Ballast Water Management Convention transition phase for local shipping in the Baltic Sea and the North Sea

Risk of invasive species dispersal via ballast water from ships in local traffic in the Baltic Sea and the North Sea

July 2014
Title: Ballast Water Management Convention transition phase for local shipping in the Baltic Sea and the North Sea.

Risk of invasive species dispersal within the Baltic and North Seas from discharges of ships' ballast water

Editing: Litehauz ApS
Svend Boes Overgaard
Ditte Kristensen
Amir Maleki
Frank Stuer-Lauridsen

Published by: Danish Nature Agency
Haraldsgade 53
DK-2100 Copenhagen Ø
Denmark
www.nst.dk

Photography:

Illustration:

Year: 2014

Map:

ISBN no.: 978-87-7091-611-0

Disclaimer:

When the occasion arises, the Danish Nature Agency will publish reports and papers concerning research and development projects within the environmental sector. This report is financed by Ministry of the Environment Environmental Technology Development and Demonstration Programme in 2013. It should be noted that such publications do not necessarily reflect the position or opinion of the Danish Nature Agency.

However, publication does indicate that, in the opinion of the Danish Nature Agency, the content represents an important contribution to the debate surrounding Danish environmental policy.

Sources must be acknowledged.
Contents

Foreword ........................................................................................................................................... 6
Executive Summary ............................................................................................................................. 7
   The coming Convention ................................................................................................................. 7
   Scope of study ................................................................................................................................. 7
   The assessment of routes, ports and ships ...................................................................................... 7
   Assessment of the exemption scheme in OSPAR and HELCOM .............................................. 8
      Burden sharing ............................................................................................................................. 10
   Catalogue of options for a transition phase towards 2020 and 2022 ..................................... 11
Dansk Resumé ................................................................................................................................... 13
   Den forestående ballastvandskonvention ...................................................................................... 13
   Evalueringen af ruter, havne og skibe ......................................................................................... 13
   Vurdering af dispensationsordningen i OSPAR og HELCOM .................................................... 14
   Udgifter til dispensationer .............................................................................................................. 14
      Byrdefordeling ............................................................................................................................. 16
   Katalog af forslag for overgangsfasen indtil 2020 og 2022 ....................................................... 16
1. Introduction ..................................................................................................................................... 19
2. Assessing the Intra-Regional Traffic with Regard to Exemption Potential ......................... 21
   2.1 Assessment of applicability of the exemption option for vessel types and traffic patterns ................................................................................................................................. 21
      2.1.1 International pax, ro-pax and ro-ro vessels (RSS traffic) .................................................. 21
      2.1.2 Offshore vessels in the North Sea ...................................................................................... 22
      2.1.3 Coastal traffic and other sectors .................................................................................... 23
   2.2 Ports with routes operating between two ports or locations only ....................................... 23
   2.3 Routes shortlisted for the exemption option ........................................................................... 25
3. Exemptions .................................................................................................................................... 27
   3.1 The exemptions under the OSPAR/HELCOM guidelines ..................................................... 27
      3.1.1 Data required ..................................................................................................................... 27
      3.1.2 Risk assessment ................................................................................................................. 28
   3.2 Considerations regarding the OSPAR/HELCOM guidelines ............................................. 28
   3.3 Evaluation of information gap within economic and ecological impacts ........................... 29
   3.4 The costs of an exemption ....................................................................................................... 29
      3.4.1 Unit costs .......................................................................................................................... 30
      3.4.2 Assessment of included routes for cost estimates .............................................................. 32
      3.4.3 Costs of exemptions – North Sea, Baltic Sea and Denmark ......................................... 33
      3.4.4 Sensitivity analyses of cost estimation ............................................................................. 34
4. Burden-sharing mechanisms ......................................................................................................... 37
   4.1 Cost sharing mechanism ......................................................................................................... 37
   4.2 Burden sharing models .......................................................................................................... 38
      4.2.1 Sharing the costs of port-specific biological and environmental survey and data analysis ................................................................................................................................. 38
      4.2.2 Sharing the costs of risk assessment and application development ............................. 39
   4.3 Cost estimation model – Options A.2 and D.2 ....................................................................... 40
4.3.1 Example calculations using the cost model in two scenarios ................. 40
4.4 Cost estimation model – Options B.1 and B.2 ........................................ 41
4.4.1 Example calculations ................................................................. 42

5. **Alternative Initiatives and Transitional Schemes** .................................. 44

5.1 Introduction ......................................................................................... 44
5.2 Transitional options for D-1 exchange ............................................... 45
  5.2.1 Introduction .................................................................................. 45
  5.2.2 D-1 in the North Sea and Baltic Sea ............................................ 46
  5.2.3 Options for D-1 flexibility for intra North Sea and intra Baltic Sea ... 47
  5.2.4 Options for D-1 extension for category 1 and 3 ships ...................... 48
5.3 Transitional options for exemption initiatives ......................................... 49
  5.3.1 Option for a reduced mixing criteria ............................................. 50
  5.3.2 Options for use of drinking water ................................................. 50
  5.3.3 Options for alternative port survey validity ................................... 51
  5.3.4 Options for area-based risk assessments ....................................... 51
5.4 Transitional options for other alternative approaches ............................ 53
  5.4.1 Introduction ................................................................................ 53
  5.4.2 Options for a discharge threshold approach in relation to traffic in a port .... 53
  5.4.3 Option for a port type threshold approach ..................................... 54
  5.4.4 Option for a route history threshold approach ............................... 55
  5.4.5 Option for a discharge frequency threshold approach for use of drinking water ......................................................... 55
  5.4.6 Option for use of technical water ................................................. 55

References ................................................................................................. 58

Appendix 1 Background information for section 2
Appendix 2 Ballast water discharge volumes
Appendix 3 Ferry routes in the North Sea and the Baltic Sea
Appendix 4 Ship calls raw data and ship calls vs. total gross tonnage
Appendix 5 Target Species as function of ship calls (raw data)
Appendix 6 Cost calculations
Appendix 7 Burden-sharing mechanisms
Appendix 8 Cost calculations for example routes
Appendix 9 Esbjerg ballast water discharge
### Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALIENS 2</td>
<td>Study on biological survey protocols and target species selection</td>
</tr>
<tr>
<td>BALSAM</td>
<td>Baltic Sea Pilot Project: Testing new concepts for integrated environmental monitoring of the Baltic Sea</td>
</tr>
<tr>
<td>BLG</td>
<td>Bulk, Liquid and Gases</td>
</tr>
<tr>
<td>BWMC</td>
<td>Ballast Water Management Convention</td>
</tr>
<tr>
<td>BWMS</td>
<td>Ballast water management system</td>
</tr>
<tr>
<td>BWTS</td>
<td>Ballast water treatment system</td>
</tr>
<tr>
<td>CONF</td>
<td>Conference</td>
</tr>
<tr>
<td>EEZ</td>
<td>Exclusive Economic Zone</td>
</tr>
<tr>
<td>GT</td>
<td>Gross tonnage</td>
</tr>
<tr>
<td>HELCOM</td>
<td>Helsinki Commission</td>
</tr>
<tr>
<td>IMO</td>
<td>International Maritime Organisation</td>
</tr>
<tr>
<td>INTERREG</td>
<td>Interregional cooperation across Europe</td>
</tr>
<tr>
<td>IOPP</td>
<td>International Oil Pollution Prevention</td>
</tr>
<tr>
<td>MEPC</td>
<td>Marine Environment Protection Committee</td>
</tr>
<tr>
<td>OSPAR</td>
<td>The Convention for the Protection of the Marine Environment of the North-East Atlantic</td>
</tr>
<tr>
<td>Pax</td>
<td>Passenger vessel</td>
</tr>
<tr>
<td>Propagule pressure</td>
<td>An estimate of the absolute number of individual species involved in any one release event (propagule size) and the number of discrete release events (propagule number)</td>
</tr>
<tr>
<td>Ro-Pax</td>
<td>Roll-on/Roll-off passenger vessel</td>
</tr>
<tr>
<td>Ro-Ro</td>
<td>Roll-on/Roll-off vessel</td>
</tr>
<tr>
<td>ROV</td>
<td>Remotely Operated vehicle</td>
</tr>
<tr>
<td>RSS</td>
<td>Regular Shipping Service (comprise e.g. Pax, Ro-Pax and Ro-Ro vessels)</td>
</tr>
<tr>
<td>USCG</td>
<td>United States Coast Guard</td>
</tr>
</tbody>
</table>
Foreword

The Danish Partnership for Ballast Water, comprising the Nature Agency and the Danish Maritime Authority, both holding legal responsibilities for ballast water regulation in Denmark, and the Danish Shipowners Association tendered on 2nd July, 2013, a study on issues of the transition phase when the Ballast Water Management Convention is implemented. The study’s main objectives were to:

- investigate the particular challenges of the short sea line traffic and the regional traffic in the water bodies that the exclusive economic zone (EEZ) of Denmark is part of: the North Sea and the Baltic Sea and assess the applicability of the exemption scheme for selected vessel types;
- provide an overview of challenges with regards to implementation of the OSPAR/HELCOM exemption guidelines as well as estimate the costs of risk assessments as the prerequisite for exemptions;
- suggest possible burden-sharing mechanisms for exemption costs;
- to propose a catalogue of transitional measures that would ease the implementation period of the BWMC for certain specific traffic segments, e.g. ferries and supply vessels;

During the course of the tendering and study process a number of IMO member states proposed a resolution addressing the transitional phase of the BWMC. At the time of writing it is not known whether the prospects of a slightly more lax implementation profile will lead to the ratification of the BWMC, but it is expected to occur during 2014. Denmark has ratified the BWMC, and the Danish regulation is set to come into force in 2015.

The study was carried out by LITEHAUZ Maritime Environmental Consultancy in Holte, Denmark. The primary participants were Mr Svend Boes Overgaard, Ms Ditte Kristensen, Mr Amir Maleki, and Dr Frank Stuer-Lauridsen. A steering committee from the Partnership on Ballast Water comprised Ms Clea Henrichsen (Danish Maritime Authority), Mr Peter W. Olsen (Danish Shipowners Association) and Mr Ulrik Christian Berggreen (Danish Nature Agency). The study was initiated in mid-September and a draft was available in late November 2013.
Executive Summary

The coming Convention
Ships and goods moved between different parts of the world may introduce species to an area where they may have great impacts on the environment, economy and human health. Although not the sole cause, a ship’s ballast water is a key vector for introducing invasive aquatic species. The International Convention for the Control and Management of Ships’ Ballast Water and Sediments (hereafter the Convention) was developed to "prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of harmful aquatic organisms and pathogens‘. This study assumes that the Assembly resolution A.1088(28), which stipulates an extended timeline for implementation of the standards of the Convention will lead to its entry into force in 2015.

In the transitional phase until 2022 OSPAR has agreed to allow ballast water exchange (D-1 standard) in the North Sea, whereas HELCOM has decided the exchanging ballast water in the Baltic Sea is not possible. The Convention is open to certain other options, hereunder granting an exemption under Regulation A-4 by after applying the Guideline for Risk Assessment (G7). An exemption applies to a vessel that operates between specific ports or locations, notably short sea traffic such as pax, ro-pax and ro-ro vessels (hereafter named RSS). The OSPAR and HELCOM organisations have adopted joint guidelines on granting of exemptions in 2013 including port survey protocols and a risk assessment methodology necessary for an application (HELCOM/OSPAR, 2013).

Scope of study
The aims of this study are to:
1) identify which types of vessels are more likely to be granted an exemption and estimate the associated costs;
2) evaluate the OSPAR/HELCOM exemption guidelines with regards to key barriers;
3) propose a catalogue of alternative transitional options phase until the D-2 standard is fully implemented in 2022.

The assessment of routes, ports and ships
The eligible traffic for an exemption in the OSPAR/HELCOM area includes RSS vessels operating between two specific ports or locations and possible offshore supply vessels. Other vessels with a comparable trading pattern include supply and maintenance vessels for wind farms and aquaculture, but these are still few and are until now rarely engaged in international operations.

The RSS operators comprise approximately 30 companies with more than 150 vessels operating 69 routes between two specific ports. The 69 routes connect a total of 85 ports with 38 ports located in the North Sea and 47 ports in the Baltic Sea. Routes calling more than two ports were not included and, as a limiting factor, it was also estimated that in a busy port with a high number of invasive species is more likely be present and consequently the chance of being granted an exemption decreases. Such ports were omitted through shortlisting of routes with more than 1,000 port of calls per year (exclusive of the RSS traffic). The number of routes that are more likely to be granted an exemption was consequently reduced to 39 connecting 52 ports. With an estimated annual
discharge of 635 million tonnes from all vessels calling ports in the North Sea and Baltic Sea the discharges from RSS are estimated to 8% (69 routes) and 6% (39 routes) of the total discharge.

Approximately 360 offshore supply vessels call some 30 different ports around the North Sea. The operational pattern may for some vessels warrant the use of the exemption scheme, however, it was not possible to identify specific routes where exemptions were applicable. A typical discharge from an offshore supply vessel is assumed to be 200m³ and the total discharge in ports from all offshore supply vessels are estimated to 0.4% of total discharges in the North Sea ports. An overview of discharge profiles and summary of total discharges are presented in Table S.1.

**TABLE S.1: TYPICAL BALLAST WATER DISCHARGES FOR SELECTED VESSEL TYPES**

<table>
<thead>
<tr>
<th>Vessel type</th>
<th>Typical discharge per port of call [m³]</th>
<th>Annual discharge from all vessels [million tonnes]</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSS vessels (all)</td>
<td>200-300</td>
<td>50</td>
</tr>
<tr>
<td>RSS vessels (shortlisted)</td>
<td>200-300</td>
<td>37</td>
</tr>
<tr>
<td>Offshore supply vessels</td>
<td>&lt;200</td>
<td>1.9</td>
</tr>
<tr>
<td>Crew boats</td>
<td>15-20</td>
<td>Not assessed</td>
</tr>
<tr>
<td>All other cargo vessels</td>
<td>Not assessed</td>
<td>635</td>
</tr>
</tbody>
</table>

**Assessment of the exemption scheme in OSPAR and HELCOM**
where a risk assessment for each port on the route must be carried out by the shipowner or another stakeholder, and the data collected during the course of the exemption development is to be stored in a common database, which also comprise a risk assessment tool. If the risk assessment results in low risk, an exemption can be granted; if it results in medium risk, further assessment is necessary; and if it results in high risk, an exemption cannot be granted.

Two barriers have been identified for the exemption process:

**The availability of existing data and ownership of new data:**
1. Few countries have existing datasets on invasive species allowing applicants to submit a risk assessment and authorities to grant an exemption.
2. The data to be generated in consequence of 1. is not owned by the shipowners who bear the costs.
3. The 1 km distance criteria for new specific surveys limits burden sharing opportunities.

**The uncertainty related to the option to revoke an exemption:**
4. The optional annual review of the exemption may be seen as an automatic mechanism to revoke an already granted licence to operate
5. No criteria are given for actions concluded from the review.
6. With the proposed exemption harmonised procedure and port survey protocol the typical timeline for the exemption application process may be close to a year. The extended period of time presents a key challenge especially in light of the optional annual review.

**Cost of exemptions**
The costs of an exemption comprise port survey, laboratory analysis, risk assessment and application development. The costs are given for three scenarios; low, medium and high:

- The **low** estimates indicate the costs with the minimum sampling sites in each port, and the risk analyses result in “low risk”.
The medium estimates indicate the costs, when 50% of the risk analyses result in “medium risk” and four survey sites are necessary in 50% of the ports. The high estimates indicate costs, when all risk analyses result in “medium risk” and four survey sites are necessary in the ports.

The costs for one exemption were estimated to approximately EUR 61,000-83,000, which comprise two port surveys, two laboratory analyses, one risk assessment and one application development. The unit costs are given in Table S.2.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Port survey</td>
<td>2</td>
<td>3,300</td>
<td>3,800</td>
</tr>
<tr>
<td>Laboratory analysis</td>
<td>2</td>
<td>23,000</td>
<td>26,000</td>
</tr>
<tr>
<td>Risk assessment</td>
<td>1</td>
<td>7,700</td>
<td>9,400</td>
</tr>
<tr>
<td>Application development</td>
<td>1</td>
<td>2,200</td>
<td>2,800</td>
</tr>
<tr>
<td>Total cost for one exemption 1</td>
<td>1</td>
<td>61,000</td>
<td>72,000</td>
</tr>
</tbody>
</table>

Based on the unit costs the total medium case exemption costs for the shortlisted 39 routes and 52 ports in the North Sea and Baltic Sea were estimated to approximately EUR 2 million, see Table S.3 for region specific details and low and high estimate range. Sharing of costs is included where several routes call the same port.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>North Sea</td>
<td>770,000</td>
<td>900,000</td>
<td>1,040,000</td>
</tr>
<tr>
<td>Baltic Sea</td>
<td>960,000</td>
<td>1,130,000</td>
<td>1,300,000</td>
</tr>
<tr>
<td>Total</td>
<td>1,730,000</td>
<td>2,030,000</td>
<td>2,340,000</td>
</tr>
</tbody>
</table>

For Denmark, the total exemption costs are estimated to approximately EUR 0.7-1.0 million for the shortlisted routes (13 routes and 23 ports). In comparison, the cost for all international Danish routes (between a port in Denmark and another country) is estimated to EUR 0.9-1.2 million.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Short listed DK routes</td>
<td>720,000</td>
<td>850,000</td>
<td>975,000</td>
</tr>
<tr>
<td>All international DK routes</td>
<td>880,000</td>
<td>1,030,000</td>
<td>1,190,000</td>
</tr>
</tbody>
</table>

Analyses of scenarios with annual port calls of 500, 1,000 or 1,500 were conducted. When including ports with <1,500 calls it results in a 25% increase of cost. When fewer routes are considered, the total costs for the industry decrease 33%, although, the costs for the individual operators may increase, since less cost sharing is possible, see Table S.5.
TABLE S.5: MEDIUM ESTIMATES OF THE TOTAL COSTS FOR EXEMPTION COSTS IN THE NORTH SEA AND THE BALTIC SEA. THE COSTS ARE SHOWN FOR INCLUSION OF PORTS WITH FEWER THAN 500, 1,000 AND 1,500 NON-RSS VESSEL CALLS PER YEAR. THE NUMBER OF ROUTES AND PORTS ARE INCLUDED.

<table>
<thead>
<tr>
<th>Ship calls</th>
<th>&lt;500</th>
<th>&lt;1,000</th>
<th>&lt;1,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Sea [EUR]</td>
<td>630,000</td>
<td>900,000</td>
<td>1,020,00</td>
</tr>
<tr>
<td>Routes</td>
<td>10</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Ports</td>
<td>17</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>Deviation from 1,000 call case</td>
<td>-30%</td>
<td>-</td>
<td>13%</td>
</tr>
<tr>
<td>Baltic Sea [EUR]</td>
<td>730,000</td>
<td>1,130,000</td>
<td>1,520,000</td>
</tr>
<tr>
<td>Routes</td>
<td>13</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>Ports</td>
<td>19</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>Deviation from 1,000 call case</td>
<td>-35%</td>
<td>-</td>
<td>35%</td>
</tr>
<tr>
<td>Total [EUR]</td>
<td>1,360,000</td>
<td>2,030,000</td>
<td>2,540,000</td>
</tr>
<tr>
<td>Routes</td>
<td>23</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td>Ports</td>
<td>36</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>Deviation from 1,000 call case</td>
<td>-33%</td>
<td>-</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Burden sharing**

Applying for an exemption under the procedure for OSPAR and HELCOM entails a number of key costs, which may be shared under certain conditions; the port surveys and laboratory analyses, the risk assessment, and the application development. There are currently no embedded mechanisms to share the cost burden between operators who would otherwise bear the cost burden alone. A number of burden sharing models for the different cost elements were developed in the present study. The models include:

**TABLE S.6: MODELS OF BURDEN SHARING.**

<table>
<thead>
<tr>
<th>Ship operator, direct financing</th>
<th>Port fee based, indirect financing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exemption applicants defray the exemption costs based on number of ships and/or number of operators seeking exemption in a given port.</td>
<td>The port finances the initial port survey and the laboratory analysis and expenses are reflected through the normal port of call fee scheme. The fee could also fund a port survey programme.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consortia, joint effort</th>
<th>Public funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment of cross-border partnerships between shipowners, ports and public authorities. National funds supported by direct EU funding or projects under the EU.</td>
<td>Costs from port survey and laboratory analysis are initially or permanently borne by public authorities.</td>
</tr>
</tbody>
</table>

The introduction of a common burden sharing mechanism is considered crucial for an equitable exemption scheme in the North Sea and Baltic Sea and such mechanisms may in addition mitigate the reluctance from ship operators to be first-movers in obtaining the needed data for the exemption application. Obviously, being a first-mover without a burden sharing mechanism lacks any incentive and even entails a penalty.
Catalogue of options for a transition phase towards 2020 and 2022

Under the consideration of the trading patterns, the ballast volumes and other specific issues, a catalogue of options is proposed which relaxes the requirements of the Convention and the OSPAR/HELCOM exemption guidelines in the transitional phase until the D-2 standard is fully implemented in 2022. It should be noted that it was beyond the scope of this study to investigate any legal implication of the proposed options relative to the implementation of the Convention and that the options should be assessed further in this regard should they be considered for implementation. It is not the intention to necessarily allow all of these alternatives simultaneously.

The options relate to certain categories of vessels, operational pattern or discharge profile and is typically affecting RSS traffic, i.e. pax, ro-pax, ro-ro vessels and a limited number of offshore supply vessels as well as those vessel(s) for which operators would be willing to dedicate to the operation between specified ports or locations. An overview of the options is given below.

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>D-1 standard</td>
<td>Exchange is considered a compliance measure for the Convention’s category 2 ships.</td>
<td>In the HELCOM area exchange is to be conducted not closer than 12 nm from nearest coast. In the OSPAR area exchange is to be carried out in a designated area.</td>
</tr>
<tr>
<td>Revised implementation schedule - Options A.1-4 and/or B</td>
<td>Exchange is considered a compliance measure for the Convention’s category 2 ships.</td>
<td>Only for vessels engaged in voyages between specific ports or locations.</td>
</tr>
<tr>
<td>Extension of the D-1 period - Option C.1-2</td>
<td>Exchange is considered a compliance measure for the Convention’s category 1 and 3 ships.</td>
<td></td>
</tr>
<tr>
<td>Exemptions initiatives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced mixing criteria** - Option D</td>
<td>Deviation from the route for which the exemption is granted is allowed for temporary contracts, dry-docking, and maintenance or repair.</td>
<td>Exchange to the D-1 standard or Option A is conducted before arriving at the new location or port and before returning to its original route.</td>
</tr>
<tr>
<td>Drinking water*** - Option E</td>
<td>A vessel departing from a different location located outside the route on which an exemption is granted may use drinking water from a public water supply.</td>
<td>Until other means of providing ballast water to the D-2 standard at the port or location is available, or a risk assessment under resolution MEPC.206(62) shows high risk.</td>
</tr>
<tr>
<td>Port survey validity - Option F</td>
<td>An exemption will not be revoked in the granted period and data from an initial port survey may be valid for use by all applicants either for the granted period or in the complete transitional period.</td>
<td>Unless major new occurrences of Target Species are identified.</td>
</tr>
<tr>
<td>Option</td>
<td>Description</td>
<td>Condition</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Area-based risk assessments</strong></td>
<td><strong>- Option G</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>-</strong> Area-based risk assessments</td>
<td>Expansion of the 1 km distance criteria for port areas and basins with no apparent internal separation. Only one independent survey with minimum three sites is needed.</td>
<td><strong>To be based on a risk assessment using hydrodynamic and biological modelling, e.g. the “Connectivity” methodology.</strong></td>
</tr>
<tr>
<td><strong>- Option H</strong></td>
<td>Transfer of ballast water within one low-risk dispersal area and from one low-risk dispersal area to another low-risk dispersal area is exempted from management of ballast water in the transitional period.</td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Other alternative approaches</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Discharge threshold</strong></td>
<td><strong>- Option I</strong></td>
<td><strong>On condition that the share of discharged ballast water from the specified vessels does not exceed e.g. 5% of the discharges from other international traffic in the port of call.</strong></td>
</tr>
<tr>
<td><strong>-</strong> Discharge threshold</td>
<td>Offshore supply vessels, crew boats and RSS vessels are exempted from the D-2 requirement</td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Port type threshold</strong></td>
<td><strong>- Option J</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>-</strong> Port type threshold</td>
<td>Vessels visiting only port pairs, which mainly import goods, i.e. no discharge of ballast water, may be exempt from the D-2 requirement.</td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Route history threshold</strong></td>
<td><strong>- Option K</strong></td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>-</strong> Route history threshold</td>
<td>Ships operating on routes with a history of more than, e.g. 50 years can be exempt from the requirements.</td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Discharge frequency threshold</strong></td>
<td><strong>- Option L</strong></td>
<td><strong>Provided that no mixing with other water and sediments has occurred, and under the assumption that no risk assessment under resolution MEPC.206(62) has been developed showing high risk from the use of drinking water.</strong></td>
</tr>
<tr>
<td><strong>-</strong> Discharge frequency threshold</td>
<td>Vessels that ballast only on rare occasions, e.g. &lt;15 times a year, may per default use drinking water as ballast.</td>
<td><strong>-</strong></td>
</tr>
<tr>
<td><strong>Use of technical water</strong></td>
<td><strong>- Option M</strong></td>
<td><strong>The quality of the technical water should on delivery have been tested in compliance with regards to the D-2 pathogen criteria by a third party, and not mixed with other water and sediments.</strong></td>
</tr>
<tr>
<td><strong>-</strong> Use of technical water</td>
<td>Vessels that ballast only on rare occasions may use technical water for ballast without providing a risk assessment.</td>
<td><strong>-</strong></td>
</tr>
</tbody>
</table>

*Until renewal of the International Oil Pollution Prevention Certificate

"The methodology could with further development also be considered as a permanent option.

---

1 This is a relaxation of the requirement for a risk assessment
Dansk Resumé

Den forestående ballastvandskonvention
Skibe og gods, som flyttes imellem forskellige dele af jordkloden, kan indføre arter til et område, hvor de kan få store konsekvenser for miljø, økonomi og folkesundhed. Skibes ballastvand er en vigtig vej for introduktion af invasive organismer i vandmiljøet. ”International konvention om kontrol med og håndtering af skibes ballastvand og sedimenter” (herefter kaldet Konventionen) er udviklet for at forhindre, minimere og i sidste instans eliminere den vandbårne risiko for miljøet, menneskers sundhed, ejendom og ressourcer, som skyldes overførselen af skadelige organismer og mikroorganismer. Denne undersøgelse antager at IMOs generalforsamlings resolution A.1088(28), som angiver en udvidet tidsfrist for implementering af konventionens standarder, fører til at konventionen vil træde i kraft i 2015.

I overgangsperioden indtil konventionen er fuldt implementeret i 2022 er man i OSPAR blevet enige om at tillade udskiftning af ballastvand (D-1 standarden) i Nordsøen, hvorimod det i HELCOM er besluttet, at det ikke er tilladt at udskifte ballastvand i Østersøen. Konventionen er åben for andre løsninger, inklusiv at få bevilget en dispensation efter ”Retningslinjer for risikovurdering i henhold til regel A-4 i konventionen om håndtering af ballastvand”. Dispensationen kan søges af fartøjer, som sejler mellem specifikke havne eller steder, specielt regional trafik som pax, ro-pax og ro-ro-fartøjer (herefter forkortet RSS®). OSPAR- og HELCOM-organisationerne har i 2013 vedtaget en harmoniseret retningslinje for at bevilge dispensitioner i de to områder, inklusiv de havneundersøgelsesprotokoller og den risikovurderingsmetodik, som er nødvendig for en ansøgning (HELCOM/OSPAR, 2013).

Fokusområder for undersøgelsen
Formålet med nærværende arbejde er at:
1. identificere skibstyper som kan forventes at søge om dispensation med succes og estimere de tilhørende udgifter;
2. evaluere OSPAR/HELCOM dispensationsretninglinjer mht. udfordringer for deres anvendelse;
3. foreslå et katalog af alternative muligheder indtil D-2 standarden er fuldt implementeret i 2022.

Evalueringen af ruter, havne og skibe
I OSPAR/HELCOM-området er fartøjer, som kan være kvalificerede for en dispensation, blandt andet RSS-fartøjer, der opererer mellem to specifikke havne eller steder, men potentielt også offshore forsyningsfartøjer. Andre fartøjer med et lignende sejlønster inkluderer forsynings- og vedligeholdelsesfartøjer til vindmølleparker og akvakultur, men der er stadig få af disse, og de er indtil videre sjældent involveret i internationale operationer.

RSS-operatørerne udgør omtrent 30 selskaber og inkluderer mere end 150 fartøjer på 69 ruter mellem to specifikke havne. De 69 ruter forbindes i alt 85 havne, hvoraf 38 havne ligger i Nordsøen og 47 ligger i Østersøen. Sejlrouter med mere end to havneanløb er ikke inkluderet og som en begrænsende faktor er det også vurderet, at det er mere sandsynligt, at en travl havn med mange anløb har et højt antal invasive arter og at chancen for at få dispensation derfor reduceres. Disse potentielle ”høj risiko” havne er udeladt i den prioriterede liste ved at se bort fra havne med over 1.000 årlige anløb (eksklusiv RSS-trafik). I konsekvens er den prioriterede liste reduceret til 39

---

8 Regular Shipping Service
ruter mellem 52 havne, hvor ruterne vurderes at have en større chance for at få godkendt en dispensationsansøgning. Med en estimeret årlig udledning af ballastvand på 635 millioner ton fra alle fartøjer som anløber havne i Nord- eller Østersøen, udgør udledningen fra RSS ca. 8% af alle 69 ruter og 6% af de prioriterede 39 ruter.

Omtrent 360 offshore forsyningsskibe anløber godt 30 forskellige havne i Nordsøen (der er ikke offshore trafik i Østersøen). Operationsmønsteret kan retfærdiggøre brugen af dispensation for nogle fartøjer. Det er imidlertid ikke muligt at identificere specifikke ruter, som direkte kunne benytte sig af en dispensation. En typisk udledning fra et offshore forsyningsfartøj antages at være 200 m³ og totaludledningen i havne fra alle offshore forsyningsfartøjer er estimeret til at udgøre 0,4% af totaludledningen i Nordsøens havne. I Tabel S.1 præsenteres et overblik over udledningsprofiler og opsommerede totaludledninger.

**TABEL S.1 TYPISK UDLEDNING AF BALLASTVAND FOR UDVALGTE SKIBSTYPER**

<table>
<thead>
<tr>
<th>Skibstype</th>
<th>Typisk udledning pr. havneanløb [m³]</th>
<th>Årlig udledning fra alle fartøjer [mio. ton]</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSS (alle)</td>
<td>200 - 300</td>
<td>50</td>
</tr>
<tr>
<td>RSS (shortlisted)</td>
<td>200 - 300</td>
<td>37</td>
</tr>
<tr>
<td>Offshore forsyningsfartøjer</td>
<td>&lt;200</td>
<td>1,9</td>
</tr>
<tr>
<td>Besætningsfartøjer</td>
<td>15-20</td>
<td>Ikke vurderet</td>
</tr>
<tr>
<td>Alle andre fragtfartøjer</td>
<td>Ikke vurderet</td>
<td>635</td>
</tr>
</tbody>
</table>

**Vurdering af dispensationsordningen i OSPAR og HELCOM**

Rederen eller en anden interessent skal lave en risikovurdering for hver havn på ruten og de genererede data skal lagres i en fælles database, som også indeholder et værktøj til risikovurderingen. Hvis risikovurderingen resulterer i lav risiko kan dispensationen godkendes; hvis den resulterer i medium risiko, er der brug for en yderligere vurdering, og hvis den resulterer i høj risiko kan en dispensation ikke godkendes.

To primære udfordringer i dispensationsprocessen er blevet udpeget:

**Tilgængelighed af eksisterende data og ejerskab af ny data:**

1. Få lande har eksisterende dataset over invasive arter, som kan bruges af ansøgere til at indlevere risikovurderinger og af myndigheder til at godkende dispensationer.
2. De data som genereres som konsekvens af 1. ejes ikke af rederen som bærer udgiften.
3. Afstandskriteriet på 1 km for nye, specifikke undersøgelser begrænser mulighederne for deling af udgifterne.

**Usikkerhed i forbindelse med muligheden for ophævelse af en dispensation:**

4. Det valgfrie, årlige review af dispensationen kan blive anset for at være en automatisk mekanisme til ophævelse af allerede godkendte tilladelse til at operere.
5. Der ikke er kriterier for hvad et reviews konklusioner kan medføre.

**Udgifter til dispensationer**

Udgifterne til en dispensationsansøgning udgøres af en havneundersøgelse, laboratorieanalyser, risikovurdering og produktion af selve ansøgningen. Udgifterne præsenteres her for tre scenarier: lav, medium og høj.
Estimatet “lav” indikerer udgiften til et minimum af prøvetagningssteder i hver havn (tre) og risikoanalyserne resulterer i “lav risiko”.

Estimatet “medium” indikerer udgiften når 50% af risikoanalyserne resulterer i ”medium risiko” og fire prøvetagningssteder er nødvendige i 50% af havnen.

Estimatet ”høj” indikerer udgiften når alle risikoanalyserer resulterer i ”medium risiko” og fire prøvetagningssteder er nødvendige i begge havne.

Den samlede udgift til en dispensation er estimeret til omtrent EUR 61.000-83.000, hvilket indeholder to havneundersøgelser, to laboratorieanalyser, en risikovurdering og produktion af en dispensationsansøgning. Udgifterne kan ses i Tabel S.2.

TABEL S.2: UDGIFFT TIL EN DISPENSATION: ”LAV”, ”MEDIUM” OG ”HØJ” ESTIMAT AF EN HAVNEUNDERSØGELSE, LABORATORIEANALYSE, RISIKOVURDERING, PRODUKTION AF DISPENSATIONSANSØGNING OG TOTALUDGIFTER TIL DISPENSATION. TAL ER AFRUNDEDE.

<table>
<thead>
<tr>
<th>Antal</th>
<th>Lav [€]</th>
<th>Medium [€]</th>
<th>Høj [€]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Havneundersøgelse</td>
<td>2</td>
<td>3.300</td>
<td>3.800</td>
</tr>
<tr>
<td>Laboratorieanalyse</td>
<td>2</td>
<td>23.000</td>
<td>26.000</td>
</tr>
<tr>
<td>Risikovurdering</td>
<td>1</td>
<td>7.700</td>
<td>9.400</td>
</tr>
<tr>
<td>Produktion af ansøgning</td>
<td>1</td>
<td>2.200</td>
<td>2.800</td>
</tr>
<tr>
<td>Totaludgifter til dispensation</td>
<td>1</td>
<td>61.000</td>
<td>72.000</td>
</tr>
</tbody>
</table>

Baseret på deludgifterne er totaludgifterne til et medium scenarie for de prioriterede 39 ruter og 52 havne i Nord- og Østersøen estimeret til omtrent EUR 2 millioner, se Tabel S.3 for regionspecifikke detaljer samt lavt og højt estimat. Byrdefordeling er inkluderet hvor flere ruter anløber samme havn.

TABEL S.3: TOTALUDGIFTER TIL ”LAV”, ”MEDIUM” OG ”HØJ” ESTIMAT AF DE PRIORITEREDE RUTERS UDGIFTER I NORDSØEN OG ØSTERSØEN. TAL ER AFRUNDEDE.

<table>
<thead>
<tr>
<th></th>
<th>Lav [€]</th>
<th>Medium [€]</th>
<th>Høj [€]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nordsøen</td>
<td>770.000</td>
<td>900.000</td>
<td>1.040.000</td>
</tr>
<tr>
<td>Østersøen</td>
<td>960.000</td>
<td>1.130.000</td>
<td>1.300.000</td>
</tr>
<tr>
<td>Totalt</td>
<td>1.730.000</td>
<td>2.030.000</td>
<td>2.340.000</td>
</tr>
</tbody>
</table>

For Danmark estimeres totaludgifterne til at være omtrent 0,7-1,0 mio. EUR for de prioriterede ruter (13 ruter og 23 havne). Til sammenligning er udgiften til alle internationale, danske ruter (mellem en havn i Danmark og i et andet land) estimeret til EUR 0,9-1,2 mio.

TABEL S.4: TOTALUDGIFTER TIL ”LAV”, ”MEDIUM” OG ”HØJ” ESTIMAT AF UDGIFTER TIL DANMARK. TAL ER AFRUNDEDE.

<table>
<thead>
<tr>
<th></th>
<th>Lav [€]</th>
<th>Medium [€]</th>
<th>Høj [€]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prioriterede DK ruter</td>
<td>720.000</td>
<td>850.000</td>
<td>975.000</td>
</tr>
<tr>
<td>Alle internationale DK ruter</td>
<td>880.000</td>
<td>1.030.000</td>
<td>1.190.000</td>
</tr>
</tbody>
</table>

Analyser af scenarier med færre end 500, 1.000 og 1.500 skibsanløb pr. år blev udført. Når havne med <1.500 årlige anløb inkluderes bliver udgifterne 25% større. Når færre ruter inkluderes falder totaludgifterne 33% selvom udgifterne til hver enkelt operator kan øge, fordi der er færre muligheder for at dele udgifterne. Se Tabel S.5.
**TABEL S.5 MEDIUM ESTIMATER AF TOTALUDGIFTERNE TIL NORDSØEN OG ØSTERSØEN. UDGIFTERNE ER VIST FOR HAVNE MED FÆRRE END 500, 1000 OG 1500 ANLØB PR. ÅR (EKSKLUSIV RSS-FARTØJER). ANTAL AF RUTER OG HAVNE I DER DANNER BASIS FOR BEREKNINGEN ER ANFØRT.**

<table>
<thead>
<tr>
<th>Skibsanløb pr. år</th>
<th>&lt;500</th>
<th>&lt;1.000</th>
<th>&lt;1.500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nordsøen [€]</td>
<td>630.000</td>
<td>900.000</td>
<td>1.020.000</td>
</tr>
<tr>
<td>Ruter</td>
<td>10</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>Havne</td>
<td>17</td>
<td>24</td>
<td>27</td>
</tr>
<tr>
<td>Forskel fra 1.000 anløb scenariet</td>
<td>-30%</td>
<td>-</td>
<td>13%</td>
</tr>
<tr>
<td>Østersøen [€]</td>
<td>730.000</td>
<td>1.130.000</td>
<td>1.520.000</td>
</tr>
<tr>
<td>Ruter</td>
<td>13</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>Havne</td>
<td>19</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>Forskel fra 1.000 anløb scenariet</td>
<td>-35%</td>
<td>-</td>
<td>35%</td>
</tr>
<tr>
<td>Totalt [€]</td>
<td>1.360.000</td>
<td>2.030.000</td>
<td>2.540.000</td>
</tr>
<tr>
<td>Ruter</td>
<td>23</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td>Havne</td>
<td>36</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>Forskel fra 1.000 anløb scenariet</td>
<td>-33%</td>
<td>-</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Byrdefordeling**


**TABEL S.6: MODELLER TIL BYRDEFORDELING.**

<table>
<thead>
<tr>
<th>Reder, direkte finansiering</th>
<th>Havneafgift, indirekte finansiering</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Oprette konsortier til fælles finansiering</th>
<th>Offentlig finansiering</th>
</tr>
</thead>
</table>

Introduktionen af fælles mekaniser til byrdefordeling anses for at være afgørende for en anvendelse af dispensationer i Nord- og Østersøen, som ikke påvirker konkurrenceforhold, og sådanne mekaniser kan i tillæg dæmpe ruteoperatørs skepsis som over at skulle være de første der skaffer de nødvendige data til at ansøge om dispensation. Initiativtagere vil uden byrdefordelingsmekaniser naturligvis mangle tilskyndelse og det kan endvidere medføre ekstra udgifter.

**Katalog af forslag for overgangsfasen indtil 2020 og 2022**

Med udgangspunkt i handlemønstre, volumener af ballastvand og andre specifikke emner, præsenteres et katalog af forslag til en fleksibel introduktion af en række krav i OSPAR/HELCOM dispensationsretningslinjerne og i Konventionen for overgangsperioden indtil D-2 standarden er gennemført i 2022. Bemærk at det er udenfor dette studies rammer at undersøge juridiske
konsekvenser af de foreslåede muligheder i forhold til Konventionen, og at en juridisk vurdering af forslagene bør foretages, hvis en gennemførsel overvejes. Det er ikke intentionen at forslagene nødvendigvis skal tillades samtidigt.


TABEL 8.7: OVERSIGT OVER FORESLÅDE VALGMULIGHEDER FOR REGIONAL REJSE I OVERGANGSPERIODEN FREM TIL 2022.

<table>
<thead>
<tr>
<th>Forslag</th>
<th>Beskrivelse</th>
<th>Betingelse</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D-1 standard</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revideret tidsplan for implementering - Forslag A.1-4 og/eller B</td>
<td>Udskiftning af ballastvand er en metode til at overholde krav for skibe i Konventionens kategori 2.</td>
<td>Indenfor HELCOM skal udskiftning ske ikke tættere end 12 NM fra nærmeste kyst. Indenfor OSPAR skal udskiftning ske i et designet område.</td>
</tr>
<tr>
<td><strong>Dispensationsforslag</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lempeliger mixing-kriterie&quot;* - Forslag D</td>
<td>Afvigelse fra ruten, hvortil en dispensation er givet, er tilladt for skibe i tilfælde af tidsbegrænsede kontrakter, tørdok og vedligeholdelse eller reparation.</td>
<td>Udskiftning som lever op til D-1 standard eller Forslag A udføres før ankomst til et ny sted eller havn og før tilbagevenden til oprindeligt rute.</td>
</tr>
<tr>
<td>Drikkevand - Forslag E</td>
<td>Et fartøj som sejler fra et sted udenfor den godkendte rute kan bruge drikkevand fra en offentlig vandforsyning.</td>
<td>Indtil der findes andre muligheder for at tilbyde ballastvand der lever op til D-2 standarden fra havn eller sted, eller at en risikovurdering ifølge resolution MEPC.206(62) viser en høj risiko.</td>
</tr>
<tr>
<td>Områdebaseret risikovurdering - Forslag G&quot;*</td>
<td>Udvigelse af 1 km afstandsindklusenter for havneområde og bassiner uden tydelige adskillelser. Der er kun behov for en selvstændig undersøgelse med minimum tre prøvetagningssteder per havn.</td>
<td></td>
</tr>
<tr>
<td>Forslag</td>
<td>Beskrivelse</td>
<td>Betingelse</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>

| Alternative dispensationsmuligheder                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| **Udledningstærskel** - Forslag I **Offshore forsyningsfartøjer, mandskabsbåde og RSS-fartøjer undtages fra D-2 kravet.**                                                                                   | På betingelse af at andelen af udledt ballastvand fra de speciferede skibe ikke overstiger fx 5% af udledningen fra anden international trafik i anløbshaven. |
| **Havnetypetærskel** - Forslag J **Fartøjer som kun sejler mellem havnepar, der hovedsageligt importerer varer og hvor der derfor ikke udledes ballastvand, kan få dispensation fra D-2 kravet.** | **Operationsmønsteret fortsættes uden ændringer.**                                                                                                                                              |
| **Rutehistorisk tærskel** - Forslag K **Skibe som opererer på ruter, der er over f.eks. 50 år gamle, kan få dispensation.**                                                                                   |                                                                                                                                     |
| **Udledningshyppighedstærskel** - Forslag L **Fartøjer som kun sjælden ballasterer, f.eks. <15 gange om året, må bruge drikkevand som ballast.**                                                                     | Forudsat at det ikke er blevet blandet med andet vand eller sedimenter og med antagelsen om, at der ikke er foreligger nogen risikovurdering ifølge resolution MEPC.206(62) som viser høj risiko ved at bruge drikkevand. |
| **Brug af teknisk vand** - Forslag M **Fartøjer som kun sjælden ballasterer, kan bruge teknisk vand som ballast uden at have gennemført en risikovurdering.**                                                      | Vandkvalitet skal ved levering være testet med hensyn til D-2 pathogenkravet af en tredjepart og må ikke blandes blandet med andet vand eller sedimenter. |

*Indtil fornyelse af International Oil Pollution Prevention Certificate.
*Metoden kan gennem videre udvikling også overvejes som en permanent løsning.
1. Introduction

The coming Convention
Ships and goods moved between different parts of the world may introduce aquatic species to an area where they are not native, and such non-indigenous species may present new risks and have great impacts on the environment, economy and human health if they become invasive. The rate of bio-invasions continues to increase, and the spread of invasive species is today recognised as one of the four largest threats to the World’s oceans (IMO, 2013a). Although not the sole cause a ship's ballast water is a key vector for introducing marine species and invasive species carried by ships have already caused devastating effects in several marine and freshwater environs of the world. In response to the increasing problem, The International Convention for the Control and Management of Ships’ Ballast Water and Sediments (BWMC, 2004), hereafter the “Convention”, was developed to:

“prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of Harmful Aquatic Organisms and Pathogens”.

The Convention will enter into force 12 months after ratification by 30 states, representing 35% of the world’s merchant shipping tonnage. As of 30 September 2013, 38 countries have ratified, representing 30.38% of the world’s tonnage (IMO, 2013b). After an extended period with few ratifications by high-tonnage states, the Convention is finally expected to be ratified in 2014 and thus enter into force during 2015 due to a compromise proposal on a new implementation profile adopted at the IMO Assembly in December 2013.

The ways to manage ballast water
The Convention will require ships to manage their ballast water before it is discharged. The two measures via which to comply with the Convention are the D-1 standard based on ballast water exchange and the D-2 discharge standard, typically requiring some form of a disinfectant treatment. For some new vessels, D-2 applies directly, but for existing vessels, D-1 will precede the D-2 standard, which is implemented on certain dates based on the year of construction and ballast water capacity towards a full implementation for all vessels in 2022.

Applying the Convention
The regulations laid down in the Convention are clear and unambiguous when traffic is international transoceanic transport. However, when it is applied in shallow and coastal seas such as in the Baltic Sea or the North Sea, meeting the criteria for allowing exchange according to the basic D-1 standard are not possible. The Convention is open to a relaxation of the distance and depth criteria, and this has prompted OSPAR to designate ballast water exchange in the North Sea according to IMO guideline G14, as the 50 nm distance or a 200 m depth criterion cannot be met. Currently, HELCOM has decided that vessels do not comply with D-1 when exchanging ballast water in the HELCOM area.

Instalment of ballast water treatment systems (BWTS) is the typical measure by which shipowners intent to comply with the D-2 standard of the Convention and much has been said and written on the massive investments needed for these systems. Other compliance measures of relevance to this study include exemptions under Regulation A-4 by use of the Guideline for Risk Assessment (G7),
but also onshore treatment and the use of “Other Measures” according to resolution MEPC 206(63) may be applicable, such as using drinking water as ballast. Whereas the onshore treatment options and “Other Methods” are still in their infancy, the exemption scheme is under serious consideration by shipowners for vessels that operate between specific ports or locations, i.e. ferry and ro-ro operators such as pax, ro-pax and ro-ro operators (hereafter named RSS vessels). With the OSPAR and HELCOM joint guidelines (to be renamed “harmonised procedures”) on granting of exemptions which where adopted in 2013 (HELCOM/OSPAR, 2013) the exemption scheme has taken its first formalised shape for the North Sea and Baltic Sea.

Additional issues have also been addressed in the MEPC and the former subcommittee BLG e.g. the hopper dredgers exemption (BWM.2/Circ.32), the current discussion on ballast water management in barges, and a proposal for exemption and other compliance measures for offshore supply vessels (MEPC 64/2/14, 2012, BWM.2-Circ.44, 2013).

Scope of study
The aims of this project are to:

1) Identify which types of vessels are more likely to apply for an exemption and establish a unified overview of the regional traffic routes in the North Sea and the Baltic Sea operating between specific ports or locations for which exemptions could be considered, and estimate the associated costs.

2) Evaluate the OSPAR/HELCOM exemption guidelines with regards to key obstacles and propose burden sharing mechanisms.

3) Propose a catalogue of alternative transitional options which relaxes the requirements of the Convention and the OSPAR/HELCOM exemption guidelines in the transitional phase until the D-2 standard is fully implemented in 2022.
2. Assessing the Intra-Regional Traffic with Regard to Exemption Potential

The exemption option under regulation A-4 in the Convention is applicable to a ship or ships on a voyage or voyages between specified ports or locations; or to a ship which operates exclusively between specified ports or locations” (BWM/CONF/36, 2004).

The following section considers the scope of the exemption option with regard to applicability to regional traffic in the North Sea and the Baltic Sea. Vessels types and operational pattern are assessed and ports that include vessels on routes where exemptions may be a feasible option are identified. The following approach is applied:

1. Ship types and traffic patterns are assessed with regard to applicability of the exemption option.
2. Ports in the OSPAR and HELCOM area that are part of routes calling at two ports only is identified and assessed with regards to other traffic intensity.
3. Ports and routes considered feasible for exemptions are shortlisted.

Details of the analysis are presented in Appendix 1.

2.1 Assessment of applicability of the exemption option for vessel types and traffic patterns

2.1.1 International pax, ro-pax and ro-ro vessels (RSS traffic)

The international pax, ro-pax and ro-ro traffic (RSS) are primary targets of exemptions due to their operation between specified ports or locations. The RSS vessels typically connect two ports, though certain lines (e.g. ro-ro) may comprise more ports on a route. The RSS traffic in the North Sea and Baltic Sea is operated by more than 30 different operators, and the number of vessels engaged on routes with only two ports is approximately 150. The port of call frequency of these RSS vessels range from 1 to 350 a week per port.

The RSS vessels typically have ballast water capacities below 5,000 m³ and discharge an approximate average of 200-300 m³ per port of call. The annual volume of ballast water discharged in OSPAR and HELCOM areas from RSS vessels calling at only two ports on a route is estimated to be approximately 50 million tonnes. In comparison, the combined annual amount of discharged ballast water in the OSPAR and HELCOM areas from all ships is estimated to be 635 million tonnes (425 million tonnes in the North Sea and 210 million tonnes in the Baltic Sea) based on a

3 Based on a ballast water operation of 200-300 tonnes per port call the discharge range is calculated to 40-60 million tonnes, see Appendix 2 for details.
The RSS traffic consequently constitutes 8% of the total (see Appendix 2 for details).

The RSS vessels in this trade operating between a limited number of ports do generally not change operational area or route, and they are typically designed or chosen for a route based on specific characteristics that meet the demand of that specific route. The vessels often operate for a longer period than the five-year window for which an exemption is valid, and the exemption option is therefore directly applicable for these types of vessels and the routes on which they operate.

2.1.2 Offshore vessels in the North Sea

The vessels engaged in offshore activity in the North Sea include a number of different types of ships, hereunder: anchor handlers, subsea support vessels, platform supply vessels, standby vessels, fast crew supplier multi purpose vessels and well stimulation vessels amongst others. In this study the term “offshore supply vessel” is used to describe all vessels engaged in this sector.

The offshore supply vessels operate from Denmark, Norway, United Kingdom, the Netherlands, and Germany and the key companies comprise more than 20. The offshore supply vessels often have a limited itinerary sailing between a service port and an exploration/production rig and the lengths of the contracts vary significantly from only a few days to years. Some offshore supply vessels sail from only one specific port, others provide services to several specific offshore installations and yet others are on the spot marked and change operational area occasionally. Hence, the vessels’ operational pattern includes both scenarios of operation solely within the same exclusive economic zone (EEZ) and scenarios where EEZ are crossed and the convention applies. The berth frequency varies considerably from vessel to vessel; in general, from twice a week to once a month, although standby vessels may berth only once a year. A rough estimate of the total number of offshore supply vessels operating in the North Sea is approximately 360.

The offshore supply vessels generally use ballast water, with capacities being ship specific and varying between 1,000 and 3,500 m³. It is estimated that approximately half of the vessels have ballast tank capacities above 1,500 m³ and therefore two different implementations dates will be in play. The exemption option may be applicable for certain offshore supply vessels trading on long-term contracts between different EEZs. When the offshore activity is limited to one EEZ, the Convention does not apply, though national authorities may stipulate specific requirements also when trading solely in national waters.

The total volume of ballast water per year discharged in ports in the North Sea from offshore supply traffic is estimated to be 1.9 million tonnes, based on 9,443 port calls in 30 ports, with an average discharge of 200 m³ per call (0.4% of ballast water discharged in ports in the North Sea). Comparing the estimated discharge of ballast water from offshore supply traffic with the total discharge from other traffic in the ports used by offshore supply vessels, the offshore supply vessels share of discharged ballast water constitutes an average of approximately 1.3%. In specific ports the discharge share of offshore supply vessels constitutes in most cases less than 5% (20 ports) and between 5% and 100% (seven ports), and for three ports share cannot be estimated.

---

4 Five Russian ports in the Baltic Sea are not included, as no data were available on cargo volumes.
6 The OSPAR/HELCOM TG Ballast is considering the implications and applicability of using “same location” in the BWMC for offshore supply vessels operating between the North Sea platforms and North Sea ports. Output on this issue is expected in 2014 (HELCOM/OSPAR, 2013a).
2.1.3 Coastal traffic and other sectors
Other intra-regional traffic, such as coastal trade, with container vessels, tankers, dry-bulk and feeder traffic, could theoretically benefit from exemptions, but in general the operational pattern of coastal traffic is considered too complex and does not readily lend itself for inclusion in an exemption scheme, as the routes almost always include more than two ports or the vessels trade in tramp.

Ships servicing aquaculture farms and wave energy installations generally operate nationally within the same EEZ and are therefore not covered by the regulations of the BWMC. Wave energy is a relative new technology still in the development phase, and only test facilities are in operation in the North Sea and the Baltic Sea. There are about 45 ports involved in the wind farm segment in the North Sea and Baltic Sea and approximately 500\(^7\) ships are engaged in construction and maintenance, which include 18 different ship types (Navigant, 2016). The wind farm vessels engaged in this segment are on a general basis not considered for the exemption option, as they either operate within same EEZ or have frequently changing operational patterns.

2.2 Ports with routes operating between two ports or locations only
The following section identifies routes relevant for exemptions. While there is no formal exclusion of vessels trading on fixed routes with more than two ports, it is obvious that the statistical chances of identifying a collective low risk for all ports on a multiport route decrease the more ports that are included. Traffic calling at three or more ports may therefore find few options in the exemption regime. Consequently only ports used by international RSS routes calling two ports (or locations) are included as shown in the in the main map and included in the following assessment. Offshore supply vessels were not included, though some offshore supply vessels operate on long contracts between specified locations, as it was not possible to determine how many vessels and on which “routes” EEZs were crossed. A separate map is presented in Figure 2 showing the key offshore supply vessel ports. Ports utilised by vessels associated with activities in aquaculture, wave energy and wind farms are not included in the map specifically, unless also used by international pax, ro-pax and ro-ro routes, as the exemption option is not considered relevant for these vessels.

The main map of RSS ports of call (Figure 1) includes a total of 85 ports, with 38 ports located in the North Sea and 47 ports in the Baltic Sea connected by a total of 69 routes. The identification of ports and routes rests with information from Shippax statistics, the Baltic Transport Journal and ferrylines.com. To the extent possible, all routes are included; however, routes which have limited operation only during summer (or winter) are not be included, e.g. Nexø-Ustka and Nexø-Darlowo. A full overview of all the assessed routes between two specific ports in the North Sea and Baltic Sea is provided in Appendices 2 and 3.

The identified ports shown in the map were assessed with regard to a traffic profile under the assumption that these ports would be likely to have ore invasive species and fall into “high risk” (see section 2.3) using the number of ship calls (mainly Eurostat 2011 figures) to identify large international ports. The ports was divided into four categories according to the annual number of ship calls: 0-500, 500-1,000, 1,000-1,500 and >1,500. The types of ships included in the categorisation are liquid bulk tankers, dry bulk carriers, container ships, specialised carriers, dry cargo barges, cruise ships and “other type of vessels”. The calls from RSS vessels where not included. For certain ports it was not possible identify the number of annual ship calls and cargo turnover was used to classify the size of the given ports based on other ports of known ship calls and cargo turnover.

\(^7\) Including the leading operators of offshore wind vessels currently in operation (2010) by the UK, Denmark and the Netherlands.
FIGURE 1: MAP OF THE NORTH SEA AND THE BALTIC SEA SHOWING THE PORTS WITH INTERNATIONAL FERRY SERVICES OPERATING BETWEEN TWO PORTS. COLOUR CODE INDICATES THE NUMBER OF SHIP CALLS PER YEAR. BLACK: <500, YELLOW: 500-1,000, ORANGE: 1,000-1,500, RED: >1,500. NUMBERS CAN BE USED TO IDENTIFY PORTS. A COMPLETE LIST IS GIVEN IN APPENDIX 2.

FIGURE 2: PORTS USED BY OFFSHORE SUPPLY VESSELS IN THE NORTH SEA. NUMBERS CORRESPOND TO PORT LIST IN APPENDIX 3.
Approximately 30 ports are used by offshore supply vessels. The ports are located in UK, Norway, Denmark, the Netherlands and Germany (Figure 2). The included ports were identified through information from offshore supply companies as well as from registered offshore supply vessel port calls in Eurostat (2011 data).

2.3 Routes shortlisted for the exemption option

An exemption may be granted following a risk assessment showing low or acceptable risk of successful transfer of invasive species as identified by the so-called Target Species. Target Species are species considered to be invasive and should not be introduced into a new port or area. Introduction of species into a port or location may be regarded as primary or secondary. Primary introduction is associated with discharge of ballast water from transoceanic voyages and secondary transfer associated with intra-regional voyages.

The major international hubs receiving vessels from transoceanic voyages are the key locations for primary introduction of invasive species. It is assumed that no risk of primary invasions can be attached to intra-regional voyages, only secondary transfer. The busier the port, the higher the risk of invasive species being present due to the more frequent and larger total volume of ballast water the port receives. The busier ports therefore present hot spots for secondary transfer of invasive species and RSS traffic calling at such ports is taken to be associated with a higher risk of secondary transfer than when calling at smaller, less busy ports.

To identify a suitable cut-off value for the shortlisting of routes the number of port calls of vessels was compared to the number of invasive species in the listed ports. Though no clear distinction between low- and high-risk ports is seen, a weak linear correlation was found between the number of invasive species and the number of ship calls, i.e. there is an increase of invasive species with an increase in the number of port calls (see Appendix 5). Given the lack of a strong indication of division boundaries (see Appendix 4), an arbitrary maximum of 1,000 ship calls per year was chosen as a limit value in the selection of ports and routes feasible for exemptions, i.e. ports with fewer than 1,000 ship calls annually are considered more likely to be low-risk ports and shortlisted to qualify for the exemption option.

The shortlisting resulted in 39 routes connecting 52 ports, see Figure 3, of which 15 are located in the North Sea and 24 in the Baltic Sea. The total yearly discharge of ballast water on the 39 routes is estimated to be approximately 37 million tonnes (6% of total discharge).

---

8 It is expected that the risk of primary introduction will decrease considerably once the D-2 standard is fully implemented and thereafter, associated primarily with hull fouling. However, in light of the new implementation schedule, where the period in which the D-2 requirements are implemented is longer, it may be expected that the discharge profile in the international hubs may include both treated and untreated water and therefore continue to be a risk of primary introduction of invasive species in a transitional period.
Section 2 - Summary and conclusions
The vessels for which the exemption option is considered a feasible option comprise RSS vessels (pax, ro-pax and ro-ro) and certain offshore supply ships. Only vessels calling two ports on a route are considered for further assessment. The ports used by RSS traffic which are considered feasible for exemption include a total of 52 ports connected by 39 routes, of which 15 are located in the North Sea and 24 in the Baltic Sea. The total yearly discharge of ballast water on the 39 routes is estimated to be approximately 37 million tonnes (6% of annual discharge of 635 million tonnes from all vessels calling ports in the North Sea and Baltic Sea). Offshore supply vessels have port of call in approximately 30 different ports in UK, Norway, Denmark, the Netherlands and Germany. Offshore supply discharges is estimated to 1.9 million tonnes in the North Sea (0.4% of total discharges in the North Sea).
3. Exemptions

Provisions for exemption to the D-2 discharge standard are provided in Regulation A-4 in the BWMC, which states that port states may grant exemptions from the requirements (Regulation B-3 and C-1) of the BWMC to vessels sailing between specified ports or locations. Several RSS companies operate international routes between specific ports or locations, and if it is likely that they do not entail a risk for spreading of invasive species with ballast water, they may be granted an exemption and benefit from this option since they will not have to install a ballast water management system (BWMS). The application for exemption of a vessel must include a risk assessment according to the provisions of the IMO guideline (G7) and this must demonstrate a low risk. The exemption is effective for a period of no more than five years subject to an intermediate review.

The BWMC states that parties with common interests to protect the environment, human health, properties and resources in a given geographical area shall seek to co-operate and develop regional agreements and harmonised procedures. For this reason the joint HELCOM/OSPAR guidelines on the granting of exemptions have been developed.

This section presents the key aspects of the joint OSPAR/HELCOM guidelines and points to critical issues within the current framework. It also estimates the total costs associated with seeking exemptions for Denmark, the North Sea and the Baltic Sea based on the routes identified in section 2.2 and 2.3.

3.1 The exemptions under the OSPAR/HELCOM guidelines

The joint HELCOM/OSPAR guidelines (2013b) were developed to assist applicants as well as national authorities in the exemption application process. The guidelines are voluntary and include the key aspects of the IMO G7 guideline, and also stipulate region specific provisions on data quality, risk assessment procedures and validity of an exemption. The decision to use the guidelines rests with the national authority and national administrators may chose to grant exemptions according to other guidelines, however, reasons for doing so should be communicated to HELCOM and OSPAR.

3.1.1 Data required

The HELCOM/OSPAR guidelines include a port survey protocol describing the methodology for comprehensive sampling in each port on the route for which an exemption is applied. A port is considered a contiguous unit, separated by for example a land mass, as peninsula or distance more than 1 km from other ports or port areas. The absolute minimum of sampling sites is three, but more sites may be required for an adequate analysis, depending on the size and type of port. Two surveys should be conducted at each port, one in spring and one in late summer in order to identify aquatic species throughout all life-cycles. All main substrate types are to be sampled for hard substrate organisms, soft bottom benthos, plankton, and mobile epifauna, and special attention be given to high priority areas, which include active berths, inactive/disused wharves, channel markers, tug and pilot vessel berths, and slipways. It is highly recommended to also map the underwater habitats either by diving, if possible, or by using underwater cameras.

---

9 Proposed to be renamed harmonised procedures at the 3rd HELCOM/OSPAR TG Ballast meeting 2013
3.1.2 Risk assessment
The collected data should be stored in a web-based database, which also comprises a risk assessment tool. The risk assessment methodology recommended and applied in the web-based tool is species-specific supported with information on the environmental conditions and shipping activity. The risk assessment may result in high, medium or low risk, depending on presence and abundance of Target Species in the ports, differences in water salinity between the ports, and salinity tolerance of the detected Target Species. If the risk assessment results in low risk, an exemption can be granted; if it results in medium risk, further review is necessary; and if it results in high risk, an exemption cannot be granted. Upon submission of an application, the ownership of the submitted data will be transferred to the public authorities and other applicants and researchers who wish to use the information stored in the database may do so.

An exemption may be granted for up to five years, but it is recommended by the IMO that the authorities conduct an intermediate review within 12-36 months, which may include a new port survey if found necessary. The review should be based on, e.g. presence of non-indigenous species, introduction pathways and changes in the physical conditions in the port. A port survey is valid for granting of exemptions for other applicants and an exemption based on already available data will be valid for the rest of the period for which an exemption is sought (maximum of five years counting from the first sampling in spring).

3.2 Considerations regarding the OSPAR/HELCOM guidelines
The shipowners have identified that the primary obstacles for the exemption process in OSPAR and HELCOM are related to issues of the data regime and the lack of certainty in the regulation:

Data regime:
1. Few countries have existing datasets on invasive species allowing applicants to submit a risk assessment and authorities to grant an exemption.
2. The data to be generated in consequence of 1. is not owned by the shipowners who bear the cost.
3. The 1 km limit criteria for a continuous port unit limits burden sharing opportunities.

Uncertainty:
4. The optional annual review of the exemption may be seen as a mechanism to revoke an already granted licence to operate, since no criteria are given for actions concluded from the review.
5. With the proposed exemption guideline and port survey protocol a typical timeline for the exemption application process may look as shown in Figure 4. The extended period of time presents a key challenge especially in light of the optional annual review.

---

**FIGURE 4** EXPECTED TIMELINE FOR THE EXEMPTION APPLICATION PROCESS USING CURRENT PROPOSED OSPAR/HELCOM FRAMEWORK

<table>
<thead>
<tr>
<th></th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial preparation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring sampling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample analysis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High summer sampling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Risk assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of application</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Application processing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response to application</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The general policy in the EU of ensuring RSS traffic as a viable alternative to transport by road may be seen from the ship owners’ perspective as challenged due to the data ownership issues, lack of (or limited) burden sharing opportunities, and the uncertainties attached to achieving and maintaining an exemption. Obviously shipowners will assess the economic feasibility of seeking an exemption for a given ship compared to installing a treatment system or maybe selling the ship, depending on the remaining service life, its maintenance conditions, the route’s profitability, etc. If exemptions to RSS traffic are to be a part of the Convention’s implementation process, the more certainty and clarity of the consequences of trading under an exemption regime, the better.

3.3 Evaluation of information gap within economic and ecological impacts

The lack of monitoring data for introduced invasive species and basic data on the historical import and discharge of ballast water presents obvious challenges for establishing credible cause and effect relationships regarding the risk for introduction of non-indigenous species in ports. The effect of measures to reduce introduction of new species is therefore difficult to assess, in particular for individual sites and locations.

There is limited information on the ecological characteristics of organisms that are introduced and become invasive, although attempts have been made (Leppäkoski et al., 2002). Recently, the HELCOM BALSAM project – Baltic Sea pilot project on testing new concepts for integrated environmental monitoring – was launched in October 2013. The project is designed to enhance the capacity of Baltic Sea member states to develop their monitoring programmes, including also monitoring of biodiversity, including non-indigenous species.

Amongst the few countries to monitor invasive species are Latvia and Germany. To fill the information gaps for non-indigenous species in harbours, Germany started in 2009 with so-called rapid assessment investigations in selected ports in the North Sea and the Baltic Sea. The first investigations have been financed by the German coastal federal states. The rapid assessment programme on non-indigenous species continued and is still running. Starting with four locations in 2009, the programme now investigates six locations in the Baltic on a regular basis. Work to implement the HELCOM/OSPAR port sampling protocol (2013b) has now begun in selected Baltic harbours, including Flensburg, Eckernförde, Kiel, Neustadt, Lübeck and Rostock (HELCOM, 2013b).

The agreed OSPAR/HELCOM policy on and management of invasive species includes the development of Target Species lists where two special types of Target Species are included:

1. Known unwanted species that are known to have already generated serious problems for the environment, economy, human health, poverty or resources somewhere in the world, with evidence of prior introduction and a relationship with ballast water as a vector

2. Species which have been comprehensively scientifically investigated for their risk potential but which have not yet caused harm (HELCOM/OSPAR, 2013b)

A Target Species list has been developed for OSPAR and HELCOM and approved as a part of the Joint HELCOM/OSPAR guideline on the granting of exemptions (HELCOM, 2013c). IMO’s G7 guideline points to Target Species that have “demonstrated impacts on environment, economy, human health...” and the identification includes the same criteria as point 1. above, though also including “strength and type of ecological interactions, e.g. ecological engineers”.

3.4 The costs of an exemption

The costs of applying for exemption for a ship sailing between two ports comprise four elements:
- Port survey;
- Laboratory analysis;
- Risk assessment; and
- Application development

Under certain circumstances these costs may be shared with other operators that are also interested in applying for exemptions for their ships operating on the same routes or mooring in the same ports. A cost model where burden sharing is incorporated has been developed in this study which is presented in section 4. In the applied burden-sharing model, expenses for port surveys and laboratory analyses are shared among the operators using the same ports and the risk assessment and application development costs are shared among the operators sailing on the same routes. Based on this approach, the total costs for applying for exemptions have been estimated for one exemption period for vessels operating from Denmark, and the whole of the North Sea and the Baltic Sea.

3.4.1 Unit costs
Table 1 provides an overview of the low, medium and high estimates of the unit costs of conducting port surveys, laboratory analyses, risk assessments and applications development. The low estimates indicate the costs if three sampling sites are sufficient in the port survey and none of the risk analyses result in “medium risk”. When the risk assessment results in “medium risk”, further review is necessary, causing additional costs. The medium estimates indicate the costs when 50% of the risk assessments result in “medium risk” and four survey sites are necessary in 50% of the ports. The high estimates indicate costs when all risk assessments result in “medium risk” and four survey sites are necessary in all the ports. The total cost for applying for exemption for a ship operating between two specific ports includes the costs of conducting two port surveys, two laboratory analyses, one risk assessment and development of one application.

In order to provide a visual overview of the seabed and record possible indigenous species, scuba diving is recommended. When diving is not possible due to bad visibility, a remotely operated vehicle (ROV) may be used instead. The price for renting an ROV together with a pilot and a tender for one day is close to that for renting a dive team for one day and no distinction has been made in price between using ROV and divers.

The ALIENS 2 project under HELCOM auspices carried out test surveys in two Finnish ports and an Estonian port in 2012 (HELCOM, 2012b) and arrived at a cost estimate of approximately EUR 10,000 for a port survey and analysis, based on work performed by the national administration, i.e. public institutes and universities. The comparable port survey cost on commercial terms in the current assessment is approximately EUR 26,000, based on interviews with companies in Denmark involved in this type of work and with the laboratory in Finland, SYKE Marine Research Centre, which conducted the analysis of the samples taken in the ALIENS 2 project. Travel time and transport of samples are not included in current estimation, as they vary dependent on distance between survey location, surveyor and laboratory.
### Table 1: Cost of one exemption: Low, medium and high estimates of port survey, laboratory analysis, risk assessment, development of exemption application and total cost of exemption.

The total exemption costs comprise two port surveys and laboratory analyses but only one risk assessment and one application. Numbers are rounded.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Port survey</td>
<td>2</td>
<td>3,300</td>
<td>3,800</td>
<td>4,300</td>
</tr>
<tr>
<td>Laboratory analysis</td>
<td>2</td>
<td>23,000</td>
<td>26,000</td>
<td>30,000</td>
</tr>
<tr>
<td>Risk assessment</td>
<td>1</td>
<td>7,700</td>
<td>9,400</td>
<td>11,000</td>
</tr>
<tr>
<td>Application development</td>
<td>1</td>
<td>2,200</td>
<td>2,800</td>
<td>3,300</td>
</tr>
<tr>
<td>Total exemption cost</td>
<td></td>
<td>61,000</td>
<td>72,000</td>
<td>83,000</td>
</tr>
</tbody>
</table>

**Figure 5** provides a visual presentation of the unit costs and their variation with regards to port survey, laboratory analysis, risk assessment, and application development. The figure shows that the laboratory analysis has the highest effects on the total price, which is especially relevant as two laboratory analyses are needed, one for each port.

![Figure 5: Variations of unit costs of the different elements needed when applying for exemption.](image)

**3.4.2 Assessment of included routes for cost estimates**

The cost estimations comprise the total cost of all routes identified in 2.3 and section 2.2 for comparison as well as costs for Danish routes. In order to assure that none of the shortlisted routes previously have been deemed high-risk routes with regards to transfer of invasive species, available literature on risk assessments of Baltic and North Sea voyages was investigated.

A number of pilot risk assessments were identified which focus on intra Baltic shipping and one on intra North Sea shipping. The most recent pilot risk assessments on intra Baltic Sea voyages, by David et al. (2013) and the HELCOM Project No 11.35 by Gollasch et al. (2011), employ a species-specific risk assessment approach similar to the joint HELCOM/OSPAR risk assessment...
methodology and comprise the ports of St. Petersburg, Gothenburg, Klaipeda and Kiel. All assessments conclude that there is high risk between the ports investigated. Heyer (2012) assessed intra North Sea voyages between Antwerp and Hamburg within the North Sea Ballast Water Opportunity Project (NSBWO) also by use of a species-specific approach. This assessment concluded that there was a high risk of successful transfer. Other previously developed risk assessment approaches only used environmental matching (e.g. Leppäkoski and Gollasch, 2006 and Gollasch and Leppäkoski, 2007) for introduction into the Baltic Sea.

It is emphasised that the routes calling at the above mentioned ports and routes previously subjected to pilot risk assessments would not be included in the busy ports (more than 1,000 calls) and shortlisted routes for assessing the exemption costs.

### 3.4.3 Costs of exemptions – North Sea, Baltic Sea and Denmark

The total cost (Table 2) for carrying out port surveys, laboratory analyses, risk assessments and exemption applications for the routes between two ports in the North Sea and the Baltic Sea has been estimated based on the unit costs in
Table 1 (see also Appendix 6). It is assumed that only one survey is necessary in each port, though this has to be investigated further for each port, as in the docks used by RSS traffic calling same port in reality may be more than 1 kilometre apart. The total combined estimation of costs for the North Sea and Baltic Sea ranges from EUR 1.7-2.3 million and comprise the shortlisted 39 routes and 52 ports. Sharing of costs, which is further explained in Section 4, is taken into account in the estimation. It is assumed that only shipping companies operating routes, which are more likely to achieve exemption, will apply for exemption and therefore take part in the sharing of costs.

The costs of exemptions when all identified routes between two ports are considered (69 routes and 85 ports) are shown in Table 3. The costs are approximately 70% higher when including all the routes and ports which are not a priori considered low risk.

The total costs for carrying out port surveys, laboratory analyses, risk assessments and exemption applications for all international routes between two ports leaving from Denmark as well as costs for shortlisted Danish routes have been estimated. The estimation of costs for all international routes (16 routes and 28 ports) amounts to approximately EUR 0.9-1.2 million and costs for the shortlisted Danish routes (13 routes and 23 ports) amounts to approximately EUR 0.7-1 million, see Table 4.

3.4.4 Sensitivity analyses of cost estimation
A sensitivity analysis of the total costs of applying for exemption has been conducted. The analysis compares the 1,000 calls per year case scenario with two other scenarios (Table 5) and comprise total costs of exemption for routes between ports which have:

- fewer than 500 port of calls; and
- fewer than 1,500 port of calls per year.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>North Sea</td>
<td>770,000</td>
<td>900,000</td>
</tr>
<tr>
<td>Baltic Sea</td>
<td>960,000</td>
<td>1,130,000</td>
</tr>
<tr>
<td>Total</td>
<td>1,730,000</td>
<td>2,030,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>North Sea</td>
<td>1,280,000</td>
<td>1,500,000</td>
</tr>
<tr>
<td>Baltic Sea</td>
<td>1,600,000</td>
<td>1,880,000</td>
</tr>
<tr>
<td>Total</td>
<td>2,870,000</td>
<td>3,380,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All DK routes</td>
<td>880,000</td>
<td>1,030,000</td>
</tr>
<tr>
<td>Short listed routes</td>
<td>720,000</td>
<td>850,000</td>
</tr>
</tbody>
</table>

34  Ballast Water Management Convention transition phase for local shipping in the Baltic Sea and the North Sea
The number of port calls are excluding RSS vessels and the analysis are based on the medium cost estimates, when 50% of the risk analyses result in “medium risk” and four survey sites are necessary in 50% of the ports.

The routes between ports with fewer than 500 ship visits per year comprise 23 routes and 36 ports. The total costs involve a 33% decrease compared to the costs for routes operating between ports with fewer than 1,000 ship calls per year. The routes between ports with fewer than 1,500 ship visits per year comprise 51 routes and 64 ports. The total costs involve a 25% increase compared to the 1,000 port of call base scenario.

When fewer routes are considered, the total costs will obviously decrease, but the costs for the individual operators may increase, since less cost sharing is possible and visa versa.

<table>
<thead>
<tr>
<th>Ship calls</th>
<th>500</th>
<th>1,000</th>
<th>1,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Routes [EUR]</td>
<td>10,000</td>
<td>90,000</td>
<td>1,020,000</td>
</tr>
<tr>
<td>Routes</td>
<td>16</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Deviation from medium case</td>
<td>-30%</td>
<td>-</td>
<td>13%</td>
</tr>
<tr>
<td>Baltic Sea [EUR]</td>
<td>730,000</td>
<td>1,130,000</td>
<td>1,520,000</td>
</tr>
<tr>
<td>Routes</td>
<td>13</td>
<td>24</td>
<td>34</td>
</tr>
<tr>
<td>Ports</td>
<td>19</td>
<td>28</td>
<td>37</td>
</tr>
<tr>
<td>Deviation from medium case</td>
<td>-35%</td>
<td>-</td>
<td>35%</td>
</tr>
<tr>
<td>Total [EUR]</td>
<td>1,360,000</td>
<td>2,030,000</td>
<td>2,540,000</td>
</tr>
<tr>
<td>Routes</td>
<td>23</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td>Ports</td>
<td>36</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>Deviation from medium case</td>
<td>-33%</td>
<td>-</td>
<td>25%</td>
</tr>
</tbody>
</table>

Figure 6 illustrates the variations of total costs of applying for exemption in the North Sea and the Baltic Sea when considering all ports with routes between two specific ports or only the ports with fewer than 1,500 ship calls/year, 1,000 ship calls/year and 500 ship calls/year, all excluding ferry traffic.

---

*Excluding RSS vessels*
FIGURE 6: VARIATIONS OF TOTAL COSTS OF APPLYING FOR EXEMPTION IN THE NORTH SEA AND THE BALTIC SEA WHEN CONSIDERING ALL PORTS WITH ROUTES BETWEEN TWO SPECIFIC PORTS OR ONLY THE PORTS WITH FEWER THAN 1,500 SHIP CALLS/YEAR, 1,000 SHIP CALLS/YEAR AND 500 SHIP CALLS/YEAR, EXCLUDING FERRY TRAFFIC. FOR EACH SCENARIO THE MEDIUM ESTIMATE OF COST IS GIVEN, WHILE BARS INDICATE THE HIGH AND LOW ESTIMATES.

### Section 3 - Summary and conclusions

The joint HELCOM/OSPAR guidelines (2013b) were developed to assist applicants as well as national authorities in the exemption application process. The guidelines include provisions for the development and process of an exemption including port survey protocol, a web-based database and risk assessment tool. The primary obstacles for the exemption process in OSPAR and HELCOM are related to issues of the data regime and the lack of certainty in the regulation, hereunder in specific: 1) lack of port based biological and environmental data for the risk assessment, 2) data used in the risk assessment is not owned by the shipowners that bear the cost, 3) burden sharing opportunities may be limited due to the criteria for continuous port units, and 5) the annual optional review may in practice render the exemption option useless as a typical timeline for the exemption application process may take the most of a year.

The costs of an exemption relates to port surveys, laboratory analysis, risk assessment and development of the application. The total combined estimation of costs for the shortlisted 39 routes and 52 ports ranges from EUR 1.7-2.3 million. The costs of exemptions are approximately 70% higher when all routes are considered (69 routes and 85 ports). The costs for Denmark for all international routes between two ports leaving from Denmark (16 routes and 28 ports) as well as costs for short listed Danish routes (13 routes and 23 ports) amounts to approximately EUR 0.9-1.2 million and EUR 0.7-1 million respectively.

Comparing the costs associated with the shortlisted routes and ports with a low and high estimate of number of routes and port to include on the shortlist, reduction of costs are between -35 to -30% for the low estimate and an increase of between 13-35% for the high estimate.
4. **Burden-sharing mechanisms**

Applying for an exemption under the framework for OSPAR and HELCOM entails a number of key costs, which may be shared under certain conditions. There are currently no embedded mechanisms to share the cost burden between operators. Albeit costs of surveys and analysis of data are not excessive and some countries may wish to carry this cost as part of a monitoring effort, the responsibility formally lies with the shipowner, and the shipowner may seek to share this cost directly with other RSS operators in the port. This section presents a model for such a burden sharing mechanism.

### 4.1 Cost sharing mechanism

An application for exemption comprises activities regarding the individual and ship-specific application, e.g. the frequency and volume discharged, and others that are port specific, e.g. those survey-related. It is assessed that the following costs may be feasibly shared when seeking an exemption:

- Port survey and laboratory analysis
  - Establishment of port-specific environmental and biological baselines
  - Continuous monitoring of aquatic biology in ports
- Risk assessment development
- Application development

The figure below is an example of the cost-sharing mechanism and it illustrates the complexity when burden is to be shared among a number of different operators in three ports. In the example an operator (operator 1) has two sister vessels calling at ports A and B and one calling at ports A and C, where a total of three other companies operates with five ships. The two eleventh exemption applications needed by operator 1 will require port surveys and laboratory analyses in all three ports and two risk assessments illustrated by the dashed squares – one for each route. A more detailed explanation of the cost-sharing mechanism is presented in Appendix 7.

---

11 Formally three applications, as an application is tied to the vessel, not the route.
The burden of the aforementioned costs can be shared in several different ways. A number of options for burden sharing are presented in the following section.

4.2 Burden sharing models

4.2.1 Sharing the costs of port-specific biological and environmental survey and data analysis

A key obstacle in applying for exemption is the requirement to donate port specific biological and environmental data to a publicly available database. As communicated in the joint HELCOM/OSPAR guidelines, the data collected should be centrally stored in a database, and the contracting party may, based on this available data, grant exemptions to other applicants without requiring new port surveys to be undertaken. It is therefore important to develop a burden-sharing mechanism where the costs of conducting the port surveys and risk assessment are shared.

The costs may be shared with operators or shared with other stakeholders through a specific port fee for access to the generated data and the risk assessment.

Option A – Ship operator, direct financing

1. **Operator based**: Ship operators who wish to seek exemptions for ships mooring in the same port pool their efforts and defray an equal share of the port survey and laboratory analysis costs regardless of the number of ships they have calling at the port.

2. **Ships based**: Ship operators who wish to seek exemptions defray a weighted share of the port survey and laboratory analysis costs corresponding to the number of ships for which the operators wish to seek exemption.

The challenge here is that the activity has to be timed so that the operators agree to seek exemption and finance the surveys at the same time. In case an applicant engage in the exemption process after
a survey has been conducted, a weighted costs share according to remaining time of survey validity should be considered.

**Option B – Port of call fee financing**

1. **Port of call fee – all vessels calling a port:** The port finances the cost of the port survey and the laboratory analysis. The costs are distributed between all ship operators calling at the port through the normal port of call fee scheme.

2. **Port of call fee – for vessels without BWMS:** As in Option B.1, with the addition that ships which have installed a ballast water treatment system are exempted from the fee. ¹²

Option B.1 entails the least cost for each operator seeking exemption; however, the drawback of this approach is that non-exemption-seeking operators also carry a part of the cost, which may raise some opposition and weaken the port’s competitiveness. The port of call fee could also target the need to fund a more frequent port survey programme, which may be needed in the period until full implementation of the D-2 requirement where risk of introduction of invasive species from ballast water is still relatively high (depending on the composition of ballast water donor ports).

In both cases option B may be challenged from other users of the ports, as it is applying a fee to users that would not be eligible for exemption.

**Option C – Mixed financing**

1. **Consortia development for EU funding – Building cross-border partnerships between shipowners, ports and public authorities to assist the seamless administration of the exemption(s) and provide financing of the surveys and laboratory costs could be a mechanism for partly financing through national funds supported by direct EU funding or addressed in projects through INTERREG IVC**³ under the EU.

This option appears attractive, as the total costs for the number of ports and routes considered here are not excessive and may be a suitable case for initiation of survey programmes and providing a platform for important lessons learned.

**4.2.2 Sharing the costs of risk assessment and application development**

Besides the survey and laboratory costs, minor costs are associated with the risk assessment and application development needed for the exemption. These are ascribed to the given ship for which an exemption is sought. However, once conducted, the costs of producing risk assessments and applications for more ships sailing the same route are negligible, as the majority of the documentation can be reused. Operators servicing a given route may therefore share the costs related to the risk assessment and application development among the different ships.

**Option D – Ship operator direct financing**

1. All ship operators that want to take part in the cost-sharing mechanism on a given route pay an equal amount of the risk assessment and application development regardless of the number of ships they have mooring at the given port.

2. Each ship operator that wishes to take part in the cost-sharing mechanism on a given route pays an amount of the risk assessment and application development corresponding to the number of ships the ship operator has sailing this route.

¹² The transitional period until 2021 comprise both ships that discharge treated ballast water (i.e. low risk) and ships that are not yet required to meet the D-2 standard and discharge untreated ballast water (i.e. higher relative risk).

³ INTERREG IVC provides funding for interregional cooperation across Europe
In Options D the shipowners pay an amount corresponding to the number of ships for which they are applying for exemption and this seems most reasonable, as the alternative is to install a BWMS on each of the ships. In this way, applying for exemption is economically attractive both for smaller shipowners having only one ship on a given route and for large shipowners operating several ships.

In general the introduction of a common burden sharing mechanism is considered crucial for an equitable exemption scheme in the North Sea and Baltic Sea and such a mechanism may in addition mitigate the reluctance from ship operators to be first-movers in obtaining the needed data for the exemption application.

### 4.3 Cost estimation model – Options A.2 and D.2

The cost estimation model applied in this study applies a combination of Options A.2 and D.2 where the costs are shared based on the number of ships the operator has operating on the specific route.

#### 4.3.1 Example calculations using the cost model in two scenarios

Taking the ports of Hirtshals and Esbjerg as examples, three companies are operating six vessels on four routes: Esbjerg-Harwich (DFDS), Hirtshals-Larvik (Color Line), Hirtshals-Langesund (Fjord Line) and Hirtshals-Kristiansand (Color Line and Fjord Line). The routes are presented in Figure 8 indicated by black dashed lines. The two Fjord Line vessels operating on Hirtshals-Langesund have already installed BWMSs and consequently these will not be considered for burden sharing.

There is less than one kilometre between the docks where the ships moor both at the port of Harwich and at the port of Hirtshals. Therefore, one survey in each port is assumed to be sufficient. At least three sites are required per survey, but depending on the size and type of the port, more sites may be necessary to obtain an adequate analysis (HELCOM/OSPAR, 2013b). The burden sharing is assuming that the other shareholder operating between Harwich and the Hook of Holland also applies for an exemption (red dashed line in Figure 8).

The low, medium and high estimates of the costs per ship for applying for exemptions on all example routes can be seen in Table 6. Detailed calculations can be found in Appendix 8.

#### Table 6: Examples of low, medium and high estimates of costs per ship have been calculated for four routes

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Esbjerg</td>
<td>Harwich</td>
<td>DFDS (1)</td>
<td>44,000</td>
<td>52,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Hirtshals</td>
<td>Kristiansand</td>
<td>Color Line (1)</td>
<td>26,000</td>
<td>31,000</td>
<td>36,000</td>
</tr>
<tr>
<td>Hirtshals</td>
<td>Larvik</td>
<td>Color Line (1)</td>
<td>44,000</td>
<td>52,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Hirtshals</td>
<td>Langesund</td>
<td>Fjord Line (2)</td>
<td>BWMS installed</td>
<td>BWMS installed</td>
<td>BWMS installed</td>
</tr>
</tbody>
</table>

DFDS = Danish-Finnish-Dutch Shipping, BWMS = Ballast Water Management System.
4.4 Cost estimation model – Options B.1 and B.2
Option B.1 imposes a fee for all vessels calling at the port, which optimally should cover the expenses associated with the port survey cost. The cost per port survey (spring and summer survey) is estimated to be EUR 26,000. As there is some uncertainty with regards to duration of survey validity in consequence of the required intermediate review and the optional annual review, three five-year scenarios representing different time intervals between port surveys are considered:

1. **Scenario 1**: five port survey with laboratory analyses are performed, one every year for five years – estimated total costs for five surveys and laboratory analyses are EUR 150,000.
2. **Scenario 2**: Two port survey with laboratory analysis are conducted, one initial and one in connection with the intermediate review. Estimated total costs for two surveys are EUR 60,000.
3. **Scenario 3**: One initial port survey is conducted in the five-year period in which the exemption is granted. Estimated total costs for one survey is EUR 30,000.

The costs are summarised in Table 7.

**TABLE 7: SUMMARY OF TOTAL COSTS OF CONDUCTING PORT SURVEYS IN A FIVE-YEAR PERIOD**

<table>
<thead>
<tr>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Five surveys</td>
<td>Two surveys</td>
<td>One survey</td>
</tr>
<tr>
<td>Cost [EUR]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150,000</td>
<td>60,000</td>
<td>30,000</td>
</tr>
</tbody>
</table>

The fee per port call in relation to total number of port calls in a port presented in the figure below ranging from lowest <EUR 5 to >EUR 60 per port of call.
4.4.1 Example calculations

Port fees are typically based on gross tonnage (GT) of the ship calling a port. Taking port of Esbjerg port as example the level of fee needed to cover the port survey and data analysis costs is calculated.

Port of Esbjerg handled approximately 35 million GT in 2012. Using the GT in 2012 as a baseline, 174 million GT will be handled during a five-year period. Imposing the fee on all vessels calling at the port results in a fee ranging from EUR 0.17-0.86 per 1,000 GT depending on the scenario of survey frequency. If the fee is imposed only on ships that do not have a BWMS installed, the total gross tonnage handled will be 121 million GT\(^{14}\) for the five years and the cost range will be approximately EUR 0.25-1.24 per 1,000 GT. The window for burden sharing of the port survey costs with ships without a BWMS is relatively short, as all ships in international trade calling European ports will have BWMSs implemented by 2022.

The resulting fees for the respective scenarios are summarised below in Table 8.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fee imposed on all ships</td>
<td>0.86</td>
<td>0.34</td>
<td>0.17</td>
</tr>
<tr>
<td>Fee corrected for vessels w. inst. BWMS</td>
<td>1.24</td>
<td>0.50</td>
<td>0.25</td>
</tr>
</tbody>
</table>

The fees are approximately a factor of 1,000 below the port fees already applied in Esbjerg (EUR 0.42 per GT) and a ship of 40,000 GT will need to pay an additional fee of EUR 20 for calling at the port (scenario 2 corrected for vessels with installed BWMS). An amount, which makes burden sharing of port surveys and data analysis costs an eligible option. In comparison, port fees may be considerably higher, e.g. in the port of Portsmouth, where EUR 1.15 per GT is imposed, and port of Tallinn, with EUR 1.80 per GT.

\(^{14}\) Assuming that none of the 30,000 ships operating in the Baltic Sea and North Sea have a BWMS implemented prior to 2015 and that the number of ships and gross tonnage calling at the port of Esbjerg are proportional.
Section 4 - Summary and conclusions
There are currently no embedded mechanisms to share the cost burden of exemptions between operators who otherwise will bear the costs of seeking exemption alone. To meet this need, two models have been developed. Model one, which allows for the sharing of exemption costs between operators servicing same ports. This model is directly operator financed and dependent on the number of operators and ships with which to share the burden amongst. For the example ports Esbjerg and Hirtshals a medium-cost estimate of EUR 31,000-52,000 per ship for DFDS, Color Line and Fjord Line are estimated. Model two comprise financing of exemptions through port fees (covers main the costs; port survey and data analysis). It is estimated that a port fee for the example port Esbjerg will need to be between EUR 0.17-1.24 per 1,000 GT depending on required survey frequency (1-5 in a five year exemption period) to cover the expenses.

Both models are considered feasible options and will allow for operators to apply for exemptions with a maximum spread of burden. The introduction of a common burden sharing mechanism is considered crucial for an equitable exemption scheme in the North Sea and Baltic Sea and such a mechanism may in addition mitigate the reluctance from ship operators to be first-movers in obtaining the needed data for the exemption application.
5. Alternative Initiatives and Transitional Schemes

The stakeholders in the North Sea and Baltic Sea have pointed to issues related to the implementation of the compliance standards (D-1 and D-2) in the International Convention for the Control and Management of Ships’ Ballast Water and Sediments regarding the intra-regional vessels in the OSPAR and HELCOM areas. An issue of concern is that until the D-2 standard is fully implemented a growing fraction of the relatively smaller regional vessels will be required to adhere to the D-2 standard while larger transoceanic vessels in the same location can discharge untreated water in compliance with D-1.

Most of the vessels operating in intra-regional trade are relatively small, and with the exception of e.g. bulkers and shuttle tankers, they take on board and discharge relatively small amounts of ballast and trim water (15-500 m$^3$) compared to the vessels from overseas trade which may utilise a considerable part of their +5,000 m$^3$ ballast tank capacity when calling ports in the area. In consideration of the trading patterns, the ballast volumes and other specific issues related to the risk profile of the trade, this section contains a catalogue of proposals aimed at a flexible introduction of the requirements of the OSPAR/HELCOM harmonised procedures and the Convention. The catalogue includes the following three parts:

- The first part investigates a number of flexible interpretations of the Conventions D-1 standard for certain categories of vessels or vessels operating in certain areas (5.2).
- The second part of the section addresses the use of exemptions (5.3)
- The third part other alternative approaches during the transitional period (5.4).

It is emphasised that the options presented have not been subjected to a full legal scrutiny with regards to the Convention requirements and secondly that the proposed options are considered for the OSPAR Region II/HELCOM areas only in the transitional period until the D-2 standard is fully implemented.

5.1 Introduction

The International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004, hereafter the Convention (BWMC, 2004), is expected to enter into force during 2015. The Convention will require ships to manage their ballast water before discharge albeit under a slightly modified implementation scheme recently adopted by the Assembly following the proposal MEPC 65/2/11 (2013); see Fig 1. The two measures via which to comply with the Convention are the D-1 standard based on ballast water exchange and the D-2 discharge standard. For existing vessels the D-1 will precede the D-2 standard, which is implemented on certain dates based on the year of construction and ballast water capacity towards a full implementation in 2022.\textsuperscript{45}

\textsuperscript{45} Assuming ratification in 2014 and entering into force in 2015
The Convention addresses all ships in international traffic, though a few ship types are exempted. In some areas of the world, many countries share a body of water and hence have much short-distanced international traffic, without the area necessary to comprise different climatic or environmental/biogeographic zones, e.g. the North Sea, the Baltic Sea, the Caribbean Sea and the Black Sea. Transport needs in such areas are often meet by short sea shipping in international traffic which may include ferries, transport of containers, bulks, and feeder services, and a number of policy initiatives exist to promote and ensure the economic and environmental sustainability of this shipping sector, since it is seen as an integrated part of intermodal regional traffic, e.g. the Motorways of the Sea in the European Union.

The vast majority of vessels in short sea shipping in the North Sea or the Baltic Sea does not trade on the high seas nor are they engaged in intercontinental trades. These vessels are not a priori assumed to be responsible for the primary introduction of invasive species, although they may contribute to the dissemination of invasive species within the area, i.e. to the risk of secondary transfer.

5.2 Transitional options for D-1 exchange

5.2.1 Introduction

The requirements of the Convention may for certain categories of ships be met by conducting ballast water exchange under Regulation B-4 to meet the D-1 standard (95% volumetric exchange). The exchange area must be at least 200 nautical miles from the nearest land and in water at least 200 metres in depth, or if this is not possible, at least 50 nautical miles from the nearest land and in waters at least 200 metres in depth. It is also possible to designate specific areas in which exchange can be performed. The requirements for ballast water exchange shall not apply if the ship must deviate from its intended voyage or is unnecessarily delayed.

The requirement to apply the D-1 standard shown below follows the new implementation schedule recently adopted at the IMO Assembly. The application of the D-2 standard follows the renewal of the International Oil Pollution Prevention (IOPP) certificate (pink cells).

![Figure 10: Proposed Implementation Schedule According to Anticipated Assembly Resolution](image)

The approach taken in the following sections towards relaxation of requirements entailing an acceptable risk scenario is to extend the D-1 standard’s applicability until D-2 must be complied with, and with a preference towards pre-2009 vessels and vessels with less than 5,000 m³ ballast tank capacities.

Any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service.
5.2.2 D-1 in the North Sea and Baltic Sea

All countries in the OSPAR and HELCOM area have agreed on an interim guidance for a D-1 ballast water exchange standard for all vessels entering into the North Sea and Baltic Sea from outside the North-East Atlantic. The vessels are to exchange ballast water at least 200 nm at waters of 200 meters of depth before entering the North Sea. The general guidance is voluntary until the Convention enters into force where it becomes mandatory until the D-2 Standard of the Convention applies (OSPAR, 2012b). The D-1 exchange standard agreed on in OSPAR and HELCOM follows the same standard (D-1) as the Convention. The guidance does not apply to intra regional voyages.

For ships operating intra North Sea and intra Baltic Sea it is not possible to conduct exchange according to the distance criteria under Regulation B-4. Designated areas for exchange have been appointed for intra North Sea voyages according to the IMO Guidelines on Designation of Areas for Ballast Water Exchange (G14). A ship on a voyage between two ports that under the Convention shall meet the D-1 standard may conduct ballast water exchange in these areas to comply. In cases where ships under way have initiated exchange when entering an exchange area and are not finished exchanging when leaving, ships may maintain their operational speed and continue exchange operations outside the designated area until complete and still be in compliance with the D-1 standard (pers. comm. S. Oftedal).

For the Baltic Sea, the current statement of HELCOM is that exchange according to the D-1 standard is not possible (HELCOM, 2009). The lack of exchange as a compliance measure in the Baltic Sea has given rise to speculations that the D-2 standard should then be applied for the affected ships. The Convention text in Regulation B-4 is not clear on this subject, and based on informal consultations with various stakeholders the interpretation applied would be that when the D-1 criteria cannot be met, the affected ships should exchange where most suitable in order to be in compliance. However, the Russian Federation has recently issued their interpretation stating that when D-1 cannot be applied, the D-2 standard is to be followed when the Convention enters into force (HELCOM, 2013a). The Netherlands in the OSPAR area may also follow a similar interpretation.

Norway has designated three exchange areas in the North-East Atlantic applicable for all ships constructed to carry ballast water (Regulation of 7 July 2009 No. 992). The designated areas are located off the Norwegian coast, and the southernmost area (Area 3, as seen in Figure 11) is a part of the OSPAR Region II. Any ship with water taken up outside or within OSPAR Areas I or II should exchange their ballast water either before they enter Norwegian territorial waters or in the designated exchange areas within Norwegian EEZ.

---

17 The guidance do not apply to vessels coming form the Mediterranean Sea, where a separate guidance exists (OSPAR Agreement 2012-04)
18 The details of these interpretations are beyond the scope of this study, but the national legal tradition of applying such regulation in the entire EEZ or only in territorial waters may play a role.
19 a) Ships trading exclusively in Norwegian territorial waters and in the Norwegian economic zone, b) ships with permanent ballast water in sealed tanks, and c) craft less than 50 metres in length overall and with maximum ballast water capacity of 8 cubic metres, which are used solely for recreation or competition or craft used primarily for search and rescue. However, such craft shall exchange ballast water outside port waters and as far from the coast as practically possible.
5.2.3 Options for D-1 flexibility for intra North Sea and intra Baltic Sea

The ships covered under category 2 with ballast water capacities below 1,500 m$^3$ (see Figure 10) are often ships engaged in short sea shipping, such as offshore supply vessels, RSS vessels and to some degree smaller vessels in coastal trade. The current implementation scheme requires category 2 ships to comply with the D-2 standard as early as 2017 following the renewal of the IOPP certificate.

As exchange will be mandatory for ships entering the OSPAR Region II and HELCOM areas from outside these areas when the Convention is in force, it is assumed that the risk of introduction of invasive species from ship entering the region is reduced by 95%, correlating to the 95% volumetric exchange of ballast water in mid-ocean. Taking into account that primary introduction of invasive species in the transitional period will be associated with ocean-going ships and that ships engaged in intra OSPAR Region II and HELCOM voyages are associated with risk of secondary transfer as well as carrying a limited amount of ballast water, it is proposed that an extension of the period in which the D-1 standard is considered a compliance measure:

**Option A – Vessels with limited ballast water capacity: Revised implementation schedule of D-1 requirement for category 2 ships with ballast water capacity <1,500 m$^3$**

1. In the Greater North Sea (OSPAR Region II) the D-1 exchange standard is considered a compliance measure for affected ships engaged in voyages between specified ports or locations only on condition that exchange is carried out in a designated area. Applicable until the D-2 requirement is fully implemented in 2022.

2. In the Greater North Sea (OSPAR Region II) the D-1 exchange standard is considered a compliance measure for all affected ships on condition that exchange is carried out in a designated area. Applicable until the D-2 requirement is fully implemented in 2022.

3. Though technically no exchange areas or designated exchange areas exists for the Baltic Sea (HELCOM area) the D-1 exchange standard is still considered a compliance measure for affected ships engaged in voyages between specified ports or locations only, on condition that exchange is carried out as far from nearest coast as possible, in any case not closer than 12 nm from nearest coast. Applicable until the D-2 requirement is fully implemented in 2022.

---

20 The proposed distance of 12 nm correlates to the territorial boundary.
4. Though technically no exchange areas or designated exchange area exist for the Baltic Sea (HELCOM area) the D-1 exchange standard is still considered a compliance measure for all affected ships until the D-2 requirement is fully implemented, on condition that exchange is carried out as far from nearest coast as possible, in any case not closer than 12 nm from nearest coast. Applicable until the D-2 requirement is fully implemented in 2022.

This option will typically be relevant for offshore supply vessels, a limited number of RSS vessels and smaller vessels engaged in coastal traffic.

The vessels with a capacity greater than 5,000 m³ are typically not engaged only in short sea operations between two ports or locations, but may include vessels in coastal trade between several ports, such as container freight vessels and bulkers. The coastal traffic typically operates outside the borders of the designated exchange areas of the North Sea and exchange will therefore be conducted in waters which have a higher risk index (according to the ESA Due Innovator II programme by Brockmann Consult) and therefore a higher potential of having invasive species present. Such vessels may be allowed compliance with D-1 only if they perform exchange under the following conditions:

Option B – Vessels with large ballast water capacity: Revised implementation schedule of the D-1 requirement for category 2 ships with ballast water capacity >5,000 m³

1. The D-1 exchange standard is considered a compliance measure for all affected ships in intra regional coastal trade on condition that exchange is performed either in a designated area or on passing the point of the route which is furthest from land and at least 12 nm from shore. Applicable until the D-2 requirement is fully implemented in 2022.

The affected ships will typically include ro-ro vessels and vessels engaged in coastal trade.

5.2.4 Options for D-1 extension for category 1 and 3 ships

A concern was raised by stakeholders that under the new implementation schedule there is no D-1 compliance option for existing ships built before 2009 in the 1,500-5,000 m³ ballast water capacity (category 1) and less than 5,000 m³ ballast water capacity after 2009 (category 3). As vessels entering the OSPAR and HELCOM areas from outside the greater North Sea will have to comply with the D-1 standard after entering into force of the Convention (OSPAR, 2012b), it is proposed that this option also is applicable for vessels in intra-regional trade operating on fixed routes or between specified locations.

Options C – Extension of category 1 and 3 ships

1. Ships in category 1 and 3 engaged in voyages between specified ports or locations only will be in compliance using the D-1 standard until the D-2 requirement is fully implemented, i.e. 2020 and 2022 for category 1 and 3, respectively.

2. Ships in category 1 and 3 engaged in voyages between specified ports or locations only will be in compliance using the D-1 requirement until renewal of the IOPP certificate.

The affected ships will typically include RSS vessels, offshore supply vessels and vessels engaged in coastal trade.

---

21 The ships in category 2 with ballast water capacities <1,500 m³ is often vessels engaged in coastal traffic, i.e. they operates in close proximity to the coast or smaller pax vessels on routes of shorter distances.
5.3 Transitional options for exemption initiatives

Some ships on international short sea routes can apply for a five-year exemption from the D-2 requirement, based on a risk assessment showing low risk of successful transfer of invasive species, although the permission can be granted only for a route operating between specified ports. A joint harmonised procedure on exemptions has been developed for the areas of OSPAR and HELCOM (North Sea and Baltic Sea) stipulating the requirements for development of the risk assessment needed to apply for an exemption. The vessels directly in the scope of this exemption scheme are those involved in RSS traffic, i.e. pax, ro-pax and ro-ro vessels, but should operators be willing to dedicate vessel(s) to the operation between specified ports, then other short sea shipping segments may be eligible.
With the Convention in force, an overseas ship entering the North Sea or the Baltic Sea will manage its ballast water to at least the D-1 standard (OSPAR, 2012b). Assuming an overall link between risk and ballast water volume, the propagule pressure from invasive species from outside the North Sea and the Baltic Sea will be reduced by approximately 95% (D-1 exchange standard). Consequently, the main risk with respect to introductions of species will be associated with secondary transfer within the North Sea and Baltic Sea from intra-regional voyages. Certain challenges are anticipated for vessels seeking an exemption under the current exemption framework in OSPAR and HELCOM. These challenges are addressed in this section.

5.3.1 Option for a reduced mixing criteria

It is a requirement under Regulation A-4 that ships do not mix ballast water or sediments other than from between the ports or locations for which an exemption has been granted. Ships on contracts on specific routes/operational areas are sometimes temporarily allocated to other routes/areas for a limited time before returning to their standard operation. A vessel may also need to go into dry dock or other off-route repair and maintenance during the period for which the exemption is granted.

Since this may be a rare event, it is proposed that under the conditions that a discharge reception facility is not available at the temporary port or location, the following option be considered:

Option D – Reduced mixing criteria

1. A ship which has been granted an exemption is allowed to deviate from the voyage for which the exemption is granted, for temporary contracts, dry-docking, and maintenance or repair under the condition that exchange to the D-1 standard is conducted in a designated area before arriving at the new location or port and before returning to its original route. The deviation from normal operations should be included in the ballast water record book and be sufficient when the alternative voyage is conducted within either OSPAR Region II or HELCOM. Applicable until the D-2 requirement is fully implemented.

The affected ships will include only vessels, which have been granted an exemption and typically include ferries in off-season time charter, offshore supply vessels on longer contracts and a limited number of ro-ro vessels.

5.3.2 Options for use of drinking water

Use of drinking water as ballast has been the subject of discussions since MEPC 59 (MEPC 59/2/17). The latest contribution was made at MEPC 65 (2013) where it was ascertained that the D-2 standard does not exceed the drinking water standards in stringency. The use of drinking water as ballast could be considered as a feasible compliance measure provided that no mixing occurs with other water or sediments, as the drinking water normally is under control from, e.g. the EU Drinking Water Directive or any equivalent standard. In the USCG Final Rules, the use of drinking water is accepted when delivered from municipal drinking water utilities, i.e. under the U.S. National Primary Drinking Water Regulation.

Some vessels with an exemption may be in a situation where there is a temporary need to divert from normal operations. Substituting ballast water with drinking water is considered a compliance measure for these vessels in the transitional period considering:

Option E – Use of drinking water

1. A vessel that has been granted exemption on a specific route between ports or locations and that are departing from a different location located outside the route on which an

---

Under the assumption that oceanic water have no or negligible presence of invasive species which due to differences in salinity will not be able to survive in waters with lower salinity than is the case for oceanic waters.
exemption is granted (i.e. dry dock, port for maintenance or repair) may use drinking water from a public water supply until other means of providing ballast water to the D-2 standard at the port or location visited is available, e.g. onshore-treated ballast water. This option is void if risk assessment under resolution MEPC.206(62) has been developed showing high risk from the use of drinking water. Applicable until the D-2 requirement is fully implemented.

5.3.3 Options for alternative port survey validity

Under the current joint HELCOM/OSPAR exemption guidelines, a review of an exemption needs to be conducted within the first three years. A recipient port state may require several reviews during the period in which the exemption is granted, but the guidelines state that more-frequent-than-annual reviews should not be required. The review does not necessarily entail that a new survey must be conducted, only that it should be checked that the requirements of the exemption have been followed, including history of the vessel’s voyages (e.g. logbook records) and that any new information regarding presence of non-indigenous species (NIS), introduction pathways for NIS and changes in physical conditions in the port should be considered.

Taking into account that 1) introduction of new invasive species in the transitional period until the D-2 requirement is fully implemented presumably will be introduced mainly by ocean-going vessels to which the exemption scheme is not applicable, and 2) that the burden of asserting that no new introduction of invasive species in the current framework lies on the local operators that represent little risk of new primary invasions to OSPAR Region II and HELCOM, it is proposed that:

Option F – Revised data validity

1. Intermediate reviews of an exemption may be required during the period for which the exemption is granted, however, the exemption will not be revoked in the granted period unless major new occurrences of Target Species are identified. Applicable until the D-2 requirement is fully implemented.
2. Data from an initial port survey are valid for use by all applicants in the complete transitional period until the D-2 requirement is fully implemented, on condition that no major new occurrence of new Target Species are identified during the period. After this date the validity of new surveys follows the original proposed time frame in the HELCOM/OSPAR exemption guideline.

This option will find relevance for vessel on fixed routes, hereunder, RSS vessels, offshore supply vessels and a limited number of vessels engaged in coastal traffic.

5.3.4 Options for area-based risk assessments

The HELCOM/OSPAR exemption guidelines states: “A port is considered to be a contiguous unit, separated by for example a land mass, as peninsula or distance more than 1 km from other ports or port areas”. Consequently an independent port survey need be conducted if discharge locations are separated by more than one kilometre.

Ports vary in their layout of breakwaters, quays and port basins; some are long narrow river ports, others have a number of smaller units distinctively separated by jetties, and some are large units with or without an apparent separation between different quays. Below are examples of large port basins and adjacent port separated units.

---

23 There is only risk of secondary transfer of already introduced species on intra OSPAR and intra HELCOM voyages.
Taking into consideration that the 1 km criteria may be a somewhat arbitrary distance when it comes to risk profile of a specific port and the fact that burden sharing is limited when certain areas within a ports are to be regarded as separate units for risk assessment it is proposed that:

Option G – Temporary expansion of the one-kilometre criteria

1. A port area or basin with no apparent internal separation, e.g. in the form of canals and docks as seen in example Figure 13 (left picture), is considered to be continuous units even if distances are larger than 1 km, and only one independent survey with minimum of three sites is needed. Applicable in the transitional period until the D-2 requirement is fully implemented.

2. As Option F.1, including also adjacent port units also when separated by jetties and breakwaters as seen in example Figure 13 (right picture)

It is beyond the scope of the current study to assess the hydrological and biological criteria for the layout of a port as to how far the distance criteria can be stretched on the basis of risk. However, evaluation parameters which may be used to define a port unit could e.g. include natural mixture of the water body within the port and limited or equal distribution of type of substrates. This subject should be addressed further should Option G be considered.

A complex assessment technology sometimes termed “connectivity” is emerging that combines hydrodynamic modelling with biological characteristics of propagules (agent-based modelling) for larger bodies of water. This allows for the identification of natural dispersal of invasive species for given characteristics (transport distances) as well as location and separation of high- and low-risk areas. As the use of connectivity provide a broader approach to the concept of risk assessment it is proposed that:

Option H – Use of low- and high-risk areas (risk assessment based on connectivity)

1. Transfer of ballast water within one low-risk dispersal area may be exempted from management of ballast water in the transitional period until the D-2 requirement is fully implemented.
2. Transfer of ballast water within one low-risk dispersal area to another low-risk dispersal area may be exempted from management of ballast water in the transitional period until the D-2 requirement is fully implemented.

Although the connectivity method is still in its infancy and need to be developed further to allow for risk categorisation of coastal waters also, it may in the future be useful for granting exemptions, e.g. in case of transfer of ballast water within low-risk areas or from one low-risk area to another low-risk area (provided the Target Species share biological characteristics) also under the fully implemented D-2 regime. Further research and test of applicability is warranted.

<table>
<thead>
<tr>
<th>Alternative exemption initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option</strong></td>
</tr>
<tr>
<td>Option D.1</td>
</tr>
<tr>
<td>Option E.1</td>
</tr>
<tr>
<td>Option F.1</td>
</tr>
<tr>
<td>Option F.2</td>
</tr>
<tr>
<td>Option G.1</td>
</tr>
<tr>
<td>Option G.2</td>
</tr>
<tr>
<td>Option H.1</td>
</tr>
<tr>
<td>Option H.2</td>
</tr>
</tbody>
</table>

5.4 Transitional options for other alternative approaches
5.4.1 Introduction
Apart from transitional options for D-1 and exemptions other alternatives may also come into consideration. These include a number of “threshold approaches” and an additional option; use of technical water. A threshold approach is in present study considered to be an option, which is triggered by e.g. volume of ballast water discharged or number of years a discharge on a given route has taken place. Threshold approaches are considered applicable for vessels with:

- low volumes of ballast water,
- low frequency or number of port calls during the year, and/or
- a long history of operation between specific ports or locations.

Four types of threshold approaches and one additional option are considered in the next sections.

5.4.2 Options for a discharge threshold approach in relation to traffic in a port
The ballast water discharge volumes from international ocean-going traffic constitute the majority of discharged ballast water in the ports of OSPAR and HELCOM and the discharge volumes from RSS vessels, offshore supply vessels and crew boats are limited in comparison. See table below for typical volumes of discharged ballast water per port call for vessels engaged in RSS traffic and offshore operations.
### Table 11: Typical Volumes of Discharged Ballast Water in Ports by Vessels in Short Sea Operations

<table>
<thead>
<tr>
<th>Vessel type</th>
<th>Typical discharge per port call</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSS vessels (1)</td>
<td>200 - 300 m³</td>
</tr>
<tr>
<td>Offshore supply vessels (2)</td>
<td>&lt;200 m³</td>
</tr>
<tr>
<td>Crew boats (3)</td>
<td>15-20 m³</td>
</tr>
</tbody>
</table>


Considering that overseas ships entering the North Sea or the Baltic Sea after the entering into force of the convention will manage their ballast water to at least the D-1 standard (OSPAR, 2012b), the propagule pressure from invasive species from outside the North Sea and the Baltic Sea will be reduced by approximately 95% (D-1 exchange standard). In consequence, it can be argued that when vessels on intra-regional voyages have a share of ballast water discharged in a port of e.g. below 5% of the total discharges it constitute not more than the same risk as ships coming from outside the North Sea. Taking into account also that 1) intra-regional vessels presents little risk of new introduction of invasive species, only risk of secondary transfer, 2) that offshore supply vessels and crew boats typically take up ballast water at the oilfields of the North Sea, which are included in the designated area of the North Sea, and 3) the general lesser volumes of ballast water associated with intra-regional traffic from offshore supply vessels, crew boats and RSS traffic, it is proposed that:

**Option I – Ballast water threshold in relation to other traffic**

1. Offshore supply vessels and crew boats are exempted from the D-2 requirement until the D-2 requirement is fully implemented, on condition that the share of discharged ballast water from the specified vessels does not exceed e.g. 5% of the discharges from other international traffic coming from outside the North Sea or Baltic Sea (level to be decided by relevant authority). The distribution of traffic should be evaluated on a yearly basis and the exemption withdrawn, e.g. with a one-year notice if the share exceeds the chosen level.

2. Same as option I.1, with the inclusion of vessels engaged in RSS traffic. This may include also coastal traffic and consequently this option has a higher risk profile for secondary transfer of invasive species.

These options will find relevance for the above named vessel types on a general basis, not only those operating on fixed routes.

Esbjerg port in Denmark is an example of a port with considerable offshore supply vessels and ro-ro services. If one uses the annually outgoing cargo volume (tonnes) as proxy for the discharged ballast water, a total of approximately 700,000 tonnes of ballast water are discharged from vessels in international trade (based on numbers from Statistikbanken for 2012). In order for the offshore supply vessels not to exceed a 5% threshold with regards to the total discharges in the port the number of port calls by offshore supply vessels may not exceed 180. See Appendix 9 for detailed information. This assumption is based on a 200 m³ discharge profile for offshore supply vessels and handled cargo as proxy for discharged ballast water from other traffic in the port. However, in reality the discharge volumes in the port may be different and more detailed information should be collected form the vessels calling the port in order to operationalize this option.

**5.4.3 Option for a port type threshold approach**

Two scenarios could be considered in relation to taking a threshold approach based on type of port. With the main risk of introduction of introduction of invasive species coming from international traffic scenario one is to consider port-pairs with little or no other traffic than from intra-regional RSS vessels and/or offshore supply vessels to have a low risk of introduction of invasive species.

---

24 The estimation is based on cargo volume in tonnes from outgoing bulk (liquid and solid) and net cargo from incoming and outgoing shipment of other types of cargo.
Scenario two is port-pairs which include a port(s) with a history of mainly importation of goods. Such ports are considered as having a relatively lower risk profiles regarding invasive species, as the volumes of ballast water discharges are limited. Summing these scenarios into one option it is proposed that:

**Option J – Ballast water threshold in relation to port type**

1. Vessels visiting only port pairs, which mainly import goods may be exempt from the D-2 requirement until the D-2 requirement is fully implemented.

A typical port-pair could be Hirtshals-Langesund, where the main traffic comprise RSS vessels and offshore supply vessels.

### 5.4.4 Option for a route history threshold approach

Certain routes have a long history of operating between specific ports, e.g. Helsingør-Helsingborg and Rodby-Puttgarden (since 1892 and 1963, respectively), and it may be argued that the species which could be transported and survive in both ports would be present in both ports already.

Considering that the propagule pressure will be considerably lessened after the Convention has entered into force, as all vessels coming from outside the North Sea will exchange their ballast water, it is proposed that:

**Option K – History of shipping**

1. Ships operating on routes with a history of more than, e.g. 50 years can be exempted from the requirements of the Convention until the D-2 standard is fully implemented, provided operations remain the same.

### 5.4.5 Option for a discharge frequency threshold approach for use of drinking water

Some vessels rearrange ballast water internally between tanks for normal operations and only discharge ballast water on rare occasions due to e.g. weather conditions or extreme tidal variations which may limit access to a port. Taking a threshold approach to these vessels it is proposed that:

**Option L – use of drinking water**

1. A vessel engaged in intra-OSPAR or intra-HELCOM trade that discharges ballast water only on rare occasions, e.g. <15 times a year (level to be decided by relevant authority), may per default use drinking water as ballast, provided that no mixing with other water and sediments has occurred and under the assumption that no risk assessment under resolution MEPC.206(62) has been developed showing high risk from the use of drinking water. Applicable until the D-2 requirement is fully implemented.

The choice of >15 times per year is arbitrary and another number may be chosen based on level of acceptable risk. The higher the number, the higher the probable propagule pressure and success of a species to establish at the new location.

### 5.4.6 Option for use of technical water

Technical water is used in industrial systems such as boiler systems, circulation systems and production plants, e.g. feed water, circulating water, boiler water, condensates or cooling water. Technical water contains by default no invasive species; however, it may contain pathogens. As the

---

35 When ships arrive fully loaded with goods they may have only low volumes of ballast water and take on ballast water when unloading rather than discharge.

36 Developed based on the concept of applying a historical date for selection of Target Species for a species-specific risk assessment. Concept presented in Behrens et al., 2005, as “The date of introduction should generally be after 1945. Earlier transfer dates can be applied by judgement”.

37 This is a relaxation of the requirement for a risk assessment.
D-2 requirement of the Convention also includes discharge limits of pathogens in form of *E. coli*, enterococci and *V. cholerae*, it should be ascertained that the water complies with the quality requirements before it can be used as ballast.

The use of technical water can in principle be applied as long as a risk assessment under resolution MEPC.206(62) has been conducted showing a low risk of environmental impact. As technical water may be very different with regards to quality and the fact that the issue of technical water has not been addressed previously with regards to ballast water, a general use is not considered to be feasible without aforementioned risk assessment. It is therefore proposed that:

**Option M – Use of technical water**

1. A vessel may use technical water for ballast provided that it is not mixed with other water and sediments without providing the risk assessment, on condition that the quality of the technical water on delivery has been determined by a third party with regards to compliance with the pathogen criteria of the D-2 standard and shows compliance. Applicable until the D-2 requirement is fully implemented.

This option may find relevance to a limited number of smaller vessels, which only ballast on rare occasions.

**TABLE 12: OVERVIEW OF THRESHOLD APPROACHES**

<table>
<thead>
<tr>
<th>Option</th>
<th>Applicability</th>
<th>Validity</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Option I.1</td>
<td>Offshore supply vessels and crew boats</td>
<td>Until full implementation of D-2</td>
<td>HELCOM and OSPAR region II</td>
</tr>
<tr>
<td>Option I.2</td>
<td>All RSS traffic</td>
<td>Until full implementation of D-2</td>
<td>HELCOM and OSPAR region II</td>
</tr>
<tr>
<td>Option J.1</td>
<td>Vessels to import ports</td>
<td>Until full implementation of D-2</td>
<td>HELCOM and OSPAR region II</td>
</tr>
<tr>
<td>Option K.1</td>
<td>Routes with more than 50 years of shipping</td>
<td>Until full implementation of D-2</td>
<td>HELCOM and OSPAR region II</td>
</tr>
<tr>
<td>Option L.1</td>
<td>Vessels which only ballast on rare occasions</td>
<td>Until full implementation of D-2</td>
<td>HELCOM and OSPAR region II</td>
</tr>
<tr>
<td>Option M.1</td>
<td>Vessels which only ballast on rare occasions</td>
<td>Until full implementation of D-2</td>
<td>HELCOM and OSPAR region II</td>
</tr>
</tbody>
</table>

It should be noted that it is beyond the scope of the current study to investigate any legal implication of the proposed options relative to the implementation of the BWMC and that the options should be assessed further in this regard.
Section 5 - Summary
Under the consideration of the trading patterns, the ballast volumes and other specific issues, a catalogue of options is proposed to allow for flexibility of the OSPAR/HELCOM exemption guidelines and the requirements for implementation of the D-1 standard in OSPAR and HELCOM areas in a transitional period. In general the options relates to RSS vessels (pax, ro-pax and ro-ro), offshore supply vessels and vessels in coastal trade and comprise:

- Options regarding D-1
- Options regarding exemptions
  - Reduced mixing criteria
  - Use of drinking water
  - Port survey validity
  - Area-based risk assessments
- Threshold approaches:
  - Other traffic in a port
  - Type of ports
  - History of shipping
  - Use of drinking water
- Other approaches:
  - Use of technical water

The presented options may not be in line with the Convention requirements and the OSPAR/HELCOM guidelines and should be assessed further in this regard. The proposed options are to be considered for the OSPAR/HELCOM areas only in the transitional period until the D-2 standard is fully implemented.
References


BWM.2/Circ.32, 2011, Applicability of the Ballast Water Management Convention to Hopper Dredgers, IMO

COWI, 2012, Ballast Water Treatment in Ports, Feasibility Study, Danish Shipowners’ Association, Maersk, DFDS, Danish Ports


Incentive and LITEHAUZ, 2012, IMO application - NOx Emission Control Area in the North Sea, draft version of proposal from Belgium, Denmark, France, Germany, the Netherlands, Norway, Sweden and the UK to IMO


HELCOM, 2012b, HELCOM ALIENS 2- Non-native species port survey protocols, Target Species selection and risk assessment tools for the Baltic Sea. 34 pp.


HELCOM, 2013b, German Port Sampling of Alien Species, Agenda Item 3, 3/8/INF for HELCOM Maritime 13th Meeting
HELCOM, 2013c, Target Species List for A-4 Exemption Processes, Agenda Item 3, 3/2/INF, Helsinki Commission, HELCOM Maritime 13/2013

HELCOM/OSPAR, 2013a, Report of the Third Meeting of Joint Helcom/Ospar Task Group on Ballast Water Management Convention Exemptions (Helcom /Ospar Tg Ballast) 3/2013, the Hague, Netherlands, 4-5 December 2013


Heyer, Karin, 2012, Compiling and testing of biological risk assessments for the invasion of alien species with ballast water, HELCOM Maritime 2012, 4/7


IMO, 2013b, http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

Leppäkoski E., and Gollasch S., 2006, Risk Assessment of Ballast Water Mediated Species Introductions – a Baltic Sea Approach

MEPC 64/2/14, 2012, Application of the BWM Convention to Offshore Support Vessels Submitted by Vanuatu, Harmful Aquatic Organisms in Ballast Water, Marine Environment Protection Committee, 64th session, Agenda item 2


OSPAR, 2012, Joint Notice to Shipping from the Contracting Parties of the Barcelona Convention, OSPAR and HELCOM on: General Guidance on the Voluntary Interim Application of the D1 Ballast Water Exchange Standard by Vessels Operating between the Mediterranean Sea and the North-East Atlantic and/or the Baltic Sea, OSPAR Commission


Seos, 2013, http://lms.seos-project.eu/learning_modules/marinepollution/marinepollution-co1-s01-p05.html
Appendix 1: Background information for section 2
Appendix 2: Ballast water discharge volumes
Appendix 3: Ferry routes in the North Sea and the Baltic Sea
Appendix 4: Ship calls raw data and ship calls vs. total gross tonnage
Appendix 5: Target Species as function of ship calls (raw data)
Appendix 6: Cost calculations
Appendix 7: Burden-sharing mechanisms
Appendix 8: Cost calculations for example routes
Appendix 9:  Eshjerg ballast water discharge