OSPAR COMMISSION

Protecting and conserving the North-East Atlantic and its resources

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

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Contents

Definitions / Glossary

“Ballast Water“ means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship.

“Ballast Water Management“ means mechanical, physical, chemical, and biological processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of Harmful Aquatic Organisms and Pathogens within Ballast Water and Sediments.

“Convention“ means the International Convention for the Control and Management of Ships‘ Ballast Water and Sediments.

“Harmful Aquatic Organisms and Pathogens“ means aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

“Non-indigenous species” (NIS) means any species outside its native range, whether transported intentionally or accidentally by humans or transported through natural processes.

“Sediments“ means matter settled out of Ballast Water within a ship.

“Ship“ means a vessel of any type whatsoever operating in the aquatic environment and includes submersibles, floating craft, floating platforms, Floating Storage Units (FSU) and Floating Production Storage Offloading (FPSOs).

“Risk assessment” means the methods outlined in the G7 Guidelines for assessing the risks in relation to granting an exemption in accordance with Regulation A-4 of the Convention and further elaborated in section 5 of this Joint Harmonised Procedure.

“Target species” species identified that meet the specific criteria indicating that they may impair or damage the environment, human health, property or resources, as further elaborated in section 3 of this Joint Harmonised Procedure.

1. Introduction

1.1 Loading and discharging ballast water is an essential part of a ship operation, with ships requiring ballast water to maintain their stability, draft and manoeuvrability. Contained within this ballast water are numerous microscopic species that will be carried to new destinations by the ship. The vast majority of these species will not survive the journey; however, the species that do survive may establish themselves in a new environment if the biological and physical conditions are favourable. There are numerous well documented examples, from all parts of the world, of the negative effects of non-indigenous species introduced through ballast water. Such non- indigenous species may cause serious ecological, economic and public health impacts, particularly when they become invasive.

1.2 In response to this the International Maritime Organization (IMO) through its Marine Environment Protection Committee (MEPC) has, over many years, been developing international legislation to prevent the harmful effects of transporting aquatic organisms in ship's ballast water. HELCOM and OSPAR have followed these global developments and provided regional input.

IMO Ballast Water Management Convention

1.3 In February 2004, a Diplomatic Conference convened by IMO adopted the "International Convention for the Control and Management of Ships' Ballast Water and Sediments" (the Convention)[1]. This Convention put in place international legislation for the first time and will enter into force 12 months after it has been signed by 30 States, representing 35% of world merchant shipping tonnage.

1.4 The Convention aims to prevent the spread of harmful aquatic organisms from one region to another by establishing standards and procedures for the management and control of ships' ballast water and sediments. Under the Convention, all ships in international traffic are required to manage their ballast water and sediments to a certain standard, according to a ship-specific ballast water management plan. All ships will also have to carry a ballast water record book and an international ballast water management certificate. The ballast water management standards will be phased in over a period of time. As an intermediate solution, ships should exchange ballast water mid-ocean. However, it is expected that most ships will need to install an on-board ballast water treatment system.

1.5 Article 3 (1) of the Convention outlines its applicability and states:

> *"Except as expressly provided otherwise in this Convention, this Convention shall apply to:*
>
> *(a) ships entitled to fly the flag of a Party; and*
>
> *(b) ships not entitled to fly the flag of a Party but which operate under the authority of a Party."*

However, the Annex to the Convention provides for Parties, under Regulation A-4, the scope to issue exemptions from Regulation B-3 (Ballast Water Management for Ships) and Regulation C-1 (Additional Measures). Regulation A-4 states:

[1] http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-(BWM).aspx

"1. A Party or Parties, in waters under their jurisdiction, may grant exemptions to any requirements to apply regulations B-3 or C-1, in addition to those exemptions contained elsewhere in this Convention, but only when they are:

a. 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;

b. effective for a period of no more than five years subject to intermediate review;

c. granted to ships that do not mix Ballast Water or Sediments other than between the ports or locations specified in paragraph 1.1; and

d. granted based on the Guidelines on risk assessment developed by the Organization.

2. Exemptions granted pursuant to paragraph 1 shall not be effective until after communication to the Organization and circulation of relevant information to the Parties;

3. Any exemptions granted under this regulation shall not impair or damage the environment, human health, property or resources of adjacent or other States. Any State that the Party determines may be adversely affected shall be consulted, with a view to resolving any identified concerns;

4. Any exemptions granted under this regulation shall be recorded in the Ballast Water record book."

1.6 Article 13 (3) of the Convention also states that:

"In order to progress further the objectives of the Convention, Parties with common interests to protect the environment, human health, property and resources in a given geographical area, in particular, those parties bordering enclosed and semi-enclosed seas, shall endeavour, taking into account characteristic regional features, to enhance regional co-operation, including through the conclusion of regional arrangements consistent with this Convention. Parties shall seek to co-operate with the Parties to regional agreements to develop harmonized procedures".

1.7 Therefore, Contracting Parties of the Helsinki and OSPAR Conventions have jointly developed this Harmonised Procedure, prior to the International Convention for the Control and Management of Ships' Ballast Water and Sediment coming into force, to ensure that exemptions are granted in a constant manner that prevents damage to the environment, human health, property or resources.

Harmonised Procedure for the Contracting Parties of OSPAR and HELCOM on the Granting of Exemptions from the International Convention for the Control and Management of Ships' Ballast Water and Sediments under Regulation A-4

1.8 The purpose of this document is to provide a harmonized procedure in accordance with Art. 13 (3) of the Convention for the issue of exemptions according to Regulation A-4 of the Convention to be used by OSPAR and HELCOM Contracting Parties once the Convention enters into force. This document is not a Guideline in the sense of Regulation A-4 or any other part of the Convention.

1.9 Exemptions under regulation A-4 of the Convention may only be granted by Contracting Parties to the Convention after its entry into force. HELCOM and OSPAR Contracting Parties are encouraged to use the applicable parts of this Harmonised Procedure in preparation for the entry into force.

1.10 Whilst Regulation A-4 gives Parties the right to grant exemptions it also sets out the requirements for doing so, *e.g*. exemptions can be only granted for vessels operating between specified ports and locations, an exemption shall not be effective for more than 5 years and exemptions must be granted based on the guidelines on risk assessment developed by the IMO (Guidelines for Risk Assessment under Regulation A-4 of the BWM Convention (G7))[2]. The IMO Guidelines outline three risk assessment methods that will enable Parties to identify unacceptable high risk scenarios and acceptable low risk scenarios and advise Parties on procedures for granting and withdrawing exemptions in accordance with Regulation A-4. They provide for the basis of the following HELCOM / OSPAR Harmonised Procedure, which has been developed specifically for the Baltic and North-East Atlantic regions.

1.11 There are three risk assessment methods outlined in the G7 Guidelines for assessing the risks in relation to granting an exemption in accordance with Regulation A-4 of the Convention:

- Environmental matching risk assessment;
- Species' biogeographical risk assessment;
- Species-specific risk assessment.

1.12 Environmental matching risk assessment relies on comparing environmental conditions between locations; species' biogeographical risk assessment compares the environmental similarity and species composition in source and destination ports/areas to identify high risk invaders, while species-specific risk assessment evaluates the distribution and characteristics of identified target species. Dependent on the scope of the assessment being performed, the three approaches could be used either individually or in any combination, recognizing that each approach has its limitations.

1.13 Environment matching and species' biogeographical risk assessment may be best suited to assessments between biogeographic regions. Species-specific risk assessment may be best suited to situations where the assessment can be conducted on a limited number of harmful species within a biogeographic region.

1.14 The three main approaches to risk assessment provided under the IMO guidelines G7 have been considered in several reports, including: The HELCOM Guidance for High and Low Risk voyages[3], adopted by HELCOM Contracting Parties in 2010 together with the Baltic Sea Ballast Water Risk Assessment[4] in the Baltic Sea, the North Sea Ballast Water Consultation Group Concept Issue of Exemption[5], as well as work undertaken as part of the North Sea Ballast Water Management

[2] http://www.imo.org/blast/blastDataHelper.asp?data_id=19689&filename=162(56).pdf

[3] HELCOM. 2010. HELCOM Guidance for High and Low Risk voyages. Adopted at the HELCOM Moscow Ministerial Meeting 2010 as part of the Declaration.

[4] HELCOM. 2011. Pilot risk assessments of alien species transfer on intra-Baltic ship voyages

[5] OSPAR (EIHA 12/3/4) - Ballast Water Exemptions in the North Sea

Opportunity[6]. The reports identified that the key risk criteria for issuing exemptions within the North Sea and Baltic were limited to:

a. Difference in water salinity between ports/locations being visited;

b. Presence of non-indigenous species fulfilling certain criteria in either port/location being visited, that is, target species.

1.15 The HELCOM ALIENS 2 & 3 projects further developed a harmonized method for granting exemptions from ballast water treatment (BWMC A-4) for ships navigating the Baltic Sea. The initiatives developed a detailed port survey protocol for sampling Baltic Sea ports for the presence of non-indigenous species, taking into account the need for and benefits of having a consistent approach with the North-East Atlantic region. The projects also considered the procedure for selecting target species and how to structure and use the collected data to support regionally coherent and transparent decision-making on exemptions.

Common understanding on application

1.16 This joint HELCOM – OSPAR Harmonised Procedure is based on the following common understanding:

a. Results from the common HELCOM - OSPAR framework are a guide for national evaluations of applications for exemptions under Reg. A-4;

b. Results are non-binding. The decision on an application for exemption rests with the national authority;

c. If national administrations do not use, or deviate from, the results of the common HELCOM- OSPAR framework, reasons should be communicated to HELCOM and OSPAR, so that they may inform the review process of the Harmonised Procedure;

d. Data needed under the common HELCOM – OSPAR framework should be collected according to the sampling protocol (section 4);

e. Subject to funding, it is suggested that data should be collected by Contracting Parties or other organisation (*e.g*. ports). Contracting Parties and other organisations are encouraged to use projects for initial data collection;

f. If no data for a risk assessment under the common HELCOM - OSPAR framework is available from official or other sources, the applicant should collect the data according to the sampling protocol;

g. The collected data from port surveys and on target species should be stored centrally under HELCOM – OSPAR supervision;

h. Data should be evaluated using the common HELCOM - OSPAR framework, as a first step by an automated decision support tool, to facilitate uniform application across the regions;

i. In an initial transitional period the Harmonised Procedure is to be implemented in a flexible and practicable way by authorities in cooperation with the ship owners, the

[6] http://www.northseaballast.eu/northseaballast/

harbours and other stakeholders, taking the regulations A-4.3 of the Convention into account, as outlined in Annex 1. This should be done in order to gain experience and to enable further development and improvement of the Harmonised Procedure.

1.17 The Harmonised Procedure is split into 7 sections including:

1. Introduction;
2. Port Survey Protocol;
3. Target Species;
4. Data Storage;
5. Risk Assessment;
6. Decision Support Tool and;
7. Administrative Procedures.

2. Port Survey Protocol

Background

2.1 This section outlines the HELCOM-OSPAR protocol for comprehensive sampling of non-indigenous species in ports. All applications aiming for a BWMC A-4 exemption in the application area, the combined HELCOM and OSPAR marine area, must carry out the port surveys following the methodology described in this section and attach the results to the exemption application. This information should cover each stopover port on the route for which the exemption is applied.

2.2 Port survey is to be regarded valid for granting exemption for applicants during a maximum period of 5 years, to be counted from the date of the first of the two sampling visits (spring bloom). A Contracting Party may decide on a shorter validity for a port survey due to *e.g.* sensitiveness of the area, intensity of traffic or need for updated port survey data on non-indigenous species.

2.3 Port surveys for detecting non-indigenous species require sampling of several different groups of organisms: hard substrate organisms, soft bottom benthos, plankton and mobile epifauna (*e.g*. fish and crustaceans).

2.4 Following is a description of the general features of the Port Survey Protocol. Annex 2 includes the complete protocol with all details and recommended equipment.

General port characteristics and available species data

2.5 Information about general characteristics, such as typical variation of abiotic conditions and patterns of port traffic, should be collected for each port to be sampled.

2.6 A port could consist of one or several contiguous areas, depending on the local physical and biological characteristics such as water exchange by currents or depending on land masses, like peninsulas or artificial harbour constructions. The division of a port in contiguous areas is independent of the distance between these areas and should be specified from case to case in close cooperation with the responsible administration. Within a port area there should be a minimum of 3 sampling sites. A site is a separate unit within a port area, such as a specific dock or a wharf. Within a site a number

of replicate samples (depending of the sample type, see below) of different groups of organisms will be taken.

2.7 Ports often have weather stations recording wind and temperature patterns and provided they are situated in relevant locations this data can be used. If additional measurements of temperature and salinity are needed the suggestion is to use data loggers.

2.8 If available, existing information from national monitoring programmes or projects should also be used when planning a port survey.

2.9 A port information data sheet summarising all above mentioned information should be filled in together with the port authorities.

Number of sampling sites per port and their selection

2.10 The field sampling will be carried out in a number of sampling sites, or exact locations, within a port. Three sampling sites per port area is the minimum required.

2.11 Species effort/accumulation curves (see Hayek & Buzas, 2010) should be presented with the results of each survey to provide proof of adequate sampling effort in terms of number of samples taken from each site. Species accumulation curves can be created simultaneously with the risk assessment within the decision support tool.

2.12 The distribution of sampling sites in the port area should follow a stratified sampling design and attention should be given to sample all main substrate types available in the port. Special attention and increased sampling efforts should be allocated to the following high priority area types: active berths, inactive/disused wharves, channel markers, tug and pilot vessel berths and slipways (see CRIMP protocol in Hewitt and Martin, 2001). Water movements within the port should also be taken into account when selecting sampling sites.

2.13 Before conducting the first survey at a given port, visual observations and general mapping of the underwater habitats is highly recommended to assure survey efforts are conducted in the most abundant/relevant habitats.

Timing of sampling

2.14 Due to seasonality and life cycle patterns of different life-forms and species, sampling will take place during two visits. The first should take place during the spring bloom and the second during the summer maximum.

2.15 Plankton samples should be taken and analysed both during spring bloom and summer maximum. The settlement plates should be deployed when conducting the first sampling and taken up when conducting the second one to allow enough time for representative fouling organism communities to develop.

2.16 Sampling of mobile epifauna, benthic infauna and fouling organisms as well as settlement plate retrieval should be conducted simultaneously with the summer maximum sampling when majority of the species are mature and identifiable.

Physical parameters

2.17 At each sampling site measurements on physical parameters (at minimum water temperature and salinity) should be made using a submersible data logger. In addition, water transparency should be measured using a turbidity meter or a Secchi disk (30 cm diameter).

2.18 Physical parameters are required to be collected during both sampling visits (spring bloom and summer maximum).

Human pathogens

2.19 One water sample from each sampling site should be taken for detecting the presence of bacteria according to Regulation D2 of the BWMC (Intestinal Enterococci, *Escherichia coli* and *Vibrio cholerae*).

2.20 Data from existing samples on human pathogens collected by local authorities during the same period can be used for analysis, provided that they fulfil protocol quality requirements.

2.21 Human pathogen samples should be collected during both sampling visits (spring bloom and summer maximum).

Plankton

2.22 Samples for phytoplankton and zooplankton species composition should be taken at each sampling site. One pooled phytoplankton sample (water sample), one concentrated phytoplankton sample (net sample) and two vertical zooplankton samples using nets with different mesh sizes, at each sampling site is required.

2.23 Nets suggested in the protocol (20 µm, 100 – 200 µm and 300 – 500 µm) are hand held and have been selected to be operable from the dock.

2.24 Plankton samples should be collected during both sampling visits (spring bloom and summer maximum).

Mobile Epifauna

2.25 Mobile epifauna, such as crabs, should be sampled at each sampling site using light weight traps tethered to existing structures (pilings, buoys, docks). Traps are selective in nature and therefore provide only information on the presence of species or at best relative measures of species abundances. However, methodologies for sampling epifauna in the port area are very limited and for example using trawls and gillnets is impossible. Attention should be given to place traps on all available substrates (mud, sand, rocky) and catch reported accordingly.

2.26 As an optional step, visual searches can be conducted at each site prior to deploying the traps to assure for efficient placement and distribution of traps.

2.27 Sampling of mobile epifauna is only required once during the sampling period, on the second visit (summer maximum).

Benthic Infauna

2.28 Grab samples: At least three samples should be taken at each sampling site located at least 15 m distance from each other using a benthic grab operable from a dock. Sediment quality of these samples can either be visually assessed or a separate sample may be taken for sediment quality (grain size) analysis. In case of known ballast water discharge at site, additional benthic samples may be taken.

2.29 A satisfactory sample requires penetration to approximately 10 cm into the sediment. Bottom quality may limit the possibilities to obtain samples from certain sampling sites and acquiring a satisfactory sample may require several attempts. As an example, in many locations, a concrete slab has been built underneath the docks to prevent erosion. Mooring berths (walking bridges) should therefore be utilized, when possible, to reach further from the shore and obtain satisfactory grab samples.

2.30 Temperature, salinity and oxygen saturation on the bottom should be measured using a submersible data logger at the grab sampling location. These data can also be obtained from site readings if the sample location is in the vicinity of the measuring location.

2.31 Sampling of benthic infauna is only required once during the sampling period, on the second visit (summer maximum).

Fouling organisms

2.32 Rapid assessment sampling protocol may be a suitable qualitative sampling method for hard substrate organisms at sampling sites with low visibility, such as typically encountered within Baltic ports. Existing structures within the port area will be targeted and the aim is to identify the species attached to ropes, chains, pilings and hard surfaces using hand held scraping tools and estimate the species coverage, if possible.

2.33 Docks are often high, built on stilts and no ropes or chains are lying in the water and therefore obtaining scrape samples from the dock can be difficult. In this case scrape samples should be undertaken from a boat.

2.34 Sampling of fouling organisms by scraping is only required once during the sampling period, on the second visit (summer maximum).

2.35 Settlement plates or settlement collectors should be used to improve the survey of fouling organisms. Fouling plates should be deployed during the first sampling visit and retrieved during the second sampling visit.

2.36 Vertical transects should be placed on pilings, projecting steel or concrete facings of wharfs, berths, piers and dolphins. They should be inspected closely for any non- indigenous species and quadrates sampled on set depth intervals.

Sample processing, analysis and data reporting

2.37 All samples are to be analysed by a quality assured laboratory (see Annex 2) to account for adequate taxonomic expertise.

2.38 At minimum, all species present in the samples are identified to the lowest taxonomic level possible. In case of finding an unknown species for the area in the survey, it should be first photographed and then preserved for further analyses (for example in 96% ethanol for genetic analyses).

2.39 Data should be reported using the agreed format suitable for transferring it to the database.

Detailed specifications on sampling methods

2.40 A detailed description of the survey protocol to be followed is appended as Annex 2, including suggested equipment for field sampling and a note on quality assured laboratories.

3. Target Species Identification[7]

3.1 In order to conduct a risk assessment for the transport of species with ballast water between harbours all organisms present, as observed through port sampling conducted as described in section 2, have to be taken into account.

3.2 To minimize the effort and to make the risk assessment procedure practicable a pre-selection of species that have to be assessed for their risk is necessary. The selected species are called target species. With the determined target species the risk assessment model (Section 5) can be run.

3.3 There are two main general questions which should be considered before a species is considered for inclusion in the target species list using the ranking criteria outlined in §3.8:

a. Is the species primarily or secondarily introduced with ballast water or sediment;

b. Is it present in part of the region but not the entire region?

3.4 Additionally two special types of species should be included:

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

b. Species which have been comprehensively scientifically investigated for their risk potential but which have not yet caused harm.

3.5 A target species list should be established, and regularly updated, by experts using the evaluation and ranking criteria defined under §3.8.

3.6 The target species lists of OSPAR and HELCOM are to be regarded as living lists under continuous updating by HELCOM STATE and OSPAR BDC, which means that other species can be included or species can be deleted, if further knowledge is available.

[7] Currently under discussion within HELCOM (Outcome of HELCOM 36-2015, para. 2.30 – 2.32)

3.7 The valid target species list at the time of adoption of this version of the Joint Harmonised Procedure is attached in Annex 3. As the list will be updated regularly by both HELCOM and OSPAR please check http://jointbwmexemptions.org/ballast_water_RA for the latest edition.

3.8 The target species selection criteria specified in the table below are to be used by HELCOM STATE and OSPAR BDC to define target species status and the inclusion or exclusion of the species into the target species list in Annex 3.

	Low risk species=1	**Medium risk species=2**	**High risk species=3**
1. Dispersion potential or invasiveness	The species does not spread in the environment because of poor dispersal capacities and low reproduction potential.	Except when assisted by man, the species does not colonise remote places. Natural dispersal rarely exceeds more than 1 km per year. The species can however become locally invasive because of a strong reproduction potential.	The species is highly fecund, can easily disperse through active of passive means over distances > 1 km/year and initiate new populations.
2. Colonisation of high conservation value habitats	Populations of the non- indigenous species are restricted to habitats of no conservation value (*e.g*. harbor constructions as quay walls or bank and shoreline stabilisation or pipes for cooling systems).	Populations of the non-indigenous species are usually confined to habitats with a low or a medium conservation value and may occasionally colonise high conservation value habitats.	Non- indigenous species often colonise high conservation value habitats, these are all biotopes where endangered species can be found. Most of the sites of a given habitat are likely to be readily colonized by the NIS when source population are present in the vicinity and makes therefore a potential threat for red-listed species.
3. Alteration of ecosystem functions and impact on native species	Data from invasion history suggest that the negative impact on native species and ecosystem functions is negligible.	Non- indigenous species known to cause local changes (<80%) in population abundance, growth or distribution of one or several native species, especially among common and ruderal species and the impacts on ecosystem processes and structures are moderate. The modification of water and sediment properties is temporary.	Non- indigenous species often cause local severe (>80%) population declines and the reduction of local species richness. At a regional scale, it can be considered as a factor precipitating (rare) species decline. Those non-indigenous species form long-standing populations and their impacts on native biodiversity are considered as almost non-reversible. Therefore the impact on ecosystem processes and structures is strong and difficult to reverse e.g. food web disruption (*Crassostrea gigas*) or habitat destruction (*Eriocheir sinensis*).

4. Effects on human health	Data from invasion history suggest that the species has weak toxic effects and no treatment is necessary.	Data from invasion history suggest that the species has moderate symptoms, easily treated, no permanent damage.	Data from invasion history suggest that the species has negative impact on human health, permanent damage or death.
5. Effects on natural resources (*e.g.* fisheries)	Data from invasion history suggest that the negative impact on natural resources is negligible.	Data from invasion history suggest that the species has only slight negative impact on natural resources and is restricted only on single locations.	Data from invasion history suggest that the species causes serious loss on aquaculture or fisheries harvest.
6. Effects on property *(e.g.* cooling systems)	Data from invasion history suggest that the negative impact on property is negligible.	Data from invasion history suggest that the species has only slight negative impact on property and this is restricted only on single locations.	Data from invasion history suggest that the species has high negative impact on property at many locations.

4. Data Storage

4.1 The data collected according to the sampling protocol (Section 2), is stored centrally in an electronic format as a database. The database is maintained by the OSPAR/HELCOM Secretariats as part of the joint online decision support tool (Section 6).

4.2 The system enables the storage of data, including:

- Harbour information (statistical information about environment, size and some business parameters of harbours); and
- In situ measurements detected in the harbours.

4.3 The list of target species, defined using the criteria outlined in section 3, as a basis for a risk assessment, is also included in the database.

4.4 The database should be able to connect to existing databases in order to access additional information. However, data used in the risk assessment process should remain under the supervision of the OSPAR/HELCOM Secretariats.

5. Risk Assessment

5.1 Based on previous work within HELCOM[8] and OSPAR[9] a specific approach, described in this section, is recommended for risk assessments under regulation A-4 of the BWM Convention for routes with one or several ports in the application area of the OSPAR or Helsinki Conventions.

[8] HELCOM Guidance on high and low risk voyages – 2010 Ministerial Declaration, Pilot Risk Assessments of alien species transfer on intra-Baltic ship voyages. HELCOM Aliens Final Report.

[9] OSPAR (EIHA 12/3/4) - Ballast Water Exemptions in the North Sea

5.2 The eight key principles of risk assessment in the IMO Guidelines G7 are effectiveness, transparency, consistency, comprehensiveness, risk management, precautionary, science based and continuous improvement.

5.3 The information required to undertake a A-4 risk assessment should be supplied in line with the other section of this harmonised procedure, *i.e*. environmental conditions and presence of non-indigenous species - section 2 Port Surveys, species to be included in the risk assessment - section 3 Target Species and shipping information (*e.g*. for water discharge volumes) - section 7 Administrative Procedures. The absence of, or uncertainty in, any information should be considered an indicator of potential risk and the level of uncertainty should be recorded in a transparent way.

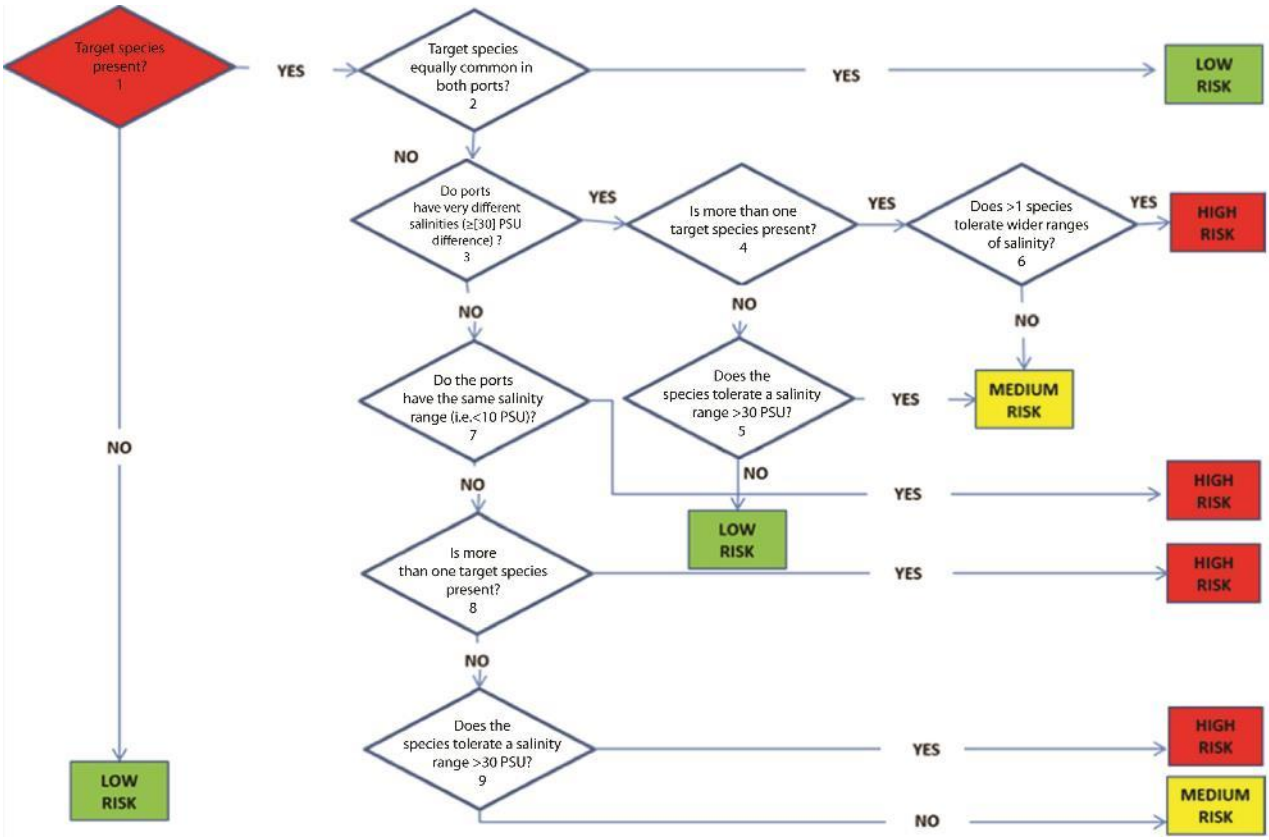
5.4 According to the terminology of the IMO Guidelines G7, a species-specific risk assessment supported with information on environmental conditions and shipping activities is to be applied. The key risk criteria to distinguish between unacceptable (high) risk and acceptable (low) risk are:

a. Presence and abundance of target species in either port/location being visited by the vessel;

b. Difference in water salinity between ports/locations being visited;

c. Salinity tolerance of target species present.

5.5 A risk assessment algorithm is a way to formalise risk assessment procedure through a set of binary yes/no questions based on a number of key criteria such as those defined in §5.4. The joint OSPAR-HELCOM Risk Assessment algorithm, outlined below and explained in more detail in Annex 4, includes three possible assessment results described in §5.6.



5.6 The joint A-4 risk assessment algorithm outlined in §5.5 includes three possible risk assessment outcomes (High Risk, Medium Risk and Low Risk) which have the following implications for A-4 exemption applications:

High risk (HR):	It is highly likely that target species are distributed with ballast water and occupy a new habitat. The risk is unacceptable. **An exemption <u>cannot be granted</u>**.
Medium risk (MR):	Target species could be distributed with ballast water and might occupy a new habitat. Further review is necessary to evaluate risk. This includes *e.g.*, local conditions in the ports and salinity tolerance, temperature, behaviour as well as dispersal ability/mobility of the species. Negative impacts of related species in other ecosystems are also relevant for this review. Based on the additional information, a decision must be reached as to whether to grant an exception permit. Individual mitigation measures other than those defined under the BWMC may be required.
Low risk (LR):	It is not very likely that target species are distributed with ballast water and occupy a new habitat. The risk is acceptable. **An exemption <u>can be granted</u>**.

5.7 It should be noted that the use of risk assessment algorithms is only to aid regionally harmonised decision making and that full consideration should be given to the specific conditions in each case. Such conditions to take into account could be additional information on non-indigenous species,

species specifics (*e.g*. dispersal capacity, habitats), connectivity between ports (*e.g*. distance separated, currents), ships operation and mitigation measures (*e.g*. volume of ballast water, position of discharge and uptake).

5.8 Based on one of the key principles of IMO Guidelines G7, "continuous improvement", the risk assessment framework and components described in this section should be kept under continuous review by the two organisations with the first assessment of the effectiveness of the risk assessment algorithm no more than two years after the entering into force of the Harmonised Procedure.

6. Decision Support Tool

6.1 In order to facilitate uniform application of the common HELCOM / OSPAR Harmonized Procedure across the regions the risk should be evaluated using, in a first step, the automated decision support tool available at http://jointbwmexemptions.org/ballast_water_RA.

6.2 The decision support tool is managed by the OSPAR/HELCOM Secretariats.

6.3 More information on the implementation of the tool can be found in Annex 5.

7. Administrative Procedures

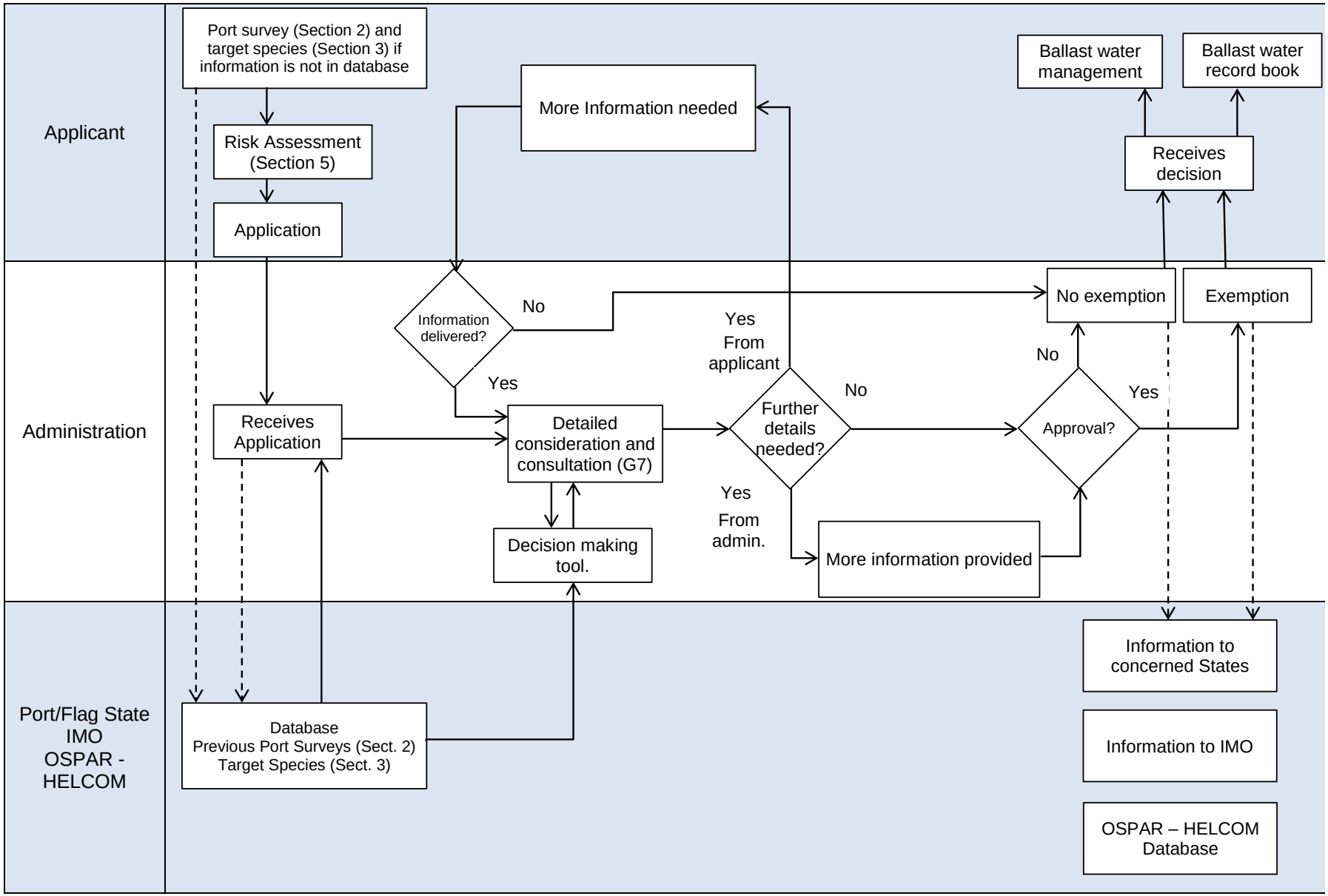
7.1 The IMO G7 guideline identifies the basic procedure and minimum information required for granting an exemption under regulation A-4 of the Ballast Water Management Convention.

7.2 These Administrative Procedures is to be considered as additions to the G7 guidelines, and have been agreed upon by the Contracting Parties of OSPAR and HELCOM.

Application Process

7.3 To enable a Contracting Party or Parties to consider granting an exemption for a ship from the BWMC under this harmonised procedure, it will be the responsibility of the ship owner/operator seeking the exemption to apply to the Port State(s) directly, copying in their national administration (see Annex 6). A ship-owner/operator seeking an exemption should note specifically that the procedure for seeking an exemption may take several months to conclude. An overview of the application process is described in the flowchart below.

7.4 If a ship owner/operator applies for an exemption applicable for a route where valid information is available in the database, the Contracting Party or Parties may grant the exemption without requiring new port surveys to be undertaken. The Contracting Party or Parties should also take into account the similarities of the specific ships and under which conditions and terms the existing exemption was granted. For validity of exemptions granted under these conditions see paragraph 7.9.


Applicant
Administration
Port/Flag State
IMO
OSPAR -
HELCOM
Port survey (Section 2) and target species (Section 3) if information is not in database
Risk Assessment (Section 5)
Application
More Information needed
Ballast water management
Ballast water record book
Receives decision
Information delivered?
No
Yes
No exemption
Exemption
Yes
From applicant
No
Yes
Receives Application
Detailed consideration and consultation (G7)
Further details needed?
No
Approval?
Yes
Decision making tool.
Yes
From admin.
More information provided
Information to concerned States
Database
Previous Port Surveys (Sect. 2)
Target Species (Sect. 3)
Information to IMO
OSPAR – HELCOM Database

Information to be provided

7.5 Information should be provided as set forth in the appendix to the Guideline G7 of the BWMC. In addition, the ship-owners/operators should provide information as specified below, upon application within the OSPAR and HELCOM regions.

7.6 Port Information:

a. The applicant should provide at least the information required in section 2, either by submitting data or by using data already available in the database, subject to a burden sharing mechanism. Information on the characteristics of ports which the ship will be visiting should be provided in line with section 2 of the Harmonised Procedure on Port Surveys and be submitted in the agreed format as included in Appendix 4.

7.7 Species Information:

a. Information on the presence of non-indigenous species should be collected in line with section 2 of the Harmonised Procedure on Port Surveys and be submitted in the agreed format as included in Appendix 4;

b. Upon submission the ownership of the submitted information will be transferred to the public authorities;

c. Given the cost implications of undertaking port surveys it is recommended that all stakeholders in a particular port cooperate to develop and use a burden sharing mechanism if the information is to be used by several other applicants.

Granting of the exemption

7.8 An exemption shall be granted for a maximum of 5 years but no longer than the time period specified by paragraph 2.2 when the port surveys are regarded valid. The approval may contain seasonal and time-specific or other restriction within the time of validity. The intermediate review as suggested in G7 is included in the grant. A recipient port State may require several reviews to be taken during the period the exemption is granted for, but more frequent than annual reviews generally should not be required.

7.9 The intermediate review should be based on any new information on the basis of the exemption granted including but not limited to: presence of non-indigenous species, introduction pathways for NIS and changes in physical conditions in the port. To check that the requirements of the exemption have been followed, the intermediate review may also include history of the vessel's voyages (*e.g.* on the basis of log book records) after the exemption was granted.

7.10 Where the Contracting Party or Parties in receipt of the application decide on the exemption, the ship-owner /operator should be notified as soon as possible.

7.11 A recommended model for an exemption should be developed for the Harmonised Procedure in order to ensure the uniformity throughout the HELCOM and OSPAR regions.

7.12 Exemptions have to be recorded in the Ballast Water Record Book and the Ballast Water Management Plan has to be considered for re-approval by the flag state after an exemption has been granted.

Communication of Information

7.13 Relevant contact details for receipt of applications should be submitted to the HELCOM and OSPAR Secretariats by the Contracting Party/Parties for publication on their respective websites.

7.14 The decision of the recipient Contracting Party should, in addition to the recipients outlined in G7, be communicated to HELCOM and/or OSPAR as soon as possible before the effective date of the exemption.

7.15 If national administrations do not use, or deviate from, the results of the common OSPAR/HELCOM framework, reasons should be communicated to OSPAR/HELCOM, so that they may inform the review process of the Harmonised Procedure.

Withdrawal of an exemption

7.16 An exemption granted under regulation A-4 of the Convention may be temporarily or permanently withdrawn if the requirements of the exemption have not been followed or due to the circumstances outlined in G7 10.4, 10.5 and 10.6:

> *"An exemption granted under regulation A-4 of the Convention may need to be withdrawn where the actual risk associated with a voyage has increased substantially since the risk assessment was conducted. This would include emergency situations such as outbreaks, incursions, infestations, or proliferations of populations of harmful aquatic organisms and pathogens (e.g., harmful algal blooms) which are likely to be taken up in ballast water (regulation C-2 of the Convention).*
>
> *When a port State notifies mariners of areas under its jurisdiction where ships should not uptake ballast water due to an emergency or other high risk situation, all exemptions should be withdrawn from ships that take up ballast water in the defined area. In such circumstances the shipowners or operators should be notified of the decision to withdraw the exemption as soon as possible.*
>
> *Guidelines for additional measures regarding ballast water management including emergency situations (G13) adopted by resolution MEPC.161(56) provide guidance to rapidly identify appropriate additional measures whenever emergency situations occur in relation to ballast water operations."*

Temporary deviation from the exemption route and temporary replacement

7.17 A ship that operates on the conditions of an exemption might temporary need to deviate from the exemption route, *e.g*. for dry-docking, maintenance or repair. The ship operator should contact all concerned port states on exempted routes and on the temporary route, well in advance before the deviation, to obtain approval for the deviation and to ensure that precautionary measures can be taken to the satisfaction of the involved states. The same procedure is to be applied for ships temporary replacing another ship that operates on the conditions of an exemption. The following options can be considered as suitable measures:

- Use of sediment and/or ballast water reception facility;
- Use of temporary/mobile BWMS;
- Use of permanent or temporary BWMS installed aboard another vessel;

- D-1 exchange in designated exchange area;
- Use of potable or technical water.

7.18 IMO guidelines and guidance documents should be considered, such as: BWM.2/Circ.52 Guidance on Entry or Re-entry of Ships into Exclusive Operation within Waters under the Jurisdiction of a Single Party.

Annex 1 – Transitional period for the implementation of the Joint HELCOM/OSPAR Harmonised Procedure for the Contracting Parties of OSPAR and HELCOM on the granting of exemptions under International Convention for the Control and Management of Ships' Ballast Water and Sediments, Regulation A-4

Introduction

By the adoption of the joint harmonized procedure HELCOM and OSPAR contracting parties agreed on implementation through a transitional period established by paragraph 1.16 of the procedure:

"In an initial transitional period the guidelines are to be implemented in a flexible and practicable way by authorities in cooperation with the ship owners, the harbours and other stakeholders, taking the regulations A-4.3 of the Convention into account. This should be done in order to gain experience and to enable further development and improvement of the guidelines."

The joint HELCOM/OSPAR Task Group on Ballast Water Management Convention Exemptions was tasked, through its terms of reference, to conclude upon transitional schemes for the implementation of the harmonized procedure.

Duration of the transitional period

The transitional period depends on its adoption by HELCOM and OSPAR and on the entry into force of the Ballast Water Management Convention. It will be applicable one year before the Ballast Water Management Convention enters into force, i.e. from the date on which the formal requirements according to Art. 18 of the Ballast Water Management Convention are fulfilled. Administrations of the Contracting Parties of OSPAR and HELCOM are urged to begin with the necessary preparations for smooth implementation in time, e.g. provide ship owners with the information that will be needed for applications in order to make sure that do not lose valuable time when preparing their application. The transitional period will end when the D-2 ballast water standard applies in full, taking the application of regulation B-3 by the IMO resolution A.1088(28) into account.

Intermediate evaluation

The transitional period shall be subject to an intermediate evaluation, jointly by HELCOM and OSPAR, to take part within 12 months after the two year anniversary of the entry into force of the Ballast Water Management Convention.

Validity of exemptions during the transitional period

Exemptions issued before or during the transitional period shall be valid for the whole transitional period, but not longer than 5 years from when the exemption is issued, regardless of the date of application or port survey. This applies provided that no major new occurrences of target species are identified. Moreover, the exemption may contain seasonal and time-specific or other restriction within the time of validity.

Validity for port survey data and exemptions as stipulated in paragraphs 2.2 and 7.9 of the procedure will then apply once the transitional period has ended.

Annex 2 – Detailed description of the Port Survey Protocol

Introduction

This protocol is developed based on CRIMP sampling protocol (Hewitt & Martin, 2001), rapid assessment protocols (Pederson *et al*., 2003; Cohen *et al*., 2005; Buschbaum *et al*., 2010) and aligned with HELCOM and OSPAR monitoring protocols (HELCOM COMBINE manual, 2015; OSPAR CEMP Monitoring Manual) where applicable. Sampling methods were tested over late summer and fall 2012, 2013, and 2014 in Estonia, Finland, Latvia, Netherlands, Poland, Spain and Sweden. The final survey protocol has been modified based on experiences from the field testing.

The aim of the protocol is to provide the required data to conduct the risk assessment according to the Harmonized Procedure.

Surveys of biota include sampling of different groups of organisms: hard substrate organisms, soft bottom benthos, plankton and mobile epifauna (*e.g.* fish). All these species groups should be surveyed following comprehensive sampling protocol. The protocol focuses on groups of organisms that can be collected from the quays.

Existing sampling in Baltic and North Sea ports

Data from national sampling programs and sampling projects can be utilized if they exist. Regular monitoring in the Baltic Sea area is currently limited to Estonia. In addition, some individual port surveys and long term projects have been conducted in Poland (*e.g* Walk *et al*., 2011), Lithuania, Germany (Buschbaum *et al*., 2010) and Finland (Paavola *et al*., 2008).

In the OSPAR region several countries (*e.g*. Germany and Netherlands) have established monitoring activities for non-indigenous species in their waters, including port areas. Some other rapid assessments have also been undertaken by specific projects.

Survey design

Ports are highly variable environments and provide a number of different habitats for non- indigenous species. Therefore sampling should follow stratified sampling design (Hayek & Buzas, 2010). Special attention and increased sampling efforts should be allocated to high priority area types, listed in Table 2 (modified from Hewitt & Martin, 2001).

Within each port several sites representing a wide range of environmental characters (including consideration of different salinities, water velocities and substrates) should be sampled. At minimum, three sites in each port area should be sampled. A minimum of three replicate samples at each site should be taken.

Species effort (accumulation) curves (*e.g*. Hayek & Buzas, 2010) should be presented with the results of each survey to provide proof of adequate sampling effort in terms of number of samples taken from each site.

Before conducting the first survey at a given port visual observations and general mapping of the underwater habitats is highly recommended to assure survey efforts are conducted in the most abundant/relevant habitats.

As a recommendation, each clearly distinguishable littoral zone in the port area should be photographed by minimum in three replicate 0.10 cm^2 quadrates along a horizontal transect.

The area of each quadrate should be scraped straight into zipper bags. All species (epifauna and infauna) have to be identified in the field when possible or else in the laboratory. Visual observations of additional species including mobile epibenthic species encountered in the transects between the quadrate locations should be noted.

Monitoring of the benthos and epifauna in the sublittoral zone in the port area is to be conducted with a hand dredge (*i.e.* "Naturalists" hand dredge of NHBS, weighing 5 kg, with a 450 x 185 mm frame and a net bag with a 1 mm mesh size; the use of an iron cable with handholds every half meter is recommended for an easier lifted out of the water) that can be used from a dock to scrape over the bottom.

Underground pipes for water supplies are to be monitored in those ports where they are installed. For that purpose a mesh bag can be attached to a hydranth to take a sample of the species inside the water system.

Similarly, all different kinds of soft substrate (sand, gravel, mud, clay, etc.) in the port area should be sampled by taking three benthic samples at each site.

Detailed list of materials and equipment needed for the field sampling is included in Appendix 1.

Sampling/monitoring frequency

Survey for mobile epifauna, fouling organisms, and benthic infauna should be conducted when majority of the species can be identified.

Plankton samples should be taken and analysed during spring bloom and summer maximum, which can be combined with performing the rest of the survey.

When taking the spring bloom plankton sample, settlement plates should also be deployed simultaneously. Plates should be retrieved when conducting the summer maximum survey (see Table 1).

Table 1. Minimum number of samples at each site.

Sample type	**Spring bloom**		**Summer maximum**		**Total**
Phytoplankton	1 x 20 µm net,	1 x Water	1 x 20 µm net,	1 x Water	4
Zooplankton	1 x 100 µm net,	1 x 500 µm net	1 x 100 µm net,	1 x 500 µm net	4
Zoobenthos			3 x Benthic grab		3
Fouling plates			3 x plate (15x15 cm)		3
Fouling, scrape			approx. 3-6		3-6
Traps			6 traps (3 box, 3 minnow)		6
Total	**4**		**19-22**		**23-26**
Plus:					
Pathogens			2 x 0.5 l water sample		2

Site selection

Spatial distribution of the sites is to be designed carefully prior to sampling. Survey should be conducted without disturbing port activities. Port and local environmental authorities can often provide useful information on the port characteristics such as ballast release locations and most frequently visited berths. Whenever possible, sampling from a boat is preferred to sampling from a dock. Sites should be selected to represent a range of abiotic conditions and aimed to cover high priority areas (Table 2).

Table 2. Priority of sampling location types based on Hewitt & Martin, 2001.

Port area		Priority
Commercial shipping facilities in port		
	active berths	**1**
	inactive/disused wharves	**1**
	channel markers	**1**
	tug and pilot vessel berths	**1**
	slipways	**1**
	dredge disposal and spoil grounds	2
	breakwaters, groynes, etc.	3

Conducting the survey

Port characteristics

Information about port characteristics, such as abiotic conditions and port traffic, should also be collected. Port information data sheet (Field data sheet 1 in Appendix 3) should be filled out in cooperation with the port and local environmental authorities and by using available data.

Ports often have weather stations recording wind and temperature patterns. Temperature and salinity loggers would be an easy and cost effective addition for recording water properties in the port area and ports are encouraged to install such devices.

Environmental data

At each site temperature and salinity should be recorded using a submersible data logger, and water transparency using a turbidity meter or a Secchi disk (30 cm diameter).

Environmental data will be collected on during both sampling visits (spring bloom and summer maximum) (Field data sheet 2 in Appendix 3).

Field sampling

Environmental data should be recorded using Field data sheet 2. GPS location of each of the sampling sites should be recorded using WGS84 coordinate system. Water salinity and temperature should be measured at least at 2.5 m intervals from surface water to bottom at each site, taking into account the potential effect of tides and characteristics of the port. Wind speed and direction, air temperature and cloud cover should also be noted. Sediment type and fractions can be assessed visually from the benthic grab samples or taking a separate sediment sample.

Human pathogens

One water sample from each site should be taken for detecting the presence of IMO D-2 bacteria (intestinal enterococci*, Eschericia coli* and *Vibrio cholera)* during both sampling visits (spring bloom and summer maximum). Samples may also be collected by local authorities and these data can be used instead if they exist and fulfill protocol quality requirements.

Field sampling

Water sample of 500 ml from at approximately 30 cm depth should be taken at each site. Sampling should follow the guidance described in the EU Bathing Water Directive 2006/7/EC. Sample depth, water depth at the site, and other relevant information should be noted using the Field data sheet 3 in Appendix 3. To prevent overlapping measurements and excess work, the pathogen sample can be taken at the same location as the environmental data sampling.

Plankton

Samples for phytoplankton and zooplankton species composition and abundance should be taken at each sampling site. Plankton sampling should be performed before sediment sampling to avoid sampling being affected by sediments suspension. Nets suggested in the protocol are hand held and have been selected to be operable from the dock. One pooled phytoplankton sample, one concentrated phytoplankton sample and two vertical zooplankton samples using nets with different mesh sizes, at each site is required. Both zooplankton and phytoplankton samples are to be taken during both sampling visits (spring bloom and summer maximum).

Field sampling

Samples of *phytoplankton* should be collected by obtaining a 250 ml water sample pooled from three locations at least 15 m apart at each site. Samples (0.5 – 1.0 l) should be taken at each location at the surface and 5 m depth (or 1m from the seabed if shallower). (HELCOM COMBINE manual, 2015, Annex 6: Guidelines concerning phytoplankton species composition, abundance and biomass, Section 2 on sampling, including preservation and storage of samples).

Additionally, a concentrated vertical sample using a small hand held 20 µm plankton net should be taken. The specific dimensions of the net used as well as a comprehensive description of the sampling procedure should be recorded in the field data sheet 3 with other relevant information.

Three tows, 10 to 15 m apart should be conducted to ensure for adequate sample. Haul and tow rates should not exceed 0.25 – 0.30 m/s. Brown glass iodine-proof bottles with tightly fitting screw caps should be used as containers. Samples should be preserved in acid Lugol solution (0.25 – 0.5 cm^3/ 100 cm^3 sample) and placed in a cooler for transport to the analysing laboratory.

A vertical z*ooplankton* sample should be collected with a standard 100 µm mesh free-fall dropnet or similar at each site. Three tows, 10 to 15 m apart should be conducted to ensure for adequate sample. Mesh size depends on the size range of zooplankton in the area and needs to be reported with the data. In addition, a sample of larger zooplankton organisms including gelatinous species should be obtained using a net with mesh size 300 – 500 µm by conducting three tows 10 to 15 m apart. 500 µm net mesh size may be required depending on the local existing biota. The specific dimensions and mesh size of the net used as well as a comprehensive description of the sampling procedure should be recorded in the Field data sheet 3 with relevant abiotic information. Tow rate should be adjusted to approximately 1 m/s and net stopped 1 m before the bottom. A flow meter can be mounted on the mouth of the web for quantification of the water volume sampled. Details of the sampling procedure, gear used and number of tows in addition to any other relevant information should be noted on the

field data sheet and reported in the provided excel sheet. Samples should be placed in sample jars or bottles and in a cooler. Samples should be preserved in 4 % formalin solution prior to transport to the analyzing laboratory or follow the instructions given by the analyzing laboratory. Gelatinous species should be examined immediately after collection without preservation. If the species identification is unknown, a digital photo should be taken. (HELCOM COMBINE manual, 2015, Annex C-7: Mesozooplankton, Section 3 on sampling).

Epifauna

Mobile epifauna, such as crabs, should be sampled at each site using *light weight traps* tethered to existing structures (pilings, buoys, docks). Sampling may occur only on the second sampling visit (summer maximum). Traps are selective in nature and therefore provide only relative measures of species abundances. However, methodology for sampling epifauna in the port area is very limited and for example using trawls and gillnets is impossible. Attention should be given to place traps on all available substrates (mud, sand, rocky) and catch reported accordingly. Traps can be baited.

As an optional step, visual searches can be conducted at each site prior to deploying the traps to assure for efficient placement and distribution of traps.

Field sampling

Two types of traps should be used when sampling mobile epifauna, Chinese crab traps (for example Fukui-designed box traps 63 cm x 42 cm x 20 cm, with 1.3 cm mesh netting, sold in many countries under various names) and minnow traps (for example Gee-minnow trap, 42 cm long and 23 cm wide with 6.4 mm netting and 2.5 cm mouth) (Fig. 1).

Minnow traps have been more effective for catching small fish and proven also effective for catching small crabs (such as mud crabs) and shrimp (Pitkänen, 2012). Crab traps (box traps) catch larger invertebrates such as *Eriocheir sinensis* and some larger fish species more effectively.

Traps should be baited using locally available fish and should be weighted either by placing rocks (approx. 1 kg) inside (minnow traps) or attaching a 1-2 kg lead weight on their frame (box traps). Traps should be tethered securely to wharves and/or dolphins or other structures. Three traps of both trap type at each site should be deployed for at least 48 h and the soak time (minutes) reported with the catch. Dimensions of the trap type used and bait species used should be reported as well.

After retrieving the traps or conducting trawling or other similar sampling, the catch should be identified and placed in zipper storage bags in a cooler. Depth and location (GPS coordinates) of the sampling as well as gear and soak time and substrate type should be recorded (Field data sheet 3). Later in the laboratory, species identification should be verified (or samples prepared for identification by a quality assured laboratory), measured, weighed, prepared and preserved. Fish and larger invertebrates can be frozen, smaller invertebrates preserved in 4 % formalin solution.

Figure 1. *Traps suggested to be used in sampling of epifauna (Chinese crab trap on left, Gee's minnow trap on right).*

Fouling organisms

Rapid assessment sampling protocol may be a suitable qualitative sampling method for hard substrate organisms at sites of low visibility, such as Baltic ports where diving is not an option. Existing structures within the port area will be targeted and the aim is to identify the species attached to ropes, chains, pilings and hard surfaces using hand held scraping tools and estimate the species coverage, if possible. Sampling of fouling organisms by scraping can be conducted on the second sampling visit only (summer maximum). Based on test surveys, docks are often high, built on stilts and no ropes or chains are laying in the water and therefore obtaining scrape samples from the dock is frequently close to impossible. *Settlement plates* or settlement collectors (Marshall & Cribb, 2004) should be used to improve the survey of fouling organisms (Figure 3). Fouling plates should be deployed during the first sampling visit and retrieved during the second sampling visit.

Figure 2. *Scraping tool used in sampling of fouling community.*

Field sampling

Scraping

Pilings or projecting steel facings of *wharfs, berths, piers and dolphins* are accorded as high priority in CRIMP protocol (Table 2). At least three pilings or similar structures should be sampled from these abovementioned locations at each site. The pilings should be located at equal distance (10 – 15 m) from each other. On *breakwaters, groynes, rockwall facings and natural rocky reefs* three sampling sites should similarly be placed 10 – 15 m apart. *Hulks (wrecks)* are often hotspots for NIS and therefore should be included in the sampling in a similar manner.

Three pilings should be scrape sampled in the sub littoral zone. An area of 0.1 m^2 be scraped to the piling surface using a hand-held scraper tool and after taking the photo sample can be scraped straight into pre-labeled zipper bags.

As an optional step, the selected pilings are recommended to be visually inspected (*e.g*. video).

Similarly, on rocky shores or breakwaters three vertical transects should be inspected and sampled as described above. While conducting the sampling, qualitative visual surveys for detecting non-indigenous species should be conducted in the area. For that purpose, if possible, a 30 mi search by one person is to be conducted for as many species as possible.

From ropes, samples at depths of 0.5 m, 3.0 m, 7.0 m and the bottom should be digitally photographed and scrape samples should be taken if possible. In addition a hand net equipped with a scraping blade (Figure. 2) can be used when obtaining scrape samples from the dock. When scraping, sample falls into the mesh bag and it can be rinsed into a bucket filled with water. When finished with scraping, sample can be sieved with 0.5 mm sieve and transferred into a zipper bag. Sampled area should be estimated and reported in the Field data sheet 3.

Samples are to be placed in cooler and transported to the quality assured laboratory for analysis. Prior to transport, samples can be preserved in 4 % formalin solution, frozen or follow specific instructions from the analyzing laboratory. However, the use of formalin unables the identification of some species *e.g*. nudribranchs, so the analysis of live communities is recommended whenever possible.

Settlement plates

Each fouling plate unit should be constructed of approximately 11 m of polypropylene rope (ø 0.5 cm), three gray 15 cm x 15 cm, or 14 cm x 14 cm, PVC plates and a brick (Figure 3 A). Each plate should be sanded briefly (few seconds, sanding paper 80) prior to the deployment to provide more hospitable settling substrate for the organisms. Hole (ø 0.5 cm) should be drilled at the center of each plate for the rope, and a tube should be placed between the rope and the plate to prevent the rope from breaking. Plates should be secured on the rope at set distances using knots secured with zipties on both sides of the plate. The plates should be secured in the rope in such a way that they will be deployed at 1m, 3 m and 7 m depths. A brick should be tied at the end of the rope for weight when deploying the unit in the port.

Fouling plate units should be deployed in a location where they will not be disturbed by for example port traffic. Units should be tied securely to the dock structures so that the first plate is submerged at approximately 1 m depth. If the water depth at the site is less than 8 m, the deepest plate may be removed and brick tied at suitable depth for the site. The unit should always remain in a vertical position and the rope should be tight.

Fouling plate units should be retrieved simultaneously with the summer maximum sampling. However, based on the test survey, only six weeks soak time was adequate to acquire a representative fouling community on the plates (Figure 3 B).

When retrieving the units, they should be pulled on the dock as carefully as possible to prevent losing any organisms such as mobile epifauna. Each plate should be placed in a plastic sheet (or an opened plastic bag) and rope and brick separated from the plates. The plates should be photographed and placed in individual labeled re-sealable plastic bags prior to transport. The brick and the rope should be packed to a separate bag. The plates should be kept moist by adding some sea water in the bags. All detached organisms should be collected. All fouling plate unit's parts should be placed into a cooler and transported to the laboratory as soon as possible.

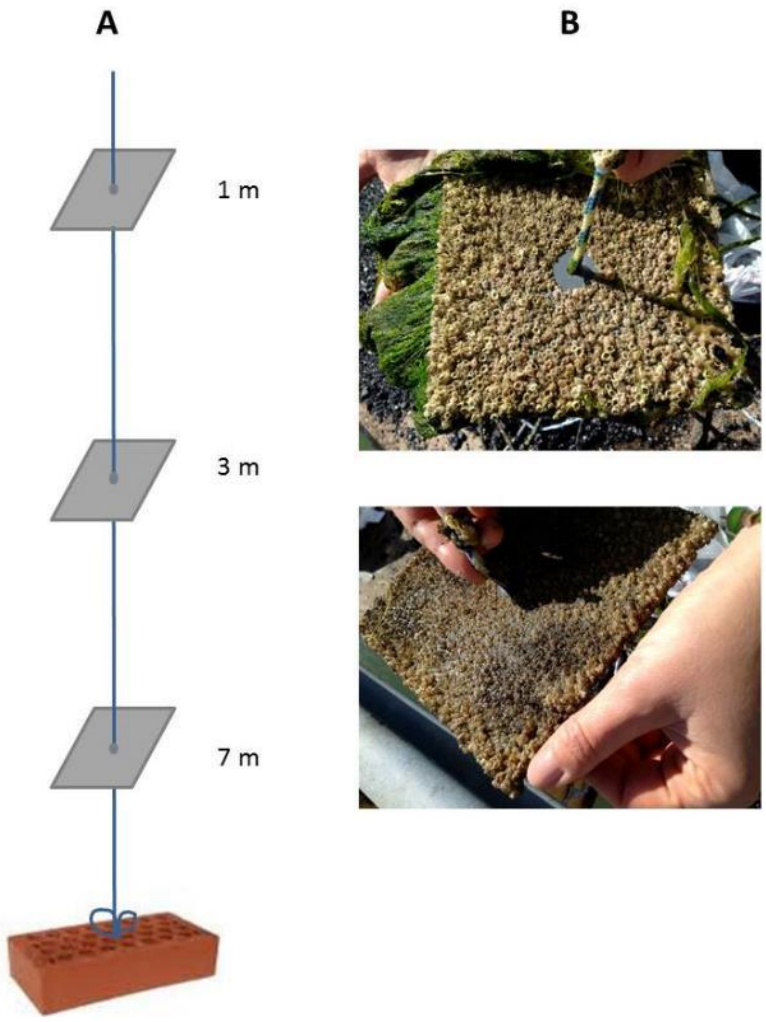


Figure 3. *Suggested setup for fouling plates (A) and retrieved fouling plates (B) after 1.5 month soak time.*

Benthic infauna

At least three grab samples should be taken at each site located at least 15 m distance from each other using a benthic grab operable from a dock. Petersen, Ponar and 'Naturalists' hand dredge of NHBS (weighing 5 kg, with a 450 x 185 mm frame and a net bag with a 1 mm mesh size) grabs have proved to be more appropriate for soft substrate sampling and to be used from a dock. As the dredge can be heavy we suggest using an iron cable with handholds every half meter. Sediment quality of these samples can either be visually assessed or a separate sample may be taken for sediment quality analysis. In case of known ballast water discharge at site, additional benthic samples may be taken. Bottom quality may dominate the possibility to obtain samples from certain sites and acquiring a satisfactory sample may require several attempts. In many locations, a concrete slab has been built underneath the docks to prevent erosion. Mooring berths (walking bridges) should therefore be utilized, when possible, to reach further from the shore and obtain satisfactory grab samples. Satisfactory sample requires penetration to approximately 10 cm into the sediment.

Temperature, salinity and oxygen saturation on the bottom should be measured using a submersible data logger at the start of the transect. These data can also be obtained from site readings if the sample location is in the vicinity of the measuring location. Sampling of benthic infauna may occur only on the second sampling visit (summer maximum).

Field sampling

Grab samples should be taken instead using a hand operated benthic grab, operable from a dock. Relevant information such as description of the site as well as name and specific dimensions of the sampler used should be recorded on the Field data sheet 3.

Samples should be sieved with a 0.5 mm sieve, transferred to sample jars, preserved in buffered 4% formaldehyde solution (1 part 40% formaldehyde solution and 9 parts water) or alcohol (70%), or follow specific instructions by the analysing laboratory and placed in a cooler for transport to the analysing laboratory as soon as possible. In the laboratory, samples may be stained using Rose Bengal (1 g/dm^3 of 40% formaldehyde). (HELCOM COMBINE manual, 2015, Annex C-8 Soft bottom Macrozoobenthos, Section 4.1 on Sampling and JAMP Eutrophication Monitoring Guidelines: Benthos Technical Annexes 1 and 2).

Specimen handling

All sampled materials should be placed in a cooler and transported to the laboratory for sorting as soon as possible. Preservation or narcotization should take place immediately, never later than 8 h from collection.

Preservation guidance may be given by the analyzing laboratory and may include:

- Formalin stock (1:1 propylene glycol-formalin) diluted to seawater 1:9 for most of the species;
- Hexamin buffered formalin, diluted to 4 %;
- Ethanol (96% for genetic analyses);
- Formaldehyde solution and 9 parts water and stained with Rose Bengal (1 g/l of 40 % formaldehyde) for benthic samples.

Sample processing, analysis and data reporting

All samples are to be analysed by a quality assured laboratory (Appendix 2) to account for adequate taxonomic expertise. In case of finding an unknown species for the area in the survey it should be first photographed and then preserved for further analyses (for example in 96% ethanol for genetic analyses). ISO/IEC quality assured laboratories are rare. However, other proofs of quality assurance are accepted as well. For example, participation in HELCOM quality assurance projects such as ZEN QAI and PEG intercalibration are considered adequate assurance of quality. In addition, any laboratory approved by national administrations can be considered quality assured. Executing party should contact the local laboratories prior to the sampling to obtain any specific instructions, equipment and/or materials concerning sample preservation and handling.

All species are to be identified to the lowest taxonomic level possible. Data should be reported using the agreed format suitable for transferring to the database as available through http://jointbwmexemptions.org/ballast_water_RA (data sheets for field data recording and Excel tables for recording of data for entry into the database; Appendix 3 and 4).

Human pathogens

Sample analysis and processing should follow the EU Bathing Water Directive 2006/7/EC and analysis should be conducted by a quality assured laboratory. Analysis of *Cholera* bacteria may require specialized laboratory. Following the sample analysis, presence and abundance (concentration) of IMO D-2 bacteria are to be reported using the agreed format suitable for transferring to the database.

Plankton

Sample processing and species identification should be conducted by a quality assured laboratory according to their best practices and should follow the HELCOM COMBINE manual Annex C-6: Guidelines concerning phytoplankton species composition, abundance and biomass, Section 2.2 qualitative determination. All non-indigenous species should be identified. Phytoplankton species composition should be reported using the provided excel sheet. Data should be reported using the agreed format suitable for transferring to the database.

All non-indigenous species should be identified. Zooplankton species composition should be reported using the agreed format suitable for transferring to the database.

Mobile epifauna

Quality assured laboratory or local authorities should confirm species identification from the preserved samples and/or photographs. Otherwise, data can be reported by the executing party. Catch per time interval per a trap (CPUE) should be reported using the agreed format suitable for transferring to the database.

Hard substrates

Scrape samples should be qualitatively analysed by local experts or quality assured laboratory. Observed species should be reported using the agreed format suitable for transferring to the database.

Settlement plates should be analysed by local experts or a quality assured laboratory. Identifying the organisms is easiest when the plates are fresh. If the analysis is delayed, possible preservation methods include 4% formaldehyde, freezing or ethanol. Ethanol tends to deteriorate the coloring of the organisms and therefore the other two are preferred.

All non-indigenous species should be identified to species level (and photographed, if possible). The rope and brick should be analysed first visually and all organisms identified. Both should also be rinsed thoroughly above a 1 mm sieve. All organisms from the sieve should also be identified. Similarly, settlement plates should be analysed by local experts or quality assured laboratory. All non-indigenous species should be identified. Observed species should be reported using the agreed format suitable for transferring to the database.

Soft substrates

Samples should be analysed and processed by a quality assured laboratory. All non-indigenous species in the samples should be identified. Results should be reported using the agreed format suitable for transferring to the database.

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Appendix 1: Field Sampling Equipment

Suggested equipment for field sampling

- 1000 ml and 500 ml sterile transparent glass bottles for pathogen samples (usually provided by the analyzing laboratory)
- Water sampler
- Plankton nets
  - Small hand hauled 20 µm net for phytoplankton (450 mm long with 250 mm mouth)
  - 100 – 150 µm (or smaller) free fall drop net for zooplankton (for example 400 - 700 mm opening)
  - 500 µm dropnet for larger zooplankton (for example 3 – 4 m long with a 700 mm opening)
- 500 ml transparent glass bottles for zooplankton samples
- 250 ml transparent glass bottles for phytoplankton samples
  - Lugol solution
- Clean funnel and a bail (for water samples)
- Scrapers for fouling communities (handheld, mesh bag attached or hand held scrapers)
  - 1 – 2 l ziplock bags for the obtained samples
- Traps
  - 6 x Collapsible Chinese crab trap
    - 6 x 2 kg lead weights
    - Cable ties (for attaching the lead weights to the traps)
  - 9 x Shrimp trap (Box or cylinder, 2 mm plastic mesh, 150-200 mm high, 400-500 mm long)
    - Rocks (approx. 1 kg) inside the traps for weight
  - Approximately 250 m of rope for tethering the traps
  - 1 l ziplock bags for the catch
  - Bait fish
- Petersen, Ponar and 'Naturalists' hand dredge of NHBS or similar hand-operated benthic grab
  - 0.5 mm sieve
- Jars (1 l) for benthic samples
- Alcohol and/or formaldehyde solution (at minimum 2 l per 3 sites)
- Buckets (rope attached to one for obtaining rinsing water)
- 3 large coolers with cold blocks
- YSI logger or CTD
- Secchi disc or turbidity meter
- Digital camera and a GPS device
- Permanent markers
- Labelling tape for the sample containers
- Mesh bags (0.5 mm)
- 50 m transect line, labelled at 1 m intervals
- 0.10 m^2 quadrate frame(s)
- Camera in an UW housing

Appendix 2: Criteria for quality assured laboratories

Quality assured laboratories may include any laboratory qualified with ISO/IEC 17025 standard or its predecessors (ISO 9000, EN-45001). Laboratories that are involved in HELCOM Quality Assurance Programs for phytoplankton (PEG) and zooplankton (ZEN) or meet the requirements of the OSPAR JAMP guidelines on quality assurance for biological monitoring[10] are also considered quality assured. In addition, any laboratory approved by national administrations can be considered quality assured.

[10] JAMP guidelines on quality assurance for biological monitoring in the OSPAR area Ref. No. 2002-15

Appendix 3: Data sheets for field recording

Port information sheet (Field data sheet 1)

Port name and ID		**Date (day, month, year)**	
Established (year)		**Location (Lat., Long. in WGS84)**	
Assessor(s) (name, surname)			

General description (General info about the port: size, area, what kind of transport cargo or people etc.)	
Recent construction (Description of any recent construction activities)	
Ship movements (Last port of call and next port of call)	
Main shipping routes	

Ballast water released (m^3)	
Ballast water taken (m^3)	
Ballast water origin (Lat., Long. in WGS84)	
Habitat description	
Existing monitoring	
Adjacent waters	

Salinity max. (psu)	
Salinity min. (psu)	
Sea surface T^a min. (°C)	
Sea surface T^a max. (°C)	
Sea floor T^a min. (°C)	
Sea floor T^a max. (°C)	
Tidal range (m)	

Comments

Provide a map of the area as an attachment

Sampling site information sheet (Field data sheet 2)

Port name and ID		Date (day, month, year)	
Site ID		Time ([hh]:[mm])	
Ballast water discharge at site (Y/N)		Originator (name, surname)	
Location (Lat., Long. in WGS84)			

Environmental data

Air T^a (°C)	
Cloud cover (%)	
Sea state (m)	
Wind speed (m/s)	
Wind direction (Grad)	
Water T^a at surface (°C)	
Water T^a at 2,5 m (°C)	
Water T^a at 5 m (°C)	
Water T^a at 7,5 m (°C)	
Water T^a at bottom (°C)	
Salinity at surface (psu)	
Salinity at 2,5 m (psu)	
Salinity at 5 m (psu)	
Salinity at 7,5 m (psu)	
Salinity at bottom (psu)	
Dissolved oxygen at bottom (mg/l)	
Turbidity (m)	

Comments	

Sediment sample (Y/N)	
Method	

Fractions and grain size

Sediment analysis, organic content (g)	
Sediment analysis, median (µm)	
Sediment analysis >1mm (% dry weight)	
Sediment analysis <1-0,5mm (% dry weight)	
Sediment analysis <0,5-0,25mm (% dry weight)	
Sediment analysis <0,25-0,125mm (% dry weight)	
Sediment analysis <0,125-0,063mm (% dry weight)	
Sediment analysis <0,063mm (% dry weight)	

Visual assessment

Material	%

Comments

Sample data sheet (Field data sheet 3)

Port name and ID		Date (day, month, year)		Originator (name, surname)	
Site ID		Time ([hh]:[mm])		Water depth (m)	

Sample type	Pathogens	Phytoplankton		Epifauna	Fouling	Zooplankton		Benthos			
		Net	Water			____ µm net	____ µm net	1	2	3	4
Duration of sampling (min.)											
Total area covered (m^2) or water volume filtered (m^3)											
Depth penetration (cm)											
Total number of samples											
Parallel sample per site											
Transect											
Sampling method											
Pretreat method											
Storage method											
Method of measurement											

Comments	

Sample data sheet (Field data sheet 3, continuation)

Port name and ID		Date (day, month, year)	
Site ID		Time ([hh]:[mm])	
Ballast water discharge at site (Y/N)		Originator (name, surname)	
Location (Lat., Long. in WGS84)		Water depth (m)	

Fouling sampling

Scrape sample	1	2	3	Comments
Depth (m)				
Type of substrate				

Epifauna sampling

Trap type	Deployed	Retrieved	Catch	Comments

Appendix 4: Format suitable for transferring to the database

Environment data collected:

ENV_ID	
HARBOUR_CODE	
LOCATION	
SAMPLING_DATE_START	
SAMPLING_DATE_END	
AIR_TEMP	
CLOUD_COVER	
SEA_STATE	
WIND_SPEED	
WIND_DIRECTION	
SEDIMENT_ORGANIC_CONTENT	
SEDIMENT_MEDIAN	
SEDIMENT_GRAN_SIZE_1	
SEDIMENT_GRAN_SIZE_2	
SEDIMENT_GRAN_SIZE_3	
SEDIMENT_GRAN_SIZE_4	
SEDIMENT_GRAN_SIZE_5	
SEDIMENT_GRAN_SIZE_6	
WATER_TEMP_SURFACE	
WATER_TEMP_2,5M	
WATER_TEMP_5M	
WATER_TEMP_7,5M	
WATER_TEMP_BOTTOM	
BOTTOM_DEPTH	
SALINITY_SURFACE M	
SALINITY_2,5M	
SALINITY_5M	
SALINITY_7,5M	
SALINITY_BOTTOM	
DO_BOTTOM	
TURBIDITY	
ORIGINATOR	
LATITUDE	
LONGITUDE	
COMMENTS	

Sampling data collected:

SAMPLE_ID	
HARBOUR_CODE	
DATE_TIME_UTC	
LOCATION	
ORGANISMS_GROUP	
SAMPLING_DURATION	
AREA_COVER_WATER_VOL	
DEPTH_PENETRATION	
PARALLEL_SAMPLES	
SAMPLING_METH	
PRETREAT_METH	
STORAGE_METH	
MEASUREMENT_METH	
TRANSECT	
LATITUDE	
LONGITUDE	
DEPTH	
COMMENTS	

Results data collected:

SAMPLE_ID	
HARBOUR_CODE	
SPECIES_NAME	
PARAMETER	
PREFIX	
VALUE	
UNIT	
COMMENTS	
COMMENTS_2	
IDENTIFICATION_CERTAIN	

Annex 3 – Target Species list

The target species list below was agreed at the time of the adoption of this version of the Joint Harmonised Procedure. The target species list is a living document and is always under review by HELCOM STATE and OSPAR BDC and will be updated if new information becomes available. Therefore please check http://jointbwmexemptions.org/ballast_water_RA for the latest edition.

Annex 4 – Detailed explanations for Risk Analysis Algorithm

Definitions:

BD Background data

EM Environmental matching risk analysis component

SpS Species-specific risk analysis component

1.1 1st level question (BD): Target species present? (1)

No No Target Species present: low risk

Yes Next level

1.2 2nd level question (BD): Target species equally common in both ports? (2)

Yes Target Species are very common in places of BW exchange.

No problem if some more are added: low risk

No Next level; includes cases in which only very few of the target species are present in one port, but the species is common in the other

1.3 3rd level question (EM): Do ports have very different salinities (≥ 30 PSU)? (3)

For the majority of organisms it would not be possible for all life stages to survive in waters with a difference of more than 30 PSU, and therefore the answer **yes** could mean low risk. To be on the safe side, even in this case a set of additional questions have to be answered for a final risk assessment.

Yes Branch of the 3rd level

No Next level

1.4 Branch of the 3rd level (BD): Is more than one target species present? (4)

The answers to this question lead to a species-specific **(SpS)** examination:

- If there is only one target species, the question is whether it tolerates a salinity range >30 PSU. (5):
  - If the answer is **no,** then the species will not be able to survive or reproduce in the new environment and the risk is regarded as acceptable;
  - If the answer is **yes,** then this species could establish itself in the environment. Because it is only one species, the risk is regarded as medium, and further criteria must be taken into account.
- If there are more than one target species that tolerates a salinity range >30 PSU? (6):
  - If the answer is **yes** the risk is regarded as unacceptable;
  - If the answer is **no**, then, as above, one species could establish itself in the environment. Because it is only one species, the risk is regarded as medium, and further criteria must be taken into account.

1.5 4th level (BD): Do the ports have the same salinity range? (7)

This question takes into account the salinity ranges defined in table 1. The marine environment is divided into three categories based on their salinity: saline, brackish and fresh water.

To be on the safe side, the limits of the categories should overlap: if the two locations are not in the same salinity range according to Table 1 but have a difference in salinity of less than 10 PSU, they should be regarded as being in the same range.

Yes Species of concern enter an area that has comparable conditions and are likely to survive: unacceptable risk

No Next level

1.6 5th level (BD): Is more than one target species present? (8)

Yes More than one target species is released into an environment that differs in salinity from the origin by less than 30 PSU: unacceptable risk

No Next level

1.7 6th level (SpS) Does the target species tolerate a salinity range >30 PSU? (9)

Yes If the physiological salinity tolerance of the target species is high, the species is likely to survive: unacceptable risk.

No If the salinity tolerance of the target species is very narrow (*e.g.* 5 PSU) it can be assumed that the species has no chances survival. Nonetheless a medium risk that requires further assessment is assumed. Note that it is not sufficient that the salinity tolerance is smaller than the difference of salinity between source and recipient area, as there is a potential for species adaptation.

Table 1: Classification of Salinity

Classification of Salinity according to the EU Water Framework Directive (Directive 2000/60/EC)		**PSU**	**PSU**	**Classification for risk assessment**
Euhalin	Marine, salinity is equal to the salinity in the ocean	> 30	> 18	Saline water
Polyhalin	Salinity is not much lower than salinity in the ocean	18 to < 30		
Mesohalin		5 to < 18	0.5 – 18	Brackish water
Oligohalin	Very low salinity, mainly in the inner coastal waters with a high amount of freshwater intake, like in lagoons	0.5 to < 5		
Fresh water		< 0.5	0 – 0.5	Fresh water

Annex 5 – Decision Support Tool

Introduction

The goal of the Decision Support Tool is to provide a simple interface to a risk assessment for translocation of target species in ballast water between harbours. It bases on a risk assessment algorithm, which uses the information about occurrence of target species and their characteristics for assessing the riskiness that they will survive and spread in the recipient harbour. Therefore a well-structured organization of the port sampling data and the species information is required.

User interface

The decision support tool is a web application that uses a start and a destination harbour as input and calculates three level of risk (low, medium and high) for a transfer between them as output. Different levels of explanations for the resulting risk assessment are provided.

The design is flexible and scalable. This means it is possible to integrate changes with little effort in the data structure and in the web application. It is possible to import data from the field measurements with standard database tools.

Contents of the database and respective data

The Risk Assessment Tool includes the following information components:

- Harbour profiles (statistical information about environment, size and some business parameters of harbours);
- In situ measurements (on the species detected in the harbours);
- Lists of target species (optionally defined for different regions);
- Risk Assessment Algorithm.

All parameters that should be sampled and that can be saved in the database for species, harbours and field measurements are listed in Annex 2. For this purpose, an Oracle11 database was created by Brockmann Consult GmbH.

System summary

The system is hosted on a Windows 2008 Server in an Oracle XE Database. The application has been built using APEX Software provided by Oracle. For more information, please refer to the Oracle APEX documentation

http://www.oracle.com/technetwork/developer-tools/apex/documentation/index.html?ssSourceSiteId=opn

The web application is hosted by the HELCOM Secretariat on behalf of OSPAR and HELCOM and is available for authorized users under address:

http://jointbwmexemptions.org/ballast_water_RA

The Risk Assessment Tool provides three different levels of access:

- Read only access – For all end users to view data and perform Risk Assessment. Credentials for this user access are: **"bw_reader**" as user and "**balwat**" as password;

- Read and Write access – This access enables to modify or correct specific data. Credentials for this user access are provided upon request to HELCOM Secretariat (helcom.secr@helcom.fi) and/or OSPAR Secretariat (secretariat@ospar.org);

- Read, Write and Load Data access – This is available for the advanced users like Data Managers & Data Administrators, who will Load new Data or Modify data when needed.

Once the application is accessed as "**bw_reader**" the information is available for consultation, starting with the main webpage which provides background information on the tool and gives access to eight tabs where information is structured as follows:

- **Home**: introduction on the tool as well as the administrative process to proceed with when asking for an exemption under the Joint HELCOM/OSPAR Harmonised Procedure;
- **Risk Assessment Algorithm**: used by the risk assessment tool to determine if there is a high, medium or low risk scenario of spreading of non-indigenous species by ships on voyages within ports in the Baltic and OSPAR area, based on the salinity in the port of departure and arrival, the salinity tolerance of target species and the occurrence of different target species in the start and destination ports;
- **All Species in the HELCOM/OSPAR area**: all species whose presence has been recorded in the combined HELCOM and OSPAR areas;
    - **Target Species in the HELCOM/OSPAR area**: target non- indigenous species selected and agreed by Parties to HELCOM and OSPAR;
- **Risk Assessment**: access to running A-4 risk assessment on spreading of non-indigenous species when travelling from port A to port B;
- **Quality Check**: quality of the samples with regard to number of species observed (species-area curves);
- **View Data**: additionally to the list of the species found in the different samples taken, information on the port characteristics, sampling environmental conditions and sampling methodology can also be viewed;
- **Additional Information & Help**: containing a user guide to help understand the tool, the data model behind the tool, two documents: the BWM Convention and the Joint HELCOM/OSPAR Harmonised Procedure, as well as the data sheets for field recording and the format suitable for transferring the collected information to the Risk Assessment Tool.

Annex 6 – National Administration Contacts

DRAFT (17 November 2014)

Official Contact Points for BWMC A-4 Exemptions

(missing countries to be added)

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