Baltic Marine Environment Protection Commission

HELCOM Guide

to Alien Species and Ballast Water Management in the Baltic Sea

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Summary

The shallow enclosed form, low salinity and relatively lively maritime traffic makes the Baltic Sea prone to entrance and settlement of non-native species[1] present in ships ballast water.

The Baltic Sea coastal countries cooperate within HELCOM (Helsinki Commission) for a harmonized implementation of the 2004 Ballast Water Management Convention[2] of the International Maritime Organisation (IMO) in the Baltic Sea area. This publication provides an overview of the regional Baltic Sea measures related to shipping, developed by the Coastal countries and the European Union within the HELCOM Maritime Group (HELCOM MARITIME). These actions include recommendations regarding ballast water exchange, target species and exemptions based on risk assessments (A-4).

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1 "**Non-indigenous species** (NIS; synonyms: alien, exotic, non-native, allochthonous) are species, subspecies or lower taxa introduced outside of their natural range (past or present) and outside of their natural dispersal potential. This includes any part, gamete or propagule of such species that might survive and subsequently reproduce. Their presence in the given region is due to intentional or unintentional introduction resulting from human activities. Natural shifts in distribution ranges (e.g. due to climate change or dispersal by ocean currents) do not qualify a species as a NIS. However, secondary introductions of NIS from the area(s) of their first arrival could occur without human involvement due to spread by natural means.

Invasive alien species (IAS) are a subset of established NIS which have spread, are spreading or have demonstrated their potential to spread elsewhere, and have an adverse effect on biological diversity, ecosystem functioning, socio-economic values and/or human health in invaded regions. Species of unknown origin which can not be ascribed as being native or alien are termed **cryptogenic species**. They also may demonstrate invasive characteristics and should be included in IAS assessments." (Olenin, S.; Alemany, F.; Cardoso, A.C.; Gollasch, S.; Goulletquer, P.; Lehtiniemi, M.; McCollin, T.; Minchin, D.; Miossec, L.; Occhipinti Ambrogi A.; Ojaveer, H.; Jensen, K.R.; Stankiewicz, M.; Wallentinus, I.; Aleksandrov, B. 2010. Marine Strategy Framework Directive—Task Group 2 Report. Non-indigenous Species. *JRC Scientific and Technical Reports.* Luxembourg: office for official publications of the European Communities, 44 pp.)

2 International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004.

2 Introduction

For the purposes of this guide the Baltic Sea area is delineated by the parallel 57°44.43'N (the Skaw) in the Skagerrak (see **Figure 1**). With a total area of about 370,000 km^2, the Baltic Sea area is one of the world's largest brackish water basins.

► **Figure 1** – Map of the Baltic Sea area.


Finland
Russia
Sweden
Norway
Helsinki
Tallinn
Estonia
Stockholm
Oslo
Riga
Latvia
Lithuania
Vilnius
Minsk
Belarus
Denmark
Warszawa
Poland
Germany
Ukraine
Kiev
Praha
Czech Republic
Slovakia
N
HELCOM 2009
0 50 100 150 200
Kilometers

Image: Anu Hirvonen, Ilkka Lastumäki

3

Alien species in the Baltic Sea

All alien species

In order to have an overview of species introductions over time a comprehensive list of non-indigenous, cryptogenic and harmful native species introductions in the Baltic Sea has been compiled and updated by HELCOM since 2008[3]. Latest version of this list is accessible through a Fact Sheet Environmental Sheet entitled "Observed non-indigenous and cryptogenic species in the Baltic Sea"[4] and via the AquaNIS database[5]. The development of alien species introductions over time is presented in **Figure 2**, examples of species observed can be found in **Table 1**.

Target alien species of special concern

The list of all introduced species in the region, as well as information on potential but not yet observed species was used as background information for further consideration, selection and agreement on the species of particular relevance in the context of the requirements of the Ballast Water Management Convention (BWMC). This list of ***target species*** covers the potentially harmful animals, plants and algae present in the North Sea region, the Ponto-Caspian region, and the North American Great Lakes. It is based on information from i.a. the Black Sea Commission, the OSPAR Commission and the Great Lakes Commission.

3 Available at: http://helcom.fi/

4 Available at: http://helcom.fi/

5 Available at: http://www.corpi.ku.lt/databases/index.php/aquanis

Species	Environmental impact	First record	Source
Cercopagis pengoi (Crustacea)	Competes with herring for zooplankton prey	1992	HELCOM[a] & NOBANIS
Marenzelleria spp. (Polychaeta, worm)	Able to improve the oxygen conditions in the bottom sediment and affect nutrient fluxes from the sediment/to the sediment.	1985	HELCOM, Viitasalo-Frosen et al. 2009[b]; Norkko et al. 2012[c]
Mnemiopsis leidyi (Ctenophore, comb jelly)	Spatially restricted to the southern Baltic Sea, where amongst other prey (e.g., copepods, nauplii of the alien cirriped *B. improvises* and larvae of jellyfish Aurelia aurita) cannibalism on larval *M. leidyi* was observed.	2006	Gorokhova et al. 2009[d]; Javidpour et al. 2009[e]
Neogobius melanostomus (Fish, round goby)	It primarily competes with the commercially important flounder *Platichthys flesus* L. 1758; it also restricts habitat utilization and therefore food availability to *P. flesus*. The abundance of *Gasterosteus aculeatus* L. 1758 in the Gulf of Gdansk was also negatively correlated with his abundance, indicating a shift from pelagic to benthic forage fishes as its populations increase in size	1990	Sapota & Skóra, 2005[f]; Kornis et al. 2012[g]
Gammarus tigrinus (Crustacea, Amphipoda)	Strong potential to modify benthic community structure and functioning in the whole coastal zone of the northern Baltic Sea as being competitively superior over all native amphipods except *Gammarus duebeni* Liljeborg, 1852.	1975	Leppäkoski & Olenin, 2000[h]; Kotta et al. 2013[i]
Rhithropanopeus harrisii (Crustacea, Mud crab)	Able to overwinter under ice and can opportunistically occupy diverse habitats, such as shafts of dead marsh plants, self-made burrows in muddy bottoms, and the brown algae *Fucus vesiculosus* in hard bottoms	1936	Schubert 1936[j]; Fowler et al.[k]
Carassius gibelio (Fish, Prussian carp)	Decline of native cyprinid fish populations has been associated with habitat degradation due to its introduction which also affects the native cyprinid fishes through reproductive interference	1948	Mikelsaar, 1984[l], Vetemaa et al. 2005[m], Tarkan et al. 2012[n]

Table 1 – Examples of invasive alien species observed in the Baltic Sea.

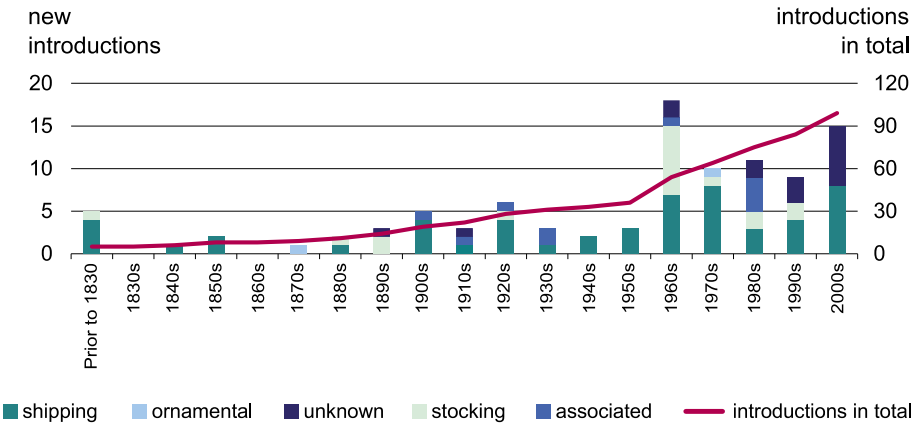


Figure 2 – Alien and cryptogenic species introductions based on the HELCOM list 2008.

a Available at: http://helcom.fi/

b Viitasalo-Frösén, S.; Laine, A.O.; Lehtiniemi, M. 2009. Habitat modification mediated by motile surface stirrers versus semi-motile burrowers: potential for a positive feedback mechanism in a eutrophied ecosystem. *Marine Ecology Progress Series* (376), 21–32.

c Norkko, J.; Reed, D.C.; Timmermann, K.; Norkko, A.; Gustafsson, B.G.; Bonsdorff, E.; Slomp, C.P.; Carstensen, J.; Conley, D.J. 2012. A welcome can of worms? Hypoxia mitigation by an invasive species. *Global Change Biology* (18), 422–434.

d Gorokhova, E.; Lehtiniemi. M.; Viitasalo-Frösen, S. 2009. Molecular evidence for the occurrence of Mertensia ovum in the northern Baltic Sea and implications for the status of Mnemiopsis leidyi invasion. *Limnol Oceanogr* (54): 2025–2033.

e Javidpour, J.; Molinero, J.C.; Lehmann, A.; Hansen, T.; Sommer, U. 2009. Annual assessment of the predation of Mnemiopsis leidyi in a new invaded environment, the Kiel Fjord (Western Baltic Sea): a matter of concern? *J Plankton Res* (31): 729–738.

f Sapota, M.R. & Skóra, K.E. 2005. Spread of alien (non-indigenous) fish species Neogobius melanostomus in the Gulf of Gdánsk (south Baltic). *Biological Invasions* (7), 157–164.

g Kornis, M.S.; Mercado-Silva, N.; Vander Zanden, M.J. 2012. Twenty years of invasion: a review of round goby Neogobius melanostomus biology, spread and ecological implications. *Journal of Fish Biology*, (80), 235–285.

h Leppäkoski, E. & Olenin, S. 2000. Non-native species and rates of spread: lessons from the brackish Baltic Sea. *Biological Invasions* (2): 151–163.

i Kotta, J.; Pärnoja, M.; Katajisto, T.; Lehtiniemi, M.; Malavin, S.A.; Reisalu, G.; Panov, V.E. 2013. Is a rapid expansion of the invasive amphipod Gammarus tigrinus Sexton, 1939 associated with its niche selection: a case study in the Gulf of Finland, the Baltic Sea. *Aquatic Invasions*, 8 in press Research Article CORRECTED PROOF. ►►

j Schubert, K. 1936. Pilumnopeus tridentatus Maitland, eine neue Rundkrabbe in Deutschland. *Zoologischer Anzeiger* (116): 320–323.

k Fowler, A.E.; Forsström, T.; von Numers, M.; Vesakoski, O. 2013. The North American mud crab Rhithropanopeus harrisii (Gould, 1841) in newly colonized Northern Baltic Sea: distribution and ecology. *Aquatic Invasions* (8), 1: 89–96.

l Mikelsaar, N. 1984. *Eesti NSV kalad*. Valgus, Tallinn.

m Vetemaa, M.; Eschbaum, R.; Albert, A.; Saat, T. 2005. Distribution, sex ratio and growth of Carassius gibelio (Bloch) in coastal and inland waters of Estonia (north-eastern Baltic Sea). *J. Appl. Ichthyol.* (21): 287–291.

n Tarkan A.S.; Gaygusuz Ö.; Gürsoy Gaygusuz Ç.; Saç G.; Copp G. 2012. Circumstantial evidence of gibel carp, Carassius gibelio, reproductive competition exerted on native fish species in a mesotrophic reservoir. *Fisheries Management and Ecology* 19 (2): 167–177.

4

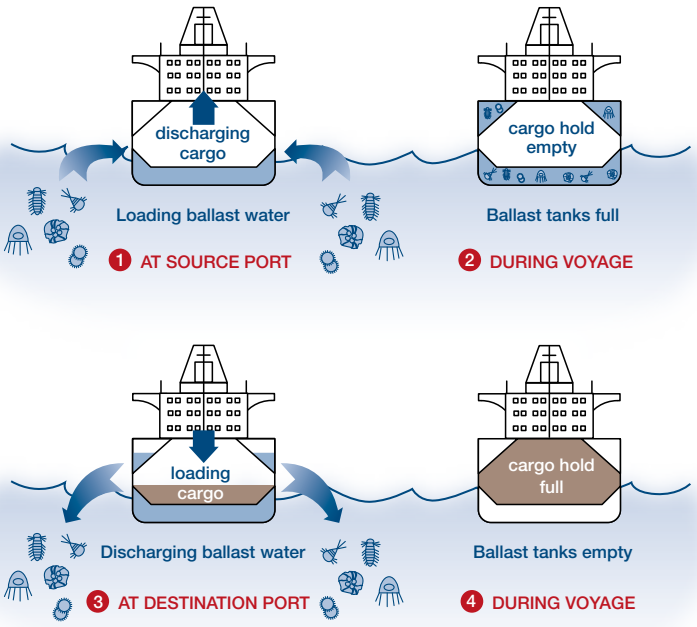
Ballast water as vector of alien species

Water is used as ballast to stabilize vessels at sea. Ballast water is pumped in to maintain safe operating conditions throughout a voyage, reducing stress on the hull, providing transverse stability, improving propulsion and manoeuvrability, and compensating for weight lost due to fuel and water consumption. Since all ships are designed for a certain weight range, ballast is used to compensate for unloaded cargo.[6]

Ballast water may contain suspended matter, such as sediment particles and organic debris, which may form layers in ballast tanks and cargo holds. Due to the complex internal structure of a ballast tank, it allows many loca-

Image: Dimitris Tamvakos

6 Pughuic, D. 2001. Ballast Water Management and Control: an Overview.



Source http://globallast.imo.org/

Figure 3 – Cross section of ships showing ballast tanks and ballast water cycle.

tions for sediments to become trapped, accumulating during the voyage. Both these sediments and the water contain thousands of organisms of different species, from eggs, cysts, and bacteria to even small fish. Therefore, when a ship transfers ballast water from one location to another, it may happen that the species contained in the ballast water settle in the new environment where they were not initially present.

These new arrivals may find a suitable environment without natural competitors. This may enable them to settle. Even if this may seem harmless for a casual observer such introductions can cause severe economical, ecological and health problems (see **Figure 3**).

Due to the large volumes of ballast water transported around the world today such introductions of alien species into new environments by ships' ballast water, as well as by other means e.g. via individuals attached to ships' hulls, is identified as one of the four greatest threats to the world's oceans and to biodiversity globally.[7]

7 GloBallast. 2002. Global Ballast Water Management Programme. http://globallast.imo.org. (This source refers to invasive marine species.)

5

Ballast water discharges in the Baltic Sea

In order to dimension the importance of the issue, the amount of ballast water discharged in the ports of the HELCOM Contracting Parties can be roughly estimated based on data on the gross weight of goods handled in all their ports, assuming that any loading operation would result in a ballast water discharge of 30% of the cargo loaded in a port (see **Figure 4**).[8] Using this kind of rough estimation the amount of ballast water discharged in the whole Baltic Sea during 2011 would be in the order of magnitude 250 000 thousand tonnes (250 000 000 m^3).[9]

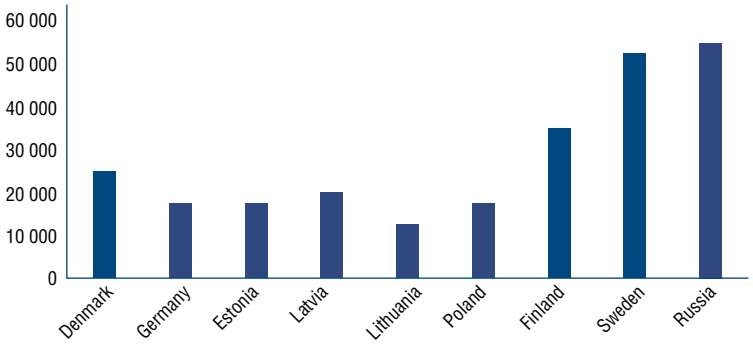


Figure 4 – Rough estimation of BW discharged in the Baltic in 2011 based on cargo statistics (thousands of tonnes).

8 Kern, K. & Stuer-Lauridsen, F. 2009. Ballast water discharges in Denmark. Litehauz, eds.

9 Based on traffic estimates in Baltic Port List 2011.

6 The Ballast Water Management Convention implementation in the Baltic Sea

The 2004 Ballast Water Management Convention

In order to prevent, minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments, the Ballast Water Management Convention (BWMC) was adopted by the IMO in 2004, providing the international regulation framework to face this global marine pollution threat.

The Convention requires ships in international traffic to manage their ballast water and sediments (Regulation B-3) to certain standards specified in the Convention (Regulation D-2), as well as keeping a ballast water record book and an international ballast water management certificate. There is a phase-in period for ships to implement their ballast water and sediment management plan, during which they are allowed to exchange ballast water (Regulation B-1) in the open sea under certain premises of depth and distance from the shore (Regulation D-1).

The Convention will enter into force 12 months after being ratified by 30 Member States, representing 35% of the world merchant shipping tonnage. Considering its current state of ratification (37 Member States representing 30.42% of the world merchant shipping tonnage in July 2013[10]) it is expected that the Convention enters into force in 2014 or 2015[11].

10 Available at: http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx

11 In the last MECP meeting (MEPC 65, May 2013) it was assumed that the Convention would enter into force on 1 January 2015 (MEC 65/2/11).

Image: Uli Harder

The 1992 Helsinki Convention

The Helsinki Convention (Convention on the Protection of the Marine Environment of the Baltic Sea Area)[12], with Denmark, Estonia, European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden as Contracting Parties is a regional Convention on the marine environment of the Baltic Sea Area.

In its Annex the Helsinki Convention establishes that the Contracting Parties shall co-operate in the effective and harmonized implementation of rules adopted by the IMO[13] in the Baltic Sea Area. Therefore, the BWMC has been the central starting point for recent HELCOM work to address alien species invasions. In the Baltic Sea region the Convention is ratified by Denmark, Russia, Sweden and Germany and is expected to be ratified by the remaining coastal states in the near future.[14]

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12 Signed in 1974, it entered into force in 1980 being revised and subsequently signed in 1992, it entered into force on 17 January 2000.

13 Annex 4, Regulation 1, section b) of the Convention on the Protection of the Marine Environment of the Baltic Sea Area, 1992.

14 Available at: http://helcom.fi/

7

Introduction to the elements of the BWMC

The BWM Convention has been organized in 22 Articles and an Annex that contains a set of Regulations (Section A to E) with technical standards and requirements for the control and management of ship's ballast water and sediments. A description of the main contents of the Regulations is included in the following table (see **Table 2**).

Due to the technical difficulties of the requirements of the Convention, the IMO, through its Marine Environmental Protection Committee (MEPC), has developed a permanently updated set of Guidelines with the aim of helping stake holders on the implementation of the Convention (see **Table 3**). For more detailed information on the BWMC and its implementation see Annex I.

Image: Ships's ballast tank inspection (Vertech Group)

Section A: General provisions	It contains definitions (A-1), general applicability criteria (A-2), exceptions to the Convention (A-3), granting of exemptions to the Convention (A-4) and equivalent compliance for pleasure craft (A-5).
Section B: Management and control requirements for ships	The contents of the Ballast Water Management Plan are specified (B-1), together with the requirement of having a Ballast Water Record Book on board (B-2). The procedure to follow regarding ballast water management depending on the construction date and the ballast water capacity of the ship is also detailed under this section (B-3), establishing specific provisions for ballast water exchange (BWE) (B-4) and sediment management (B-5). It ends up with requirements on the issue for the officers and crew (B-6).
Section C: Special requirements in certain areas	The procedure to apply additional measures to those established in Section B of the Convention (C-1) and to define areas where ballast water is not to be uptaken are detailed (C-2), including the communication procedure to follow on this measures (C-3).
Section D: Standards for ballast water management	Standards for ballast water exchange (D-1) and management (D-2) are specified. The procedure a ballast water treatment system has to fulfill to be approved for its installation on board is also detailed (D-3). Finally, special attention is given to the use of prototypes of promising ballast water treatment technology (D-4) and the update of the standards by IMO (D-5).
Section E: Survey and certification requirements for ballast water management	Information on the requirements for initial, renewal, intermediate, annual and additional surveys (E-1) and certification requirements (from E-2 to E-5) is provided. Ballast water management certificate and ballast water record book forms are contained in appendix to this section (Appendix I and II, respectively).

Table 2 – Contents of the Regulations of the BWMC.

Guide-line	Title	MEPC Resolution, year of adoption
G1	Guidelines for sediment reception facilities	152(55), 2006
G2	Guidelines for ballast water sampling[a]	173(58), 2008
G3	Guidelines for ballast water management equivalent compliance	123(53), 2005
G4	Guidelines for ballast water management and development of ballast water management plans	127(53), 2005
G5	Guidelines for ballast water reception facilities	153(55), 2006
G6	Guidelines for ballast water exchange	124(53), 2005
G7	Guidelines for risk assessment under regulation A-4 of the BWM Convention	162(56), 2007
G8	Guidelines for approval of ballast water management systems	174(58), 2008
G9	Procedure for approval of ballast water management systems that make use of Active Substances	169(57), 2008
G10	Guidelines for approval and oversight of prototype ballast water treatment technology programmes	140(54), 2006
G11	Guidelines for ballast water exchange design and construction standards	149(55), 2006
G12	Guidelines on design and construction to facilitate sediment control on ships	209(63), 2012
G13	Guidelines for additional measures regarding ballast water management including emergency situations	161(56), 2007
G14	Guidelines on designation of areas for ballast water exchange	151(55), 2006
	Guidelines for ballast water exchange in the Antarctic treaty area	163(56), 2007

Table 3 – List of Guidelines for the common implementation of the BWMC (updated to May 2013).

a Linked to these Guidelines, the Guidance concerning ballast water sampling and analysis for trial use in accordance with the BWM Convention and Guidelines (G2), contained in Annex 1 to the BWM.2/Circ.42 have just been recently approved in the MEPC 65 with the aim of providing sampling and analysis guidance.

8

The regional Baltic Sea area harmonised implementation of the IMO BWMC

Even if IMO Guidelines reflect consensus at IMO level, and are thus highly authoritative, they sometimes lack all the details needed for harmonised implementation in a specific region like the Baltic Sea. Such detail can be provided i.a. through HELCOM regional cooperation.

BWMC promotes regional co-operation of those Parties bordering enclosed and semi-enclosed seas, to develop harmonized procedures in order to further the objectives of the Convention, including through the conclusion of regional agreements consistent with it (article 13, section 3 of the BWMC 2004).

Taking into account this call for a regional dimension, and the hydromorphological and biological characteristics which make the Baltic Sea an area of special requirements regarding its protection from alien species entrance and settlement, the Contracting Parties to HELCOM agreed in 2007 upon a Road Map[15] in order to structure the joint efforts towards ratification of the BWMC no later than 2013.

15 Available at: http://helcom.fi/

8.1 Where (Regulation B-4) and how (Regulation D-1) exchange ballast water in the Baltic Sea area

The IMO Guidelines (G6) provide specific depth and distance from the shore requirements for ballast water exchange (BWE). Ballast water can only be discharged at least 200 nautical miles from the nearest land and in water at least 200 meters in depth, and if it is not possible – as far as from the nearest land but at least 50 nautical miles from the nearest land and in water at least 200 meters in depth (Regulation B-4).

These depth and distance from the shore requirements cannot be met in the Baltic. For such cases, according to the Convention, special areas for BWE could be designated following IMO Guidelines (G14). HELCOM concluded that most of the alien species in the Baltic Sea have a wide tolerance in salinity, so therefore, it was agreed that BWE was not a suitable option within the Baltic Sea.[16]

There has been an effective cooperation between the Barcelona Convention, the OSPAR Commission and HELCOM on ballast water exchange to avoid the introduction of non-indigenous species between the ports of the Mediterranean Sea and the ports in the North-East Atlantic and the Baltic Sea. That cooperation has given birth to three voluntary interim guidelines indicating where ballast water is to be exchanged in the combined sea area covering the Baltic Sea, North-East Atlantic and the Mediterranean, depending on the route of the ship (see **Figure 5**).

These regional Ballast Water Exchange Guidelines could be summarised as follows:

- General Guidance on the Voluntary Interim Application of the D1 Ballast Water Exchange Standard in the North-East Atlantic (named G1 in Figure 5): jointly adopted by HELCOM and OSPAR countries and applicable from 1 April 2008. According to them, vessels transiting the Atlantic or entering the North-East Atlantic from routes passing the West African Coast are requested to conduct, on a voluntary basis, BWE before arriving at the OSPAR area or passing through the OSPAR area and heading to the Baltic Sea[17].

- Similarly, HELCOM and OSPAR countries agreed that vessels leaving the Baltic and transiting through the OSPAR maritime area to other destinations will be requested, starting from January 2010, to discharge their ballast water until the vessel is 200 nm off the coast of North West Europe in wa-

16 Available at: http://helcom.fi/

17 BWM.2 Cir. 14 (2008)

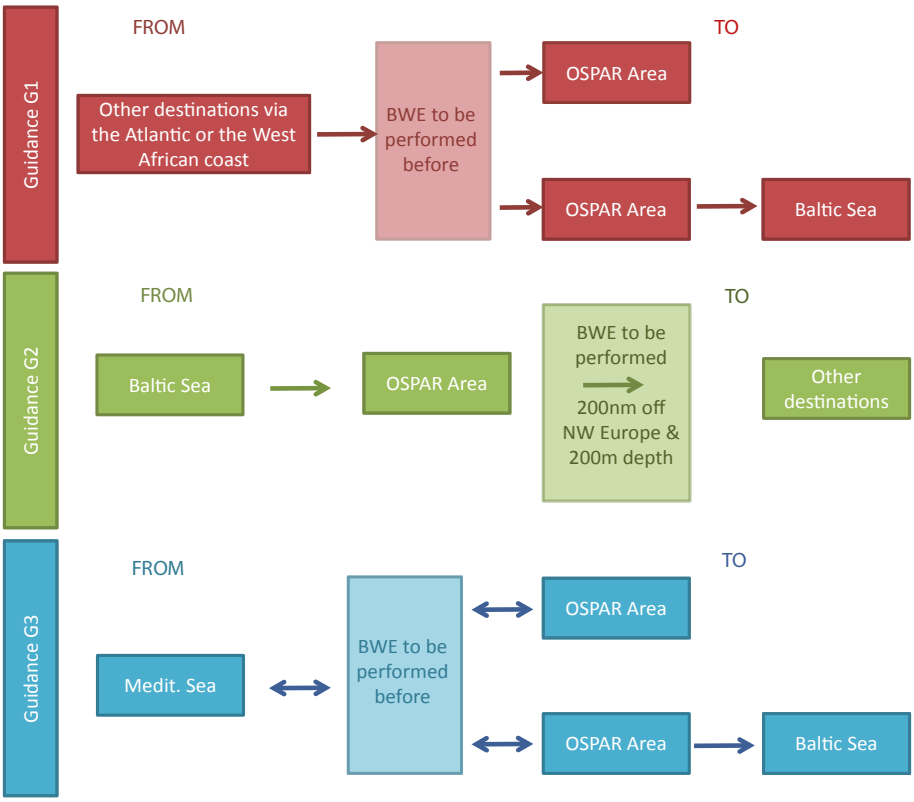

Figure 5 – Representation of all the voluntary guidelines on ballast water exchange currently in force in the Baltic Sea.

ters deeper than 200 m, with the aim of avoiding BWE within HELCOM and OSPAR areas (named G2 in Figure 5). This agreement adopted the form of General Guidance of voluntary application[18].

Additionally, a Joint Notice to Shipping Industry and the Instructions to Surveyors on both Guidelines was developed for their use by HELCOM and OSPAR countries[19].

- 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"[20] (named

18 BWM.2 Cir. 22 (2009)

19 Available at: http://helcom.fi/

20 BWM.2 Cir. 39 (2012)

G3 in Figure 5), applicable since 1 October 2012, it recommends that vessels should exchange all their ballast tanks at least 200 nm from the nearest land in water at least 200m deep, as soon as they enter or leave the North-East Atlantic, depending on the direction of their route, but outside the Mediterranean Sea.

All these voluntary Guidance have an interim character and they will no longer apply when a ship is in a position to apply the D-2 Standard of the BWMC, or latest when the Convention comes into force and a ship has to apply the D-2 Standard.

8.2 Exemptions to ballast water management (Regulation A-4) in the Baltic Sea area

Under certain low risk conditions the BWM convention Regulation A-4 enables a party to grant exemptions to any requirements to apply regulation B-3, on ballast water management for ships, or regulation C-1, on measures additional to those in Section B of the convention.

In 2010 the HELCOM contracting parties agreed on a regional Baltic Sea guidance on these A-4 exemptions[21] to ensure a regionally efficient implementation. Based on the 2010 guidance and earlier work[22] the HELCOM and OSPAR commissions agreed in October 2013 on more comprehensive and detailed joint guidelines on A-4 exemptions.[23]

These new joint A-4 guidelines are applicable to the contracting parties of the two regional commissions and are not guidelines in the IMO sense -even if they are based on the IMO Guidelines for risk assessment under regulation A-4 of the BWM convention (G7).[24]

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21 "Guidance to Baltic application of BWM Convention A-4 Risk Assessments" adopted as part of the HELCOM Ministerial Declaration in Moscow, Russia, 20 May 2010.

22 e.g. Leppäkoski, E. & Gollasch, S. 2006. Risk Assessment of Ballast Water Mediated Species Introductions – a Baltic Sea Approach. Report prepared for HELCOM, Helsinki, Finland, 111 pp.; Gollasch, S., David, M. & Leppäkoski, E. 2011. Pilot risk assessments of alien species transfer on intra-Baltic ship voyages. Report prepared for HELCOM, Helsinki, Finland, 98 pp.; HELCOM 2013. HELCOM ALIENS 2- Non-native species port survey protocols, target species selection and risk assessment tools for the Baltic Sea. 34 pp.; and Heyer, K. 2012. Compiling and testing of biological risk assessments for the invasion of alien species with ballast water.

23 Joint HELCOM/OSPAR Guidelines for the Contracting Parties of OSPAR and HELCOM on the granting of exemptions under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, Regulation A-4.

24 Resolution MEPC.162(56).

Image: Interspill

However, the joint guidelines do establish a framework where applicants aiming for a BWM convention A-4 exemption in the combined HELCOM and OSPAR marine area should carry out a number of agreed steps.

As a first step for an A-4 application the applicant should carry out port surveys of alien species and physical parameters in the ports concerned, following the port survey protocol described in the joint guidelines, or get access to the results of such surveys done by others. This information should cover each stopover port on the route for which the exemption is applied.

As a second step the applicant should submit the port survey data to a joint regional HELCOM-OSPAR database, established with the joint guidelines, and run an online risk assessment on the data. The risk assessment is based on matching the lists of species found in the stopover ports, a risk assessment algorithm and list of target species included in the joint guidelines and the tolerances of target species to environmental parameters.

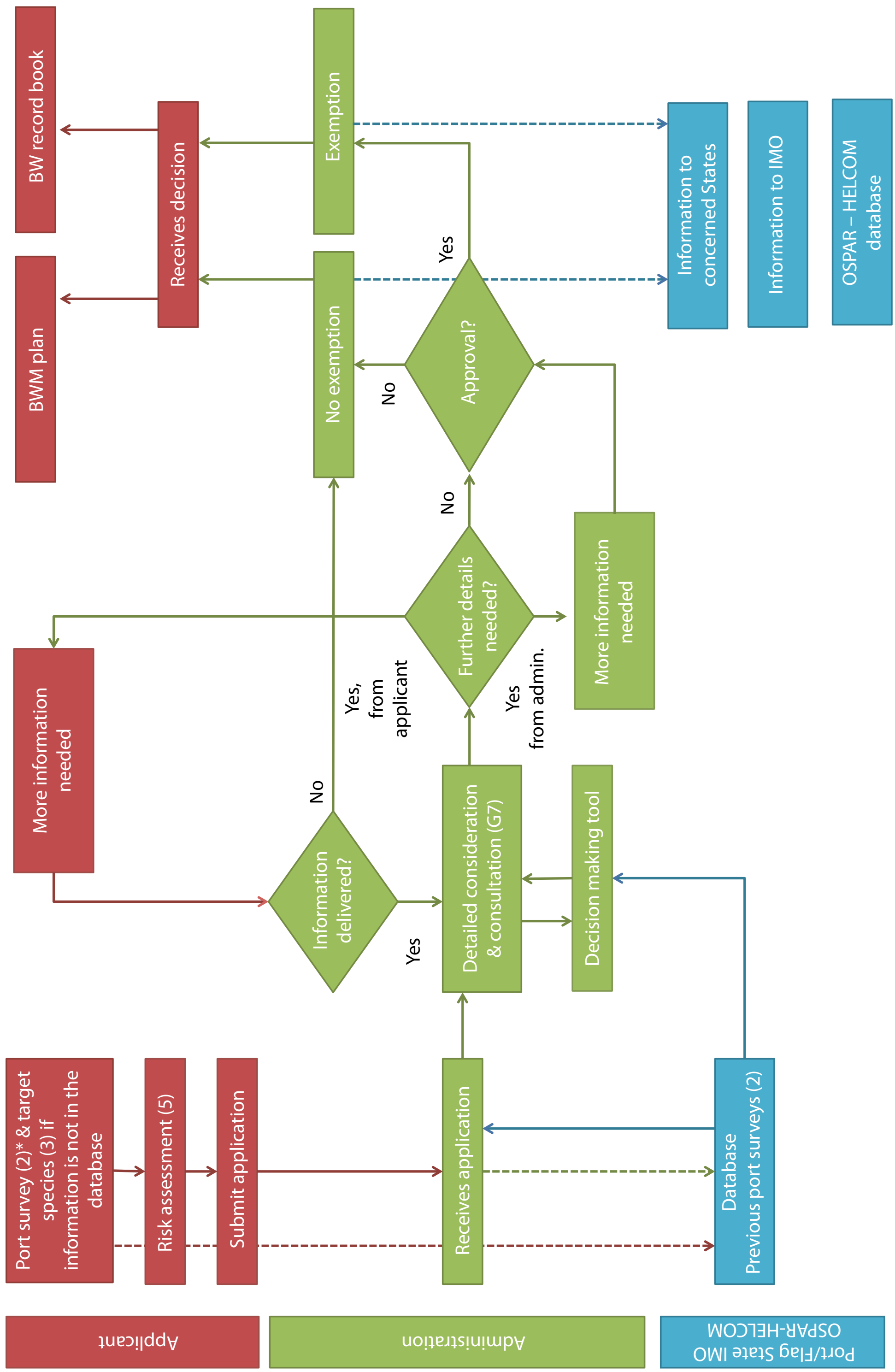
Finally the applicant should attach the results of the risk assessment to an application fulfilling other national requirements and submit for the consideration of port states. See **Figure 6** for an illustration of the entire regional A-4 procedure, including also consultation after a submission.


Image: Rikka Puntila


Image: Rikka Puntila

Through operational tests by targeted HELCOM projects in a number of ports in Finland, Estonia and Sweden during 2012-2013 the methodology has been optimised to ensure reliable and comparable results with minimal costs. Some port survey data has also been made available through these studies. As a feature introduced to further ease the burden and costs involved the port surveys carried out according to the joint guidelines are regarded as valid for re-use during a period of maximum of five years. However, a contracting party may decide on a shorter validity period if necessary. A validity period should be counted from the date of the first of the two obligatory sampling visits (spring and autumn).

► **Figure 6** – Chart of the application process for an exemption to Regulation B-3 to the BWCM according to HELCOM/OSPAR Guidelines. (*Figures in brackets refer to Sections in the HELCOM/OSPAR Guidelines; dotted lines indicate submission of data, whereas continuous lines represent process flow).



Applicant
Administration
Port/Flag State IMO OSPAR-HELCOM
Port survey (2)* & target species (3) if information is not in the database
Risk assessment (5)
Submit application
Receives application
Database Previous port surveys (2)
Detailed consideration & consultation (G7)
Decision making tool
Information delivered?
Yes
No
More information needed
Further details needed?
Yes, from applicant
Yes from admin.
No
More information needed
Approval?
Yes
No
No exemption
Exemption
Receives decision
BWM plan
BW record book
Information to concerned States
Information to IMO
OSPAR – HELCOM database

Image: Maritime Office in Gdynia

8.3 Circumstances when ballast water management do not apply (Regulation A-3)

Under certain conditions (Regulation A-3, point 5) a ship may apply to be exempt of ballast water management altogether, not subject to time limit as is the case under Regulation A-4 (see previous section). The Regulation A-3 establishes that "***the discharge of Ballast Water and Sediments from a ship at the same location** where the whole of that Ballast Water and those Sediments originated and provided that no mixing with unmanaged Ballast Water and Sediments from other area has occurred. If mixing has occurred, the Ballast Water taken from other areas is subject to Ballast Water Management in accordance with this Annex"*. The BWMC does not provide an exact definition on the concept of ***"same location"*** so it is a topic of regional discussions.

9

Port reception facilities

The provision of adequate reception facilities for sediments in ports and terminals where cleaning and repair of ballast tanks occurs based on IMO Guidelines G1 is included in the previously mentioned HELCOM's Road Map.

Initiatives on ballast water port reception facilities have been carried out by Baltic Sea coastal states. Among them, a "Feasibility study regarding mobile reception facilities for ballast water in major ports" was initiated in 2012 by Danish Shipowners' Association, Maersk, DFDS and Association of Danish Ports with the purpose of analysing possibilities and obstacles related to the construction of mobile facilities as an alternative to installation of treatment systems on board.

Regulation B-3 (ballast water treatment on board)

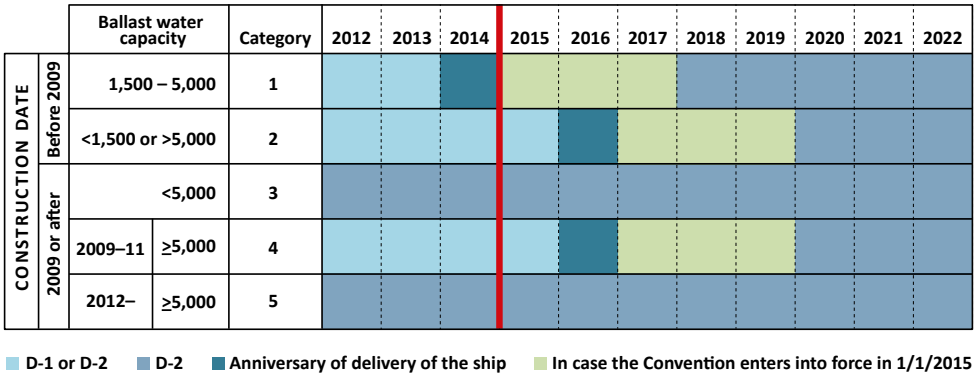
This Regulation indicates the ballast water management that ships have to carry out depending on their year of construction and the capacity of their ballast water tanks. It also refers to the standards required to that management in the years to come (see **Table A**).

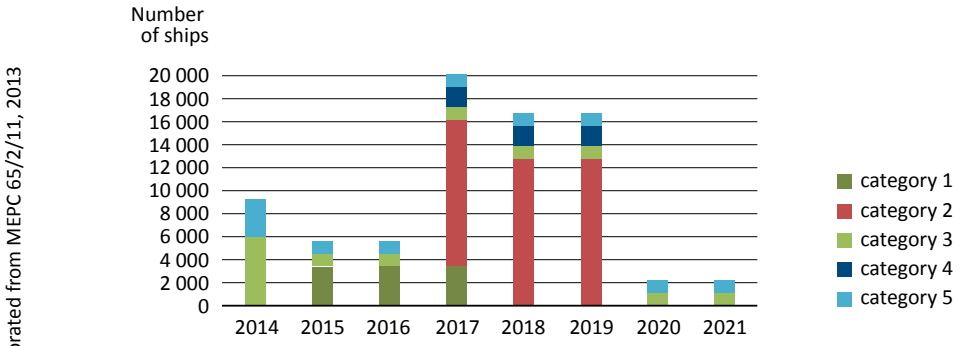
It has to be considered that although the Convention dates back to 2004 it has not yet entered into force, so the MEPC has recently approved (MEPC 65/22, Annex 3, May 2013) a draft IMO Assembly resolution on the application of this regulation for submission to the 28th session of the IMO Assembly (25 November to 4 December 2013). It recommends that ships constructed before the entry into force of the Convention will not be required to comply with regulation D-2 (ballast water performance standard), until their first renewal survey following the date of entry into force of the Convention.

Category in Figure A	Construction year	Ballast water capacity (m^3)	2012	2013	2014	2015	2016
1	Before 2009	>1,500 and <5,000	D-1 or D2		D2		
2	Before 2009	<1,500 or >5,000	D-1 or D2				D-2
3	In or after 2009	<5,000	D-2				
4	In or after 2009 but before 2012	≥5,000	D-1 or D2				D-2
5	In or after 2012	≥5,000	D-2				

Table A – Compilation of B-3 Regulation requirements.

In order to have a an idea of the consequences of this change in the implementation dates of the BWMC, the Correspondence Group on the Assembly resolution on Application of BWMC provided the following figure (**Figure A**) showing the effect of this change on the volumes of annual installation works of BWM systems on board ships that have not done so. As it can be observed a peak workloads is expected for a five-year period, from 2017 to 2021.





elaborated from MEPC 65/2/11, 2013

Figure A – Estimated installation workloads with the option on the application of the B-3 Regulation approved at the MEPC 65.

Regulation D-2 (biological composition required to the ballast water treated)

This Regulation details the biological characteristics treated ballast water shall satisfy to be discharged (see **Table B**).

Presence of viable organisms	
Amount	**Size**
<10 viable organism/m^3	≥50µm
<10 viable organism/mL	<50µm and ≥10 µm

Presence of indicator microbes	
Toxicogenic *Vibrio cholerae* (O1 and O139)	<1cfu/100 mL or <1cfu/1 g (wet weight) zooplankton samples
Escherichia coli	<250 cfu/100mL
Intestinal Enterococci	<100 cfu/100 mL

Table B – Biological requirements of the treated ballast water to dump (cfu stands for colony forming units).

Ballast water treatment methods and technologies to achieve D-2 Standard

Ballast water has to be treated on board in order to fulfil the D-2 Standard that allows it to be discharged into the sea. For that purpose, there are different methods of treatment (summarised in the following Table, **Table C**), which are the foundation of the 68[25] different technologies currently available for installation on board according to IMO requirements. The Convention does not provide specific requirements regarding treatment methods. However, treatment systems should be type approved following the IMO guidelines (G8), and moreover, technologies that make use of active substances[26] should be also approved by the MEPC of IMO (according to guidelines G9)[27]. Most systems commercially available comprise two stages of treatment with a physical solids-liquid separation followed by biocidal disinfection.

25 A collection of the current technologies available can be found in Ballast water treatment technologies and current system availability. 2012. Lloyd's Register.

26 Defined by the Convention as "a substance or organism, including a virus or a fungus, that has a general or specific action on or against Harmful Aquatic Organisms and Pathogens."

27 A current list of Ballast Water Management Systems, which received Type Approval Certification, Basic and Final Approval is available at: http://www.imo.org/OurWork/Environment/BallastWaterManagement/Documents/Table%20updated%20in%20October%202012%20including%20TA%20information.pdf

Method		Description
Mechanical	Filtration	It aims to remove the sediments and particles from the ballast water during the intake, using discs or screen filters
	Cyclonic separation	It provides enhanced sedimentation by injecting the water at high velocity to impart a rotational motion which creates a centrifugal force, increasing the velocity of particles relative to the water, allowing them to be separated and removed
	Flocculation	It consists in the injection of a substance (flocculent) to aggregate particles, which are subsequently removed by filtration or magnetic separation
Physical disinfection	UV irradiation	UV light radiations generate photochemical reactions that attack and break down the cell membranes, killing or sterilizing organisms
	UV irradiation + TiO_2	UV light also activates the surface of the titanium catalytic semiconductor, disinfecting ballast water using both photochemical and photocatalytic reactions
	Ultrasound treatment	The effect of ultrasound, generated by a transducer (which converts mechanical or electrical energy into high frequency vibrations) is based on physical and chemical changes in the destruction of organisms and the rupture of cell membranes, resulting from cavitation
	Cavitation	It kills organisms by the high pressure, shear forces, and shock waves generated by the collapse of vapour bubbles induced into the ballast water
	Deoxygenation	It kills organisms by creating severe hypoxia (through lowered pressure via venture or vacuum, or lowered partial pressure via gas sparging with inert gasses
Chemical disinfection	Different biocides or chemical are used for ballast water treatment including: • Chlorination • Electrochlorination • Ozonation • Chloride dioxide • Peracetic acid • Hydrogen peroxide • Menadione/Vitamin K	

◄◄ **Table C** – Methods of treatment of ballast water (Source: adapted from Ballast Water Management Systems. 2011. Guidance Note NI 538. Bureau Veritas and Ballast Water Self Monitoring. 2011. EPA 800-R-11-003.).

Regulation B-4 (where to exchange ballast water)

This Regulation details the conditions that should be fulfilled when carrying out BWE according to D-1 Standards: at least 200 nm from the nearest land and in water at least 200 m in depth; when this is not possible, it should be conducted as far from the nearest land as possible, and in all cases at least 50 nm from the nearest land and in water at least 200 m in depth. The Regulation also indicates that in seas where none of these circumstances apply, the port State may designate areas where a ship may conduct BWE.

Regulation D-1 (efficiency of the exchange of the ballast water)

Regulation D-1 establishes that when ships perform BWE they have to achieve a minimum efficiency of 95% volumetric exchange of ballast water. When the pumping-through method is used this efficiency is considered to be achieved by pumping through three times the volume of each ballast water tank; which can be reduced only if is proved that the 95% volumetric exchange is met.

Regulation A-3 (exceptions to ballast water management)

This Regulation stipulates the conditions when ships are not required to apply BWM according to the requirements of the Convention, which are:

- when the safety of a ship in emergency situations or save life at sea is to be ensured; or
- when there has been an accidental discharge or ingress of BW and sediments resulting from damage to a ship or its equipment; or
- when the uptake and discharge of BW and Sediments is being used to avoid or minimize pollution incidents from the ship; or
- the uptake and subsequent discharge on the high seas of the same BW and sediments; or
- the discharge of BW and Sediments from a ship at the same location where the whole of that BW and those Sediments originated and provided that no mixing with unmanaged BW and sediments from other areas has occurred.

Regulation A-4 (granting exemptions to ballast water management)

In this section, the Convention species the conditions under which a Party may grant exemptions to any requirements to apply regulation B-3 (Ballast Water Management for Ships) or C-1 (Additional Measures to those on Section B of the Convention). Apart from procedural specifications, the conditions to fulfil are as follows:

- *"granted 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;*
- *effective for a period of no more than five years subject to intermediate review;*
- *granted to ships that do not mix Ballast Water or Sediments other than between the ports or locations specified in paragraph 1.1; and*
- *granted based on the Guidelines on risk assessment developed by the Organization."*

Article 5 (port reception facilities)

Article 5 of the Convention states that Parties undertake to ensure that, in ports and terminals designated by them where cleaning or repair of ballast tanks occurs, adequate facilities are provided for the reception of sediments, taking into account the Guidelines developed by IMO (G1, Resolution MEPC.152(55), adopted on 13 October 2006). Such reception facilities shall operate without causing undue delay to ships and shall provide for the safe disposal of such sediments that does not impair or damage their environment, human health, property or resources or those of other States.

Regulation C-1 (additional requirements)

The Convention leaves the door open to the possibility that Parties to the Convention establish additional measures to those contained in Section B of the Convention. Therefore, ships may be required to meet a specified standard or requirement when transiting determined areas[28].

28 For further information on National measurements, please consult National ballast water management requirements. 2012. Lloyd's Register, available at: http://www.lr.org/sectors/marine/documents/175149-national-ballast-water-management-requirements.aspx

In 1999[29], the first ballast water related risk assessment study in the Baltic Sea area was undertaken for the Nordic Council of Ministers, contributing to raise awareness on the subject. Afterwards, a couple of studies[30] have considered the issue in a more detailed manner, but the work was undertaken prior the adoption of the risk assessment guideline of IMO.

In 2010, the HELCOM Guidance on how to distinguish between high and low risk (a risk of secondary spreading of alien species through ballast water and sediments) by ships engaged in intra-Baltic voyages was adopted in the HELCOM Moscow Ministerial Meeting[31]. The aim of this Guidance was to support transparent and consistent risk assessment for regional ship voyages and to allow a unified Baltic Sea system on exemptions for applying BWM requirements in accordance with BWMC Regulation A-4. Subsequently, the Guidance was tested through the "Pilot risk assessments of alien species transfer on intra-Baltic ship voyages" project (ALIENS project)[32] in 2010–2011. The results of the project proved the need of data on alien species and environmental conditions in ports, as a pre-requisite for carrying out a reliable risk assessment. In order to fill in those gaps, a second project on alien species (ALIENS 2 project) was launched. It concluded in December 2012 providing a proposal for a regionally harmonized method for granting exemptions from BW treatment for marine traffic in the Baltic Sea[33]. Currently, the work on alien species at HELCOM continues within the ALIENS 3 project ("Test, further development and operationalization of the HELCOM biological survey protocols and A-4 risk assessments in the Baltic Sea"), which aims to test, further develop and operationalize the harmonized system of granting exemptions according to Regulation A-4 of the BWMC in intra-Baltic traffic, developed within the HELCOM ALIENS 2 project.

29 Gollasch, S. & Leppäkoski, E. (eds.). 1999. Initial Risk Assessment of Alien Species in Nordic Coastal Waters. Nordic Council of Ministers, Copenhagen, 244 pp.

30 Leppäkoski, E. & Gollasch, S. 2006. Risk Assessment of Ballast Water Mediated Species Introductions – a Baltic Sea Approach. Report prepared for HELCOM, Helsinki, Finland, 111 pp.

31 Available at: http://helcom.fi/

32 Available at: http://helcom.fi/

33 Available at: http://helcom.fi/

In addition to HELCOM's efforts on the implementation of Regulation A-4, Parties to HELCOM have also conducted initiatives on the issue. Such is the case of Germany who, in 2011, launched a project on the compilation and testing of already existing risk assessment approaches for granting exemptions according to Regulation A-4, to be applied in the North Sea and Baltic Sea[34].

34 Available at: http://helcom.fi/

ANNEX III Contents of the A-3 exemption applications according to the joint HELCOM-OSPAR Guidance

General information	Period for which an application is sought; from month and year to month and year
	Why an exemption under regulation A-4 is sought
Ship's information	Ship name
	IMO number
	Port of registry
	Gross Tonnage
	Owner
	Call sign
	BWM option usually undertaken by ship, including BW treatment technology, if installed
	A copy of the Ship's BWM Plan should be submitted
	The Administration may also require BW and sediment management history for a determined period
Route information	Route of application, given as donor port(s) and recipient port for BW discharge
	If single voyage: Date and time of departure and arrival
	If multiple voyages: Voyage frequency, regulatory and estimated amount of BW discharged during the exemption period. Estimated time and dates for departures and arrivals.
	Any voyages, the estimated total number of voyages and the amount of BW discharged under the duration of the exemption

Table D – Minimum information required for an exemption application to Port State according to the appendix of the IMO Guidelines G7 currently in force (MEPC162/56).

Port characteristics	General info about the port (size, area, what kind of transport cargo or people etc.) Description of any recent construction activities Summary of Last port of Call and Next Port of Call Main shipping routes Catchment area: surface, salinity, temperature, tidal range Origin and amounts of ballast water released and taken Habitat description Existing monitoring Adjacent waters
Sampling site and environmental data	Minimum of 3 sites per port, representing different port areas within the port Specifications regarding prioritizing of sampling locations GPS location Atmospheric conditions: air temperature, cloud cover, wind speed and direction Water characteristics: sea state (wave height), temperature, salinity, dissolved oxygen, turbidity, chlorophyll-a, pH Sediment sample: method, sediment quality, fractions and grain size, organic content
Human pathogens (intestinal Enterococci, *Escherichia coli* and *Vibrio cholera*)	Sampling in spring bloom and summer maximum One water sample (500 mL from 30 cm depth) per site from each sampling site should be taken. Register sample depth and water depth at the site
Phytoplankton sampling	Sampling in spring bloom and summer maximum Two samples per site, one pooled water sample (from at 1 and 5 m depth samples) of at least 250 mL and one concentrated sample taken with a 20µm net
Zooplankton sampling	Two vertical samples per site taken with different mesh size nets (100 and 500 µm). For that purpose, three tows should be conducted, and samples pooled afterwards
Zoobenthos	Minimum of three grab samples per site using a Petersen or Ekman grab, subsequently 1 mm sieved
Fouling organisms	Sampling by scraping in summer maximum: identify the species attached to ropes, chains, pilings and hard surfaces using hand held scraping tools and estimate the species coverage. Minimum sampling: three structures Settlement plates should be deployed during the first sampling and retrieved during the second one (three months soak time at minimum). One rope with three plates at different depths
(Mobile) epifauna	Sampling in summer maximum Sampling at each site using light weight traps: three Chinese crab traps and three minnow traps. Soaking time: 48 h minimum

Table E – Summary of the port surveys according to the HELCOM-OSPAR Guidelines.

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