . (17 November 1983).	<a href="http://www.imo.org/blast/blastDataHelper.asp?data_id=22816&amp;filename=A528(13).pdf">http://www.imo.org/blast/blastDataHelper.asp?data_id=22816&amp;filename=A528(13).pdf</a>
Mehdi, R. & Schröder-Hinrichs, J.-U. (2016). <i>A Theoretical Risk Management Framework for Vessels Operating Near Offshore Wind Farms</i> . MARE-WINT, 359-400	<a href="https://link.springer.com/chapter/10.1007/978-3-319-39095-6_21">https://link.springer.com/chapter/10.1007/978-3-319-39095-6_21</a>
Mehdi, R. (in press). <i>Improving the co-existence of offshore energy installations &amp; shipping</i> .	
OECD (2015). <i>The Impact of Mega-Ships: Case-specific policy analysis</i> .	<a href="https://www.itf-oecd.org/sites/default/files/docs/15cspa_mega-ships.pdf">https://www.itf-oecd.org/sites/default/files/docs/15cspa_mega-ships.pdf</a>
Oxford Economics. (2015). <i>The economic value of the EU shipping industry-update</i> .	<a href="http://www.ecsa.eu/images/Studies/150220_European_Shipping_Update.pdf">http://www.ecsa.eu/images/Studies/150220_European_Shipping_Update.pdf</a>
Randall, E., Drake, A. & Cenac, W. (n.d.). <i>Improvements for dredging and dredged material handling</i> .	<a href="https://www.westerndredging.org/phocadownload/ConferencePresentations/2011_Nashville/Session2A-AdvancesInDredging/2%20-%20Randall,%20Drake,%20Cenac%20-%20Improvements%20for%20Dredging%20and%20Dredged%20Material%20Handling.pdf">https://www.westerndredging.org/phocadownload/ConferencePresentations/2011_Nashville/Session2A-AdvancesInDredging/2%20-%20Randall,%20Drake,%20Cenac%20-%20Improvements%20for%20Dredging%20and%20Dredged%20Material%20Handling.pdf</a>
Rawson, A. & Rogers, E. (2015). <i>Assessing the impacts to vessel traffic from offshore wind farms in the Thames Estuary</i> . <i>Scientific Journals of the Maritime University of Szczecin</i> , 43(115), 99-107.	<a href="https://www.researchgate.net/publication/316460284_Assessing_the_impacts_to_vessel_traffic_from_offshore_wind_farms_in_the_Thames_Estuary">https://www.researchgate.net/publication/316460284_Assessing_the_impacts_to_vessel_traffic_from_offshore_wind_farms_in_the_Thames_Estuary</a>
Ruskule, A., Kalvane, I., Veidemane, K., Przedzimirska, J., Schultz-Zehden, A., Depellegrì, D., Blažauskas, N., Askman, P., Nilsson, H., Pålsson J., Käppeler, B. & Veidemane, E. (2014). <i>Pan-Baltic stakeholders' dialogue on MSP: Synthesis report from PartiSEApate single-sector workshops held in 2013</i> . Riga.	<a href="http://www.partiseapate.eu/wp-content/uploads/2014/08/Syntesis-report-from-pan-Baltic-Dialogues-2013.pdf">http://www.partiseapate.eu/wp-content/uploads/2014/08/Syntesis-report-from-pan-Baltic-Dialogues-2013.pdf</a>
Sarwar, G. M. (2006). <i>Impacts of climate change on maritime industries</i> (Doctoral dissertation, World Maritime University, Malmö, Sweden).	<a href="https://commons.wmu.se/cgi/viewcontent.cgi?referer=https://www.google.de/&amp;httpsredir=1&amp;article=1275&amp;context=all_dissertations">https://commons.wmu.se/cgi/viewcontent.cgi?referer=https://www.google.de/&amp;httpsredir=1&amp;article=1275&amp;context=all_dissertations</a>
Stopford, M. (2009). <i>Maritime economics</i> (3rd ed.). New York, NY: Routledge.	
The Ministry of Infrastructure and the Environment & The Ministry of Economic Affairs (2014). <i>White Paper on offshore wind energy: Partial review of the National Water Plan Holland Coast and area north of the Wadden Islands</i> . The Hague	<a href="https://www.government.nl/binaries/government/documents/reports/2015/01/26/white-paper-on-offshore-wind-energy/white-paper-on-offshore-wind-energy-internetversie.pdf">https://www.government.nl/binaries/government/documents/reports/2015/01/26/white-paper-on-offshore-wind-energy/white-paper-on-offshore-wind-energy-internetversie.pdf</a>
The Nautical Institute. (2013). <i>The shipping industry and maritime spatial planning: A professional approach</i> .	<a href="https://www.nautinst.org/en/forums/msp/">https://www.nautinst.org/en/forums/msp/</a>
UNCLOS Article 87, 1a. <i>United Nations Convention of the Law of the Sea</i> . (10 December 1982).	<a href="http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm">http://www.un.org/Depts/los/convention_agreements/texts/unclos/closindx.htm</a>
World Wildlife Fund (WWF). (2012). <i>Shipping and sustainability: Sustainability based on the global sustainable shipping initiatives report for WWF</i> .	<a href="https://www.wwf.at/de/view/files/download/showDownload/?tool=12&amp;feld=download&amp;sprach_connect=2395">https://www.wwf.at/de/view/files/download/showDownload/?tool=12&amp;feld=download&amp;sprach_connect=2395</a>