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Ballast Water and Alien Species: Regulating Global Transfers and Regional Consequences

Davor Vidas and Maja Markovčić Kostelac

Ecologists deem the alterations caused to biological diversity by the transfer and spread of alien (non-indigenous) invasive species to be one of the most serious threats to biodiversity – second in impact after habitat destruction.¹ Geologists remind us of the extent of the global migration caused by human activity, due in particular to marine organisms attached to ships or transported as ballast. As observed by Zalasiewicz:

The transfer of species globally has become a merry-go-round of living organisms without precedent in the Earth's four-and-a-half-billion-year history.²

Unlike with the 'traditional' forms of marine pollution, the transfer of marine organisms is virtually irreversible, and the consequences may be permanent. Although maritime transport is not the sole source of the invasion, it is the major source. The current proportions can be illustrated by the following:

Worldwide, there are more than 480,000 annual ship movements with the potential for transporting organisms. Calculations on the amount of ballast water carried with the world's fleet of merchant ships indicate that somewhere between 2–12 billion tons of ballast water are transported annually... In ballast tanks and as well as other ship vectors (including hulls, anchor chains and sea chests) ships may carry 4,000 to 7,000 taxa every day, ranging from viruses to fishes.³

¹ See: *Invasive Alien Species: Comprehensive Review on the Efficiency and Efficacy of Existing Measures for the Prevention, Early Detection, Eradication and Control*, doc. UNEP/CBT/SBS TTA/6/7, Annex: 'Adverse Impacts of Invasive Alien Species', 20 December 2000, p. 18; available at: <www.cbd.int/doc/meetings/sbstta/sbstta-06/official/sbstta-06-07-en.pdf>. On invasive alien species and global shipping, see Gollasch, chapter 17 in this book.

² J. Zalasiewicz, *The Earth After Us: What Legacy Will Humans Leave in the Rocks?* (Oxford University Press, 2008), p. 131. See also Zalasiewicz and Williams, chapter 2 in this book.

³ Gollasch, chapter 17 in this book, at p. 298.

With the exponential growth of global trade, facilitated by maritime traffic, the spread of alien species has grown accordingly. Three main vessel-source vectors for the transfer of organisms have persisted: ballast water (including sediment), hull fouling, and the cargo itself. This chapter focuses on ballast water – in itself important for the stability and safety of the ship and thus a key component of (global) maritime traffic.

REGULATING BALLAST WATER ISSUES: THE PARTICULAR SITUATION OF ENCLOSED OR SEMI-ENCLOSED SEAS

Over the past twenty years, the International Maritime Organization (IMO) has focused on developing international standards to reduce and ultimately eliminate the growing ecological problems related to the transfer of organisms in ballast water, while at the same time ensuring the unimpeded flow of maritime traffic. Here it should be recalled that some 90 per cent of global trade is transported by shipping. Therefore, major dilemmas are involved and delicate balances – related to global maritime trade, regional environmental status, and individual ship safety – must be taken into consideration.

In developing international standards for responding to such challenges, several principles are of paramount importance:

- due to the global nature of shipping, standards must be globally acceptable
- unimpeded flow of maritime transport needs to be ensured
- ship safety shall not be affected
- technology development for the reduction and ultimate elimination of harmful impact of transfer of organisms should be sought
- the particular situation and needs of certain sea areas and regions should be accommodated, to avoid the proliferation of a variety of national and regional approaches.

On the basis of the above principles, scientists, experts and policy-makers have gradually developed ballast water management standards⁴ now incorp-

⁴ The first resolution that referred to transfer of aquatic organisms through ballast water was adopted in 1973 at the MARPOL diplomatic conference, then at IMCO (Inter-Governmental Maritime Consultative Organization). However, the problem of harmful aquatic organisms was not raised as a separate issue in IMO until 1988. In 1991, the Marine Environment Protection Committee of the IMO adopted the Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediment Discharges: MEPC Resolution 50(31). Based on the Guidelines, IMO Assembly adopted in November 1993 the new Guidelines under the same title: Resolution A.774 (18). In November 1997, the IMO Assembly adopted the Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens: Resolution A.868(20).

orated into a legal instrument: the International Convention for the Control and Management of Ships' Ballast Water and Sediments (hereinafter: the Ballast Water Convention).⁵ It has been noted that the Ballast Water Convention can be considered to be a result of the application of the precautionary approach, since the Convention was 'achieved through the collaboration with the scientific community and in spite of the lack of detailed knowledge of the relationship between risk for ecosystems and human health and concentration of organisms in ballast water'.⁶

The objectives of the Ballast Water Convention are to prevent, minimise and *ultimately eliminate* the transfer of harmful aquatic organisms via ship ballast water and sediments.⁷ This ultimate objective is to be met through gradual introduction of technology for on-board *treatment* of ballast water, involving the implementation of a 'Ballast Water Performance Standard' with which ships will have to comply. Ballast water *exchange*, as currently still practised by various operators, is accepted as an *interim* measure only. However, some time still remains until ballast water exchange as a method is entirely phased out – under the Convention, that must be by the year 2016.

For many marine regions, and especially for enclosed or semi-enclosed seas,⁸ ballast water exchange poses difficult questions, often different from those for the areas facing the open ocean. European waters as a whole are largely characterised by ship-lanes being relatively close to shore: such is the situation in the North Sea and in the Baltic Sea, as well as in most of the Mediterranean Sea.⁹ In some enclosed or semi-enclosed seas, like the narrow and shallow Adriatic Sea, which is deeply incised into the European mainland (and is, in fact, a semi-enclosed basin within a larger semi-enclosed sea), the difficulties are strongly pronounced.

⁵ Text reprinted in *Ballast Water Management Convention*, IMO Publication 1620M (London: IMO, 2005).

⁶ M. Tsimplis, 'Alien Species Stay Home: The International Convention for the Management of Ships' Ballast Water and Sediments 2004', *IJMCL*, Vol. 19, 2005, pp. 411–445, at p. 445.

⁷ Art. 2 of the Ballast Water Convention. The Convention (Art. 1.8) defines as 'harmful' those aquatic organisms and pathogens which, if introduced into the sea (including estuaries) or into fresh watercourses, 'may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of the sea'. The term used in the Convention is 'harmful aquatic organisms and pathogens', and not 'alien species' or 'invasive alien species'.

⁸ For the definition of an 'enclosed or semi-enclosed sea', see Art. 122 of the United Nations Convention on the Law of the Sea (LOS Convention).

⁹ For an overview see M. David and S. Gollasch, 'EU Shipping in the Dawn of Managing the Ballast Water Issue', *Marine Pollution Bulletin*, Vol. 56, 2008, pp. 1966–1972, especially at pp. 1968–1971.

This chapter first briefly discusses some key features of the Ballast Water Convention.¹⁰ Thereafter, an overview of ballast-water management standards under the Convention is provided. Only some basic elements, particularly those relevant for the enclosed or semi-enclosed sea areas, will be briefly analysed. Finally, in view of the particular situation of some enclosed or semi-enclosed seas, aspects of measures adjusted to respond to their special needs are examined.

BALLAST WATER CONVENTION: KEY ELEMENTS

The Ballast Water Convention was adopted on 13 February 2004, at the International Conference on Ballast Water Management for Ships held at IMO in London.¹¹ Adoption of the Convention marked an important milestone in efforts aimed at reducing the risks arising from the transfer and introduction of harmful aquatic organisms and pathogens through ship ballast water.

However, the Ballast Water Convention has not yet entered into force, due to rather stringent requirements.¹² What is required is the ratification (or equivalent) of 30 states, the combined merchant fleet of which constitutes not less than 35 per cent of the gross tonnage of the world's merchant shipping.¹³ To date, seven years after the Convention was adopted, 27 states have ratified it, representing altogether only 25.32 per cent of the world gross tonnage of merchant fleet.¹⁴

¹⁰ For a comprehensive review and analysis of the Ballast Water Convention, see M.H. Fonseca de Souza Rolim, *The International Law on Ballast Water: Preventing Biopollution* (Leiden: Martinus Nijhoff, 2008). For a useful brief overview of the Convention, see 'New Convention on Ballast Water – Preventing Alien Invaders', *Environmental Policy and Law*, Vol. 34, 2004, pp. 120–123.

¹¹ For the text of the Convention, as adopted by the Conference, see IMO doc. BWM/CONF/36 of 16 February 2004. For the Final Act of the Conference, see IMO doc. BWM/CONF/37 of 16 February 2004; four Resolutions adopted by the Conference are attached to the Final Act.

¹² See Art. 18.1 of the Ballast Water Convention.

¹³ The Conference debated several alternative proposals for requirements for the entry into force of the Convention. The final decision, of increasing the number of states in comparison with some other recently adopted IMO conventions, may be said to reflect the (then forthcoming) marked expansion of EU membership, and the concern that the EU could become a bloc controlling international ratification processes at the IMO. The tonnage percentage requirement, however, is not considered particularly strict in comparison with earlier IMO practice. On the distribution of world gross tonnage of merchant fleet, see Leemans and Rammelt, chapter 16 in this book.

¹⁴ For the status of the Ballast Water Convention, see the document *Status of Multilateral Conventions and Instruments in Respect of which the International Maritime Organization or its Secretary-General Performs Depositary or Other Functions*, updated monthly, and available at the IMO website, <www.imo.org>; information included in this chapter is as of 31 March 2011.

Like several other IMO conventions, the Ballast Water Convention consists of a main body, containing provisions stipulating the basic rights and duties of the parties, and an Annex with more detailed regulations. The Annex forms an integral part of the Convention and contains five sections with actual Regulations. There are also two Appendices presenting certain standard formats.¹⁵ To facilitate global and uniform application of various requirements under the Convention, several Guidelines have been developed by the IMO Marine Environment Protection Committee (MEPC). These are of key importance for the uniform interpretation and harmonised implementation of the Convention, and currently include the following:

- Guidelines for sediment reception facilities (G 1)
- Guidelines for ballast water sampling (G 2)
- Guidelines for ballast water management equivalent compliance (G 3)
- Guidelines for ballast water management and development of ballast water management plans (G 4)
- Guidelines for ballast water reception facilities (G 5)
- Guidelines for ballast water exchange (G 6)
- Guidelines for risk assessment under Regulation A-4 of the Convention (G 7)
- Guidelines for approval of ballast water management systems (G 8)
- Procedure for approval of ballast water management systems that make use of active substances (G 9)
- Guidelines for approval and oversight of prototype ballast water treatment technology programmes (G 10)
- Guidelines for ballast water exchange design and construction standards (G 11)
- Guidelines on design and construction to facilitate sediment control on ships (G 12)
- Guidelines for additional measures regarding ballast water management, including emergency situations (G 13)
- Guidelines on designation of areas for ballast water exchange (G 14)

MEPC has also adopted Guidelines for ballast water exchange in the Antarctic Treaty area. While Guidelines 1 to 14 were developed by MEPC in the years from 2005 to 2008, the remaining Guidelines (G 15) for port-state

¹⁵ The forms in the appendices relate to: 1) the issuance of the International Ballast Water Management Certificate, and 2) operational recording for reporting and verification (to be controlled by inspections) of a Ballast Water Record Book.

control are under development by the relevant IMO bodies.¹⁶ As observed by one commentator, ‘the role of the guidelines is debatable... their name indicates that they are not mandatory but examples that need to be followed in the general sense’.¹⁷

The Ballast Water Convention applies to ‘ships entitled to fly the flag of a Party’ and ‘ships not entitled to fly the flag of a Party, but which operate under the authority of the Party’ (Article 3.1(a) and (b)). The provisions of the Convention, including its Annex and Guidelines, represent a ‘cookery book’ for establishing the regime necessary for implementing the objectives of the Convention. Their ‘recipes’ provide room for national or regional ‘flavouring’ to take account of specific local and regional circumstances. However, the Convention also emphasises the need for general consistency and predictability.

In respect of the rights, duties and obligations of the parties, the Convention has retained the division between flag state and port state, as in other IMO instruments. Coastal-state obligations relate mostly to the development of national ballast water strategies, policies and measures, monitoring, regional cooperation, and law enforcement in accordance with international law.

Rights and Duties in Implementing the Convention

The key objective of the Convention – of ultimately eliminating the transfer of harmful aquatic organisms via ship ballast water and sediments – is to be achieved through gradual implementation of a Ballast Water Performance Standard (Regulation D-2), discussed in further detail below. To meet this standard, it is anticipated that ships will conduct ballast water treatment, or have the opportunity to make use of ballast-water reception facilities.

The Ballast Water Convention requires that any ship of 400 gross tonnage and above carries a valid International Ballast Water Management Certificate (hereinafter: Certificate), an approved Ballast Water Management Plan and a Ballast Water Record Book. Technologies applied for meeting the standard under Regulation D-2 of the Convention must be approved (type approval).

¹⁶ The Guidelines G 1–G 14, and Guidelines related to the Antarctic Treaty area, have been adopted by the following MEPC resolutions: G 1: MEPC.152(55); G 2: MEPC.173(58); G 3: MEPC.123(53); G 4: MEPC.127(53); G 5: MEPC.153(55); G 6: MEPC.124(53); G 7: MEPC.162(56); G 8: MEPC.174(58); G 9: MEPC.169(57); G 10: MEPC.140(54); G 11: MEPC.149(55); G 12: MEPC.150(55); G 13: MEPC.161(56); G 14: MEPC.151(55); and Guidelines for ballast water exchange in the Antarctic Treaty area: resolution MEPC.163(56).

¹⁷ Tsimplis, ‘Alien Species Stay Home’, p. 445.

Parties are to ensure that ballast water management does not cause greater harm to their environment, human health, property or resources, or those of other states, than that which is thereby prevented.

To implement the objectives of the Convention, parties ‘shall endeavour’, beyond cooperation, to establish or support continued development and research work in relation to ballast water management; and to report to the IMO as well as to inform other parties on matters and aspects related to ballast water management.

The Convention does not prevent any party from taking, individually or jointly with other parties, more stringent measures in order to establish a more appropriate level of protection – provided that such measures are consistent with international law (Article 2.3). The procedures for introducing those ‘more stringent measures’ are elaborated under Regulation C-1, there termed ‘Additional measures’. The combined effect of the general obligations under the Convention (Article 2) with Annex, Section C (‘Special requirements in certain areas’) may prove to be of special importance for enclosed or semi-enclosed seas.

Facilitating Implementation of the Convention

Several interaction issues are addressed by the Ballast Water Convention regarding ‘administrations’¹⁸ and ships. Interference with the voyage of a ship is to be avoided to the highest degree possible, while satisfying the required level of protection to the marine environment against the introduction of harmful aquatic organisms through ship ballast water. The Convention operates with careful balances to this end; some of the outstanding issues are briefly reviewed here.

Reception facilities

The Convention requires parties to provide facilities for sediment reception in ports and terminals where cleaning or repair of ballast tanks takes place.¹⁹ The Convention’s balance between requiring, on the one hand, the avoidance of undue delay to ships, while still ensuring the prevention of damage to the environment, human health and resources, is evident also in the provision on sediment reception facilities (Article 5).

However, the Convention contains no mandatory requirements for a party to facilitate the reception of ballast water. Facilities for ballast water recep-

¹⁸ ‘Administration’ is defined in Art. 1.1 of the Ballast Water Convention as ‘the Government of the State under whose authority the ship is operating’.

¹⁹ Guidelines for sediment reception facilities (G 1) specify the requirements associated to such a facility.

tion may be considered by those parties that find the protective level against unwanted transfers offered by the performance requirements of the Convention insufficient, a point thus also related to the implementation of additional (more stringent) measures.²⁰

Survey and certification, inspection of ships, and 'undue delay'

In order to implement requirements and to enable monitoring of compliance, parties are obliged to establish regimes for survey (normally by or on behalf of the flag state), certification (by or on behalf of the flag state) and inspection (normally by or on behalf of a port state). The Convention contains provisions defining procedures for survey and the issuance of certificates (Article 7) as well as procedures concerning inspection (Article 9). These procedures are well consistent with generally established practices.

The port state has both the right and duty to perform inspections for the purpose of detecting violations of the provisions of the Convention. These are, however, limited to:

- verifying that the ship is carrying a valid Certificate;
- undertaking inspection of the Ballast Water Record Book; and
- sampling of the ship's ballast water, carried in accordance with the relevant guidelines (Guidelines for ballast water sampling, G 2).

Regarding sampling, the time required to analyse the samples is not to be used as a basis for *unduly delaying* the ship (its operation, movement or departure). 'Undue delay' and undue detention are important considerations under the Ballast Water Convention (Article 12), and relate also to verification of additional measures for survey and certification (Article 7.2), inspection (Article 9) and detection of violations and control of ships (Articles 8 and 10). Parties shall undertake all efforts to avoid undue delay to ships; and if a ship has been unduly delayed, it is entitled to compensation for the loss or damage suffered.

This right, however, is not an absolute one, and this is where the Ballast Water Convention operates with another important balance: safeguarding ship operations, on the one hand, and providing safeguards to the environment, human health, property or resources, on the other. If a ship is found to have violated the Convention, the port state may warn, detain or exclude the ship; that does not constitute 'undue delay'. The port state can in such cases grant the ship permission to leave the port or terminal for the purpose of discharging ballast water or proceeding to a repair yard or reception facility, *but it is under duty not to do so* if that would present a *threat of harm* to the

²⁰ Measures as provided for in Section C and its associated Guideline (G 13).

environment, human health, property or resources. Moreover, if sampling indicates that a ship poses such a threat, the party ‘in whose waters the ship is operating’ shall prohibit it from discharging ballast water until the threat is removed (Article 10.3); also that is not considered ‘undue delay’ to the ship.²¹

Finally, there is one more set of situations in which the party is obliged to ensure that the ship does not discharge ballast water until it can do so without threat of harm to the environment, human health, property or resources; and where thus there may arise an actual delay to a ship, without this being regarded as ‘undue’. This relates to the situations that may give rise to a *detailed inspection* (Article 9, paragraphs 2 and 3). Detailed inspection may be carried out in several cases, as follows:

- if a ship does not carry a valid Certificate;
- if there are clear grounds for believing that the condition of the ship or its equipment does not correspond substantially with the Certificate; and
- if there are clear grounds for believing that the master or the crew are not familiar with essential shipboard procedures relating to Ballast Water Management, or have not implemented such procedures.

In those circumstances, the inspecting party shall ensure that the ship does not discharge ballast water until it can do so without presenting a threat of harm to the environment, human health, property or resources.

However, no additional procedural rules for such detailed inspections are provided for by the Convention. In order to facilitate uniform implementation, it should be recommended that efforts be made in order to establish mechanisms for triggering such detailed inspections, as well as details of what such an inspection should encompass. While recognising the right of each party to develop national policies in its ports (Article 4), detailed inspection requirements could be optimally harmonised through regional coordination, preferably through regional memoranda on port-state control.

Violations

In relation to circumstances where violation of the Convention has been revealed, the rights and duties of the parties involve several key considerations. First, the ‘administration’ is authorised under the Convention to establish, through its legislation, sanctions against violations, and such sanctions shall be adequately severe to discourage violations. Second, when inspection

²¹ The term ‘in whose waters the ship is operating’, in the lack of any definition under the Ballast Water Convention, must be understood in accordance with customary international law, as reflected in the LOS Convention. See, in general, Art. 16 of the Ballast Water Convention.

indicates violation of the Convention, the ship and its administration should be notified; such notification is to include any evidence of the violation. And third, administration which has detected the violation shall investigate the matter and institute proceedings or provide the flag state in question with information and evidence of the violation in order for it to consider sanctions against the ship.

The flag state or the port state that detected the violation may take steps to warn, detain or exclude the ship. These actions represent both sanctions (detention and exclusion) as well as cooperation with other states (warning). A regional plan could include uniform responses to violations when these are detected. This may be considered through regional cooperation in conjunction with dealing with the concept of detailed inspections.

Technical assistance, cooperation and regional cooperation

Under the Ballast Water Convention, the parties undertake to provide support for other parties requesting technical assistance in several specifically enumerated aspects related to the control and management of ship ballast water (Article 13). Requested assistance and support includes training of personnel, assistance to ensure the availability of technology, equipment and facilities, and assistance to initiate joint research and development programmes. This may be arranged directly or through the IMO.

As to the transfer of technology regarding the control and management of ship ballast water and sediments, the parties undertake to cooperate, subject to their national laws, regulations and policies.

According to the Convention, parties with a common interest in protection against the unwanted transfer of harmful aquatic organisms and its potential effects in a given geographical area, in particular those bordering enclosed or semi-enclosed sea areas, shall endeavour – taking into account characteristic regional features – to enhance regional cooperation (Article 13.3). This relates to information exchange, but also to the conclusion of regional agreements, as well as the development of harmonised procedures. It may be anticipated that the encouragement offered by the Convention in this sphere will provide further stimulation for expanded involvement on ballast water issues, including regional cooperative participation.

STANDARDS FOR BALLAST WATER MANAGEMENT

The objectives of the Ballast Water Convention are to be achieved through implementing the management of ship ballast water and sediments, in accordance with the standards defined by the Convention. ‘Ballast Water Management’ is defined as:

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.²²

This definition predominantly reflects the precautionary approach, although the Convention combines both preventive and reactive approaches. The basic principle contained in Regulation A-2 of the Convention requires that any and all discharge of ship ballast water shall take place through ballast water management in accordance with the provisions of the Annex to the Convention.²³ Therefore, standards for ballast water management can be considered an essential part of the Convention. There are two groups of standards defined by the Convention: 'ballast water exchange standard' (Regulations D-1 and B-4) and 'ballast water performance standard' (Regulation D-2).

Ballast Water Exchange Standard

The Ballast Water Exchange Standard is derived from the earlier Guidelines,²⁴ and defines *how* and *where* exchange of ballast water must be conducted. Regulation D-1 relates to the question of 'how': in line with this standard, ships should exchange at least 95 per cent of the volume of their ballast water (for sequential exchange); or, if the pumping-through method is used, pumping through three times the volume of each ballast water tank is required. Regulation B-4.1 relates to 'where': ballast water exchange is to be conducted at least 200 nautical miles²⁵ from the nearest land²⁶ and at sea-depths of at least 200 meters. In cases where exchange at such a distance is not possible, exchange can still be conducted, but then as far from the nearest land as possible, and in all cases at least 50 miles from the nearest land; in any case, the water depth requirement remains at least 200 meters (Regulation B-4.1.2). This standard, therefore, relies on the difference in content and species characteristics between the oceanic and coastal waters, as well as deep and shallow waters.

²² Art. 1.3 of the Ballast Water Convention.

²³ Annex 'Regulations for the Control and Management of Ships' Ballast Water and Sediments' contains Regulations A-E, and forms an integral part of the Ballast Water Convention (Art. 2.2 of the Convention).

²⁴ The 1997 Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens; see footnote 4 above.

²⁵ All references to 'miles' hereinafter are nautical miles.

²⁶ The term 'from the nearest land' means, in accordance with Regulation A-1.6, from the baseline from which the territorial sea is established in accordance with international law (with an exception regarding the north-eastern coast of Australia, as detailed in Regulation A-1.6).

However, the exchange standard stops short of defining the desirable outcome – the quality or content of ballast water that would not impose harm once discharged into the marine environment. Under this standard, a ship has fulfilled its obligations if the ballast water on board has been exchanged in accordance with the standard, irrespective of the actual biological content of the water discharged. This is thus a procedural standard, consisting of two criteria: 1) volume percentage of ballast water exchanged; and 2) distance/depth where this is done. Compliance with the standard is not measured by the actual end-result, but only by the fact of it being successfully performed.

Indeed, this can be considered a practical measure that reduces the chances of invasion from living organisms in ballast tanks in a recipient port.²⁷ However, studies have shown that the degree of efficiency is uncertain.²⁸ The actual outcome depends on several factors, including the conditions on uptake, duration of voyage, characteristics of route, weather conditions, type of ship, quantity of ballast water and various other circumstances. Moreover, as will be discussed further below, in some sea areas this standard cannot be applied, due to geographic and hydrographic circumstances.

Ballast Water Performance Standard

In contrast to the exchange standard discussed above, the Ballast Water Performance Standard is a water-quality standard. It defines water quality – the content acceptable for discharge into a marine environment – by detailing the maximum content of organisms in ballast water as the requirement for satisfying the standard.²⁹ When it was adopted in the 2004 Ballast Water Convention, there were in fact no technologies available enabling its implementation. Therefore, the standard was at that time conceived as a *goal* for

²⁷ On invasions see J.M. Drake and D.M. Lodge, 'Global Hot Spots of Biological Invasions: Evaluating Options for Ballast-Water Management', *Proceedings of the Royal Society of London – B*, Vol. 271, 2004, pp. 575–580; available at <<http://aquacon.nd.edu/research/invasive-species/documents/DrakeandLodgeHotspots.pdf>>. As to the Mediterranean, see A. Occhipinti-Ambrogi and D. Savini, 'Biological Invasions as a Component of Global Change in Stressed Marine Ecosystems', *Marine Pollution Bulletin*, Vol. 46, 2003, pp. 542–551.

²⁸ Especially regarding regional seas, see T. McCollin, E.M. Macdonald, J. Dunn, C. Hall and S. Ware, 'Investigations into Ballast Water Exchange in European Regional Seas', in *Proceedings of the Second International Conference on Marine Bioinvasions*, New Orleans, 9–11 April 2001 (abstract available at <http://massbay.mit.edu/publications/marinebioinvasions/mbi2_abstracts.pdf>, pp. 100–101); and T. McCollin, A.M. Shanks and J. Dunn, 'Changes in Zooplankton Abundance and Diversity After Ballast Water Exchange in Regional Seas', *Marine Pollution Bulletin*, Vol. 56, 2008, pp. 834–844.

²⁹ For specifications, see Regulation D-2 of the Annex to the Ballast Water Convention.

technology developers rather than an available and applicable technical standard.³⁰

The corrective for uncertainty involved in the development of such a standard can be found in two elements of the Ballast Water Convention: 1) the phasing-in period for the ballast water performance standard; and 2) the provision for the review of standard.

Phasing-in period

'Phasing-in' or 'phasing-out' provisions are very common in IMO technical instruments, particularly those relating to ship design and equipment. They are necessary for many different reasons, including ship construction costs, building capacities, the need to allow stability in the shipping market (which directly influences the global economy), ensuring ship safety, as well as management and operational procedures.

In the case of Ballast Water Convention, the reason for defining a phasing-in period was the need to ensure sufficient time for the development of technology that could ensure the compliance with the performance standard envisaged by the Convention. The phasing-in period is from 2009 to 2016, depending on the date of a ship's construction and its ballast water capacity.³¹

The first implementation date, 2009, only five years after the adoption of the Ballast Water Convention, seems to have been too ambitious, and created some legal ambiguity. The time required to develop guidelines for accomplishing the Convention, the relatively lengthy processes of technology testing and approval, as well as the rather slow Convention ratification process all resulted in a need to postpone the deadlines defined by Regulation B-3.

Review of Standards

The described circumstances in which the Convention D-2 standard was developed required a specific 'adjustment mechanism' that could ensure adequate reaction, should the defined standard prove unrealistic or inadequate. What was sought was flexibility to ensure that the basic principles of the Convention would be maintained, even under changed circumstances.

³⁰ The latest MEPC session (in October 2010) gave final approval to six ballast water management systems that make use of active substances, bringing the current number of systems with final approval to 18 altogether. For an overview of ballast water management systems that make use of active substances, which received (either basic or final) approval from IMO (as of October 2010), see <www.imo.org/OurWork/Environment/BallastWaterManagement/Documents/table%20updated%20in%20October%202010.pdf>. Also, ten ballast water management systems which, as of October 2010, received type approval certification by their respective administrations are listed therein.

³¹ See Regulation B-3 of the Annex to the Ballast Water Convention.

This is provided by Regulation D-5, whereby MEPC is authorised to undertake a review of available technologies appropriate for achieving the defined standard, as well as an assessment of the socio-economic effects in relation to the developmental needs of developing countries. The Convention defined the latest date for this review: no later than three years before the earliest effective date of the standard set forth in Regulation D-2. Since that date was in 2009, the review was due in 2006.³²

Based on its assessment, the Committee (or a review group formed by it) may propose amendments to the Annex of the Ballast Water Convention for consideration by the parties to the Convention; indeed, only parties may participate in formulating recommendations and amendment decisions taken by the Committee. If the parties decide to adopt the amendments to the Annex, the procedure for adoption and entry into the force is as set out in Article 19 of the Convention. Thus, we see that MEPC serves the parties of the Ballast Water Convention as a technical advisory body mandated to assess, discuss, propose – but not itself amend – the standards of the Convention. That role is, also under general treaty law, reserved strictly for the parties.³³

The provisions of Regulation D-5 were designed to address the situation that arose during the assessment procedure from 2005 to 2007.³⁴ Another aspect to bear in mind is the fact that the Convention did not enter into the force by the first application date (2009) as set forth in Regulation B-3, which gives rise to the question of the principle of non-retroactivity under the law of international treaties.³⁵ The most appropriate legal option here could have been to adopt a Protocol to the Convention.³⁶ However, that was deemed impracticable. Instead, the IMO Assembly adopted a Resolution³⁷

³² See also Resolution 4, 'Review of the Annex to the International Convention for the Control and Management of Ships' Ballast Water and Sediments', adopted by the International Conference on Ballast Water Management for Ships, IMO doc. BWM/CONF/37, of 16 February 2004, p. 10.

³³ See Art. 39 of the Convention on the Law of the Treaties (done in Vienna, 22 August 1969, entered into force on 27 January 1980); published in UNTS, Vol. 1155, pp. 331ff; text reprinted in ILM, Vol. 8, 1969, pp. 645ff. Currently, since the Ballast Water Convention is not in force, and given its Art. 18, states that so far on the international plane established their consent to be bound by the Convention are 'contracting states'; see Art. 2(1)(f) of the Vienna Convention on the Law of Treaties.

³⁴ The first assessment took place during the 53rd session of MEPC in July 2005; it was followed by another, during the 55th session of MEPC in October 2006, and then during the 56th MEPC session in July 2007.

³⁵ See Art. 28 of the Vienna Convention on the Law of Treaties.

³⁶ See doc. BLG 11/4/3 submitted by the IMO Secretariat for the 11th session of the IMO Bulk Liquids and Gases Sub-Committee, held 16–20 April 2007. The document contains legal opinion provided by the IMO Legal Office.

³⁷ Resolution A.1005(25) adopted by the IMO Assembly at its 25 session, on 29 November 2007.

recommending that states, when establishing their consent to be bound by the Ballast Water Convention (by ratification, acceptance, approval or accession) accompany the relevant instrument with a declaration or other communication to the IMO Secretary-General, stating their intention to apply the Convention on the basis of the understanding that:

A ship subject to regulation B-3.3 constructed in 2009 will not be required to comply with regulation D-2 until its second annual survey, but no later than 31 December 2011.³⁸

The Resolution also calls for declaration to be submitted by the current contracting states to the Convention.³⁹ It could be expected that similar approach would be applied for further delay, if and when required. The Resolution requested MEPC to review, by its 58th session, the issue of a ship subject to Regulation B-3.3 constructed in 2010 and the immediate availability of type-approved technology to meet the D-2 standard.⁴⁰

Although there could be understanding for political and practical reasons behind this solution, from the legal point of view it seems an unusual practice, and one that may create additional uncertainty and reluctance towards ratification of the Ballast Water Convention.

Ballast Water Exchange Standard: Shortcomings and Options Available

Currently, and in the forthcoming period which may take some additional years, ballast water exchange is the most frequently used management tool. Its positive attributes are relative biological effectiveness, availability and, above all, the low costs involved. Open-ocean ballast water exchange can reduce the risk of ballast-water mediated invasion.

However, some aspects of ballast water exchange are particularly challenging for enclosed and semi-enclosed sea areas. Firstly, ballast water exchange is not 100 per cent effective in removing all harmful organisms from ballast tanks.⁴¹ Secondly, implementation of this method may, under various circumstances, endanger the stability and integrity of the vessel, particularly during severe weather conditions of the type frequently present on the open-ocean high seas. In such a situation, shipmasters would hesitate to exercise the risky operation of exchanging ballast water on the high seas, preferring

³⁸ Ibid., pt. 2.

³⁹ Ibid., pt. 4.

⁴⁰ Ibid., pt. 6.3. At the 59th session of MEPC (July 2009), it was confirmed that sufficient ballast water management systems would be available to ships constructed in 2010.

⁴¹ See, e.g., G.M. Ruiz and G. Smith, *Biological Study of Container Vessels at the Port of Oakland. Final Report*, 22 March 2005, available at: <www.serc.si.edu/labs/marine_invasions/publications/PortOakfinalrep.pdf>.

to conduct it in sheltered waters. That, however, means a greater probability of secondary introduction. Exchange of ballast water not undertaken in an open ocean environment significantly reduces its biological efficiency. Further, the more sheltered waters of semi-enclosed and enclosed seas are often sensitive marine environments, and thus more vulnerable to additional pressures.

Another shortcoming of the ballast water exchange standard lies in its limited applicability for shipping within an enclosed or semi-enclosed sea, where neither the distance from the shore nor the sea-depth can fulfil the requirements of the Convention. Matters are further complicated by the provision of Regulation B-4.3, stipulating that a ship shall not be required to deviate from its intended voyage or delay the voyage in order to comply with the ballast water exchange standard.

Ballast Water Exchange Area

The possibility of designating specific areas for the exchange of ballast water was meant as a relaxation provision for enclosed or semi-enclosed sea areas. In fact, however, this would hardly overcome the difficulties involved. The feasibility of designating an area for exchange of ballast water gives rise to many concerns, regarding several enclosed or semi-enclosed sea areas in particular. In addition to bio-geographical considerations and trading patterns, the development of such an exchange area will most likely affect its efficiency, due to deteriorating it over time. Another concern is that such areas may themselves become a source of secondary transfers of harmful aquatic organisms within a region. Increase in trade, as anticipated in most such sea-areas, may undermine the quality of the exchange area over time.

According to the Guidelines developed by the IMO,⁴² a potential ballast water exchange area should be assessed in order to ensure that its designation will minimise any threat of harm to the environment, human health, property or resources.⁴³ Consideration must be given to various oceanographic, physic-chemical, biological, and environmental parameters, as well as to the information on important resources in the area. It is equally important to take into account the navigational characteristics in the area in question. The designated area should be on or near usual navigational routes.⁴⁴ However, the area designation should not have an adverse impact to the safety of navigation: therefore, when selecting the area, location and size

⁴² Resolution MEPC 151(55) adopted on 13 October 2006: Guidelines on designation of areas for ballast water exchange (G 14); see also footnote 16 above and the accompanying text.

⁴³ *Ibid.*, pt. 8.2.

⁴⁴ *Ibid.*, pt. 7.2.4.

should be considered, as well as issues relating to the concentration of traffic in a limited area. The foreseen ballast water operations, proximity of other vessel traffic (like small crafts), traffic separation schemes and other routing measures in place, are all relevant factors here.

Moreover, related legal and political issues are inevitable. Regulation B-4.2 authorises the port state to designate an area for ballast water exchange, in consultation with adjacent or other states, in sea areas where the distance from the nearest land or the depth do not meet the parameters for ballast water exchange. In such a consultation process, the comments of adjacent or other states should be taken into account 'as far as practicable',⁴⁵ and no party should designate an area in the waters under the jurisdiction of another state without its explicit agreement.⁴⁶ It could be anticipated that the views and interests of a port state and those of adjacent or other coastal state(s) may differ, creating a potential source of conflict. In addition, although the discharge of ballast water is considered as operational discharge, intentional discharge in a zone designated for such a purpose could be considered as dumping, with all the legal consequences involved.

Several enclosed or semi-enclosed seas have relatively small surface areas and are narrow, highly ecologically sensitive, and of utmost importance for the coastal population. In most cases, these seas are highly integrated ecosystems that could be severely affected by the secondary introduction of invasive species. Moreover, due to the limited space within some semi-enclosed seas, fulfilling the exchange standard⁴⁷ within the exchange area of a limited size could entail significant delay for a ship. And traffic congestion could affect the safety of navigation.

All these elements need to be assessed in accordance with the Guidelines (G 14) against the main purpose of designating an area: minimising potential harm to the environment. Designation of an area where large quantities of ballast water are to be discharged and exchanged is a rather controversial issue, involving complex ecological, legal and political questions concerning some enclosed and semi-enclosed seas while offering only limited benefits for their sensitive marine environments.

Pending technology development enabling implementation of the ballast water performance standard in commercial shipping, and in the absence of an area designation, a further question arises: of the legality of a discharge of

⁴⁵ *Ibid.*, pt. 6.1.

⁴⁶ The term 'waters under jurisdiction' of a state, as used in the Ballast Water Convention, must be understood in accordance with customary international law, as reflected in the LOS Convention; see Art. 56(1)(b) of the LOS Convention, on jurisdiction in the EEZ.

⁴⁷ That is, exchange of at least 95 per cent of ballast water volume, or pumping three times the volume of each ballast water tank.

ballast water *not* conducted in accordance with Convention standards (B-4.1 or B-4.2). This may happen due to the character of the navigational route, since a ship is not required to deviate from its intended voyage. Regulation A-2 stipulates that the discharge of ballast water shall be conducted only through ballast water management in accordance with the provision of the Annex to the Convention, except where expressly provided otherwise. Therefore, the general rule is – no discharge if the ballast water has not been managed. Exceptions from that rule should be explicit. These are prescribed in Regulation A-3 and relate to safety and anti-pollution purposes, or to a discharge that is environmentally harmless. According to Regulation A-3:

The requirements of regulation B-3, or any measures adopted by a Party pursuant to Article 2.3 and Section C, shall not apply to:

1. the uptake or discharge of Ballast Water and Sediments necessary for the purpose of ensuring the safety of a ship in emergency situations or saving life at sea; or
2. the accidental discharge or ingress of Ballast Water and Sediments resulting from damage to a ship or its equipment:
 - .1 provided that all reasonable precautions have been taken before and after the occurrence of the damage or discovery of the damage or discharge for the purpose of preventing or minimizing the discharge; and
 - .2 unless the owner, Company or officer in charge wilfully or recklessly caused damage; or
3. the uptake and discharge of Ballast Water and Sediments when being used for the purpose of avoiding or minimizing pollution incidents from the ship; or
4. the uptake and subsequent discharge on the high seas of the same Ballast Water and Sediments; or
5. 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 areas has occurred. If mixing has occurred, the Ballast Water taken from other areas is subject to Ballast Water Management in accordance with this Annex.

In addition, parties are authorised to grant exemptions, but these are related to the implementation dates of D-1 (exchange) or D-2 (performance) standard, or to additional measures – and are thus not relevant for the above question.

It can be therefore concluded that, apart from the exceptions provided for in Regulation A-3, ships are not allowed to discharge ballast water unless treated or exchanged in accordance with the standards under the Ballast Water Convention. However, the Convention does not provide clear directions regarding the relationship of the dispensation given in Regulation B-4.2 and discharge admissibility. A relevant regional arrangement or, in some cases, national provisions could fill this gap.

Additional Measures

For several enclosed or semi-enclosed seas, better solutions than the designation of specific areas for ballast water exchange – particularly in the transitional period while ballast water exchange standard prevails – could be to develop additional/more stringent measures as provided in Article 2.3 of the Ballast Water Convention and in Regulation C-1. This regulation contains provisions for parties that do not find the level of protection offered by Section B of the Annex to the Convention sufficient to prevent, reduce, or eliminate the transfer of harmful aquatic organisms and pathogens through ship ballast water and sediments. Such party or parties may, consistent with international law, require ships to meet a specified standard or requirement. The need for such additional (more stringent) measures may rest on geographical characteristics or on circumstantial situation; hence, the measure may be permanent, or time-limited. However, a party whose view is that additional/more stringent measures are therefore needed should, prior to establishing these, consult with adjacent or other states that may be affected by such standards or requirements.

Parties intending to introduce additional measures are subject to several obligations and/or considerations, including in particular:

- communication of their intention to establish additional measure to IMO at least six months prior to the projected date of implementation of the measure (except in emergency or epidemic situations);
- obtaining approval by the IMO, yet only to the extent required by customary international law as reflected in the LOS Convention;
- to endeavour to make available all appropriate services, as far as practicable, in order to ease the burden on ships, including notification to mariners of areas, and available and alternative routes or ports; and
- no additional measure is to compromise the safety and security of the ship, nor conflict with any other convention with which the ship must comply.

Although the additional measures may be imposed by a single state, it is preferable for measures to be defined through regional cooperation. Article 13.3 of the Convention deals specifically with regional cooperation in enclosed and semi-enclosed seas. It invites parties with common interests to protect the environment, human health, property and resources to endeavour, taking into account characteristic regional features, to enhance regional cooperation, including through the conclusion of regional agreements.

The Convention does not specify the substance of the measures, leaving to the interested parties the freedom to develop measures appropriate to the needs of a particular area. However, as regards the principles and procedures

to ensure a transparent and harmonised approach, the relevant Guidelines for additional measures⁴⁸ should be followed.

ENCLOSED AND SEMI-ENCLOSED SEAS SURROUNDING EUROPE: ANTICIPATING THE ENTRY INTO FORCE OF THE CONVENTION

As noted initially, European waters are characterised by ship-lanes being relatively close to shore: such is the situation in the North Sea and in the Baltic Sea, as well as in most of the Mediterranean Sea. In some enclosed or semi-enclosed seas, like the narrow and shallow Adriatic Sea, the difficulties are strongly pronounced.

The problem for those seas arises, at the outset, because the Ballast Water Convention is not yet in force; and once in force, it will be binding for its parties only. There is, moreover, no common policy on ballast-water issues at the EU level so far;⁴⁹ only recently have the EU bodies taken the first steps towards a coordinated approach to this issue.⁵⁰ Also, there are no legal mandatory requirements at various European enclosed and semi-enclosed sea levels; some countries have, however, adopted national regulations.⁵¹

Two approaches have emerged through regional cooperation in recent years, in anticipation of the entry into force of the Ballast Water Convention. One approach is the introduction of certain *voluntary* ballast-water management requirements in accordance with the Convention, until its entry into force. In 2008, such voluntary interim application of aspects of the Ballast Water Convention, in particular the ballast-water exchange standard in accordance with Regulation D-1, was introduced by HELCOM and OSPAR countries for shipping in the north-east Atlantic and the Baltic Sea.⁵² These

⁴⁸ Resolution MEPC.161(56) adopted on 13 July 2007: Guidelines for additional measures regarding ballast water management including emergency situations (G 13).

⁴⁹ Indeed, so far (31 March 2011) only four EU member states have at all ratified, approved or acceded to the Ballast Water Convention: France, the Netherlands, Spain and Sweden. Regarding semi-enclosed seas discussed, two Adriatic coastal states have acceded to the Convention: Albania and Croatia – while the two EU-member coastal states (Italy and Slovenia) have not as yet. Among the Baltic Sea coastal states, only Sweden has acceded to the Convention. Only one additional European coastal state acceded to the Convention so far: Norway. Finland signed the Convention, subject to acceptance. Among the Mediterranean coastal states, in addition to the four already mentioned (Albania, Croatia, France and Spain), there are only two more contracting states to the Convention: Egypt and Syria.

⁵⁰ See Ringbom, chapter 20 in this book, on recent activity by the European Maritime Safety Agency.

⁵¹ See Gollasch, chapter 17 in this book. See also an overview of developments in several semi-enclosed seas surrounding Europe in David and Gollasch, 'EU Shipping in the Dawn of Managing the Ballast Water Issue', pp. 1969–1971.

⁵² See further in Gollasch, chapter 17 in this book, at pp. 302–303.

requirements apply to extra-regional traffic, i.e., to vessels entering the north-east Atlantic on trans-Atlantic voyages and on routes passing the West African coast.

Another approach, aiming at *legally binding* measures, has emerged in the Adriatic Sea regional cooperation, and has been discussed between Adriatic countries since 2006, in the context of an initiative towards PSSA designation for the Adriatic Sea.⁵³ That approach involves introducing regionally-adjusted ballast water measures, upon joint regional initiative brought to the IMO through *ad hoc* procedures. Among the measures considered are the designation of the Adriatic Sea as a ‘no ballast water exchange area’, thus requiring ships to undertake ballast water exchange prior to entry to the Adriatic Sea area (which, once the Convention is in force, would become the situation on both legal and factual grounds);⁵⁴ and mandatory ship reporting on ballast water entering the Adriatic Sea. While these two measures may stand independently, they would create an optimal effect in tandem; and both measures should be regarded as temporary, pending entry into force of the Ballast Water Convention and actual implementation of ballast water performance standard under the Convention. In the current situation, both measures would be subject to approval by the IMO to gain legally binding force at the global level – even though the Convention itself is not in force, and might not enter into force for some time (and even then will not become binding for third states, including many IMO member states).⁵⁵ One procedural possibility considered among the Adriatic states is the inclusion of such measures as associated protective measures in the proposal for PSSA designation. Whether such measures may be proposed already in advance of the entry into force of the Ballast Water Convention is a legal issue,⁵⁶ while it

⁵³ For a comprehensive overview and discussion on the Adriatic PSSA initiative see D. Vidas, ‘Particularly Sensitive Sea Areas: The Need for Regional Cooperation in the Adriatic Sea’, in K. Ott (ed.), *Croatian Accession to the European Union: The Challenges of Participation* (Zagreb: Institute of Public Finance and Friedrich Ebert Stiftung, 2006), pp. 347–380; available at <www.ijf.hr/eng/EU4/vidas.pdf>. As to the related ballast-water measures proposed, see *ibid.*, at pp. 368–369. These measures were initially elaborated in *Ballast Water Issues for Croatia – Adriatic PSSA*, Report prepared for the Croatian Ministry of the Sea, Transport and Infrastructure, February 2006 (Lysaker: The Fridtjof Nansen Institute and Det norske Veritas, 2006), unpublished, on file with the authors.

⁵⁴ There are indeed certain management and practical by-products to consider, in terms of possible effect on inter-Adriatic traffic, on the ports within the Adriatic Sea, and on the modalities of traffic arriving to the Adriatic Sea – that all would need to be taken into account when designing the proposed measure. Similarly to HELCOM/OSPAR practice, the main target of such a measure would be traffic of extra-regional origin.

⁵⁵ The latter measure (mandatory reporting), in order to gain legal effect on third states, should in any case (with the Ballast Water Convention in force or not) be approved by the IMO.

⁵⁶ As to the legal basis related to the associated protective measures in the PSSA context, see dis-

is a matter of policy whether the measures so proposed would thereupon be adopted at the IMO.

It has been observed that ‘the HELCOM/OSPAR and Adriatic approaches may be taken as a starting point for the development of a European-wide concerted approach’.⁵⁷ Once the Ballast Water Convention is in force and the ballast-water performance standard in place, these regional approaches will no longer be needed. In the interim, however, it is difficult to see what other options are left to the coastal and port states of the enclosed and semi-enclosed seas concerned.

CONCLUSION

The Ballast Water Convention is a comprehensive legal instrument, and one that in the long term could ensure the reduction and, ultimately, elimination of the serious environmental challenge caused by the transfer of aquatic organisms via ship ballast water. However, in the transitional period, while ballast water exchange remains the most frequently used management tool, additional and more stringent measures, based on regional cooperation, will be the best solution for the highly sensitive marine ecosystems of enclosed and semi-enclosed sea areas. Instruments of regional cooperation can fill the gap until the Convention enters into force, as well as deal with its identified shortages in the transitional period. Also in the later stage, regional cooperation will remain the instrument through which implementation of global standards can be ensured, taking into account the specific needs of certain regions – a consideration of particular importance for highly environmentally sensitive enclosed and semi-enclosed sea areas. Bearing in mind the global character of shipping, also regional cooperation should take into account globally defined standards. As for national legislation, its predominant role must be to ensure implementation and enforcement in accordance with international law.

cussion in IMO doc. 53/8/2 of 15 April 2005, especially para. 12, pp. 4–5. Approval of the IMO is required for additional measures proposed only to the extent required under customary international law, as reflected in the LOS Convention (Regulation C-1, para. 3.3 of the Annex to the Ballast Water Convention). See further in Vidas, ‘Particularly Sensitive Sea Areas’, p. 368.

⁵⁷ David and Gollasch, ‘EU Shipping in the Dawn of Managing the Ballast Water Issue’, p. 1971.

