Chapter 15

Responsive Ocean Governance: The Problem of Invasive Species and Ships' Ballast Water – An EU Study

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15.1. Introduction

Shipping is the dominant mode of transport worldwide, accounting for nearly two-thirds of world trade. Furthermore, maritime traffic is steadily increasing. As much as 85 percent of all maritime traffic takes place in the northern hemisphere (North Atlantic, Northern Europe, North Pacific).[1] Accordingly, problems related to shipping are particularly relevant in the northern hemisphere, including the transfer of unwanted alien organisms in ships' ballast water.[2] Commodities are often transported in ships on "one-way routes" without suitable cargo for the return trip; hence the need to take on ballast water to help stabilise the vessel.[3] Shipping in general is one of the primary vectors for the transfer of marine invasive species nationally and internationally.[4]

Shipping is of utmost importance for Europe: about 90 percent of the European Union's (EU) external trade goes by sea. The United States, Europe, and Japan are the biggest exporters of ballast water by crude oil carriers.[5] In Europe (like in many other regions), inshore marine areas are among the ecosystems considered to be most vulnerable to invasions. Moreover, dense transport networks tend to increase the amount and frequency of introductions

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[1] O. Endersen, H. L. Behrens, S. Brynestad, A. B. Andersen, and R. Skjong, "Challenges in Global Ballast Water Management," *Marine Pollution Bulletin* 48 (2004): 615–623, p. 616.

[2] "Preventing Pollution from Ships," European Maritime Safety Agency (July 2008).

[3] P. E. Hulme, "Biological Invasions in Europe: drivers, pressures, states, impacts and responses," in R. E. Hester and R. M. Harrison, eds, *Biodiversity Under Threat*, Issues in Environmental Science and Technology No. 25 (Cambridge: The Royal Society of Chemistry, 2007), pp. 56–80, at p. 60.

[4] E.g., M. Doelle, M. L. McConnell, and D. L. VanderZwaag, "Invasive Seaweeds: global and regional law and policy responses," *Botanica Marina* 50 (2007): 438–450, p. 442.

[5] "Preventing Pollution from Ships," n. 2 above.

of alien species.[6] The EU has a significant number of ports used for international trade. In addition, there are numerous "secondary" ports for transporting goods inside the EU region.[7] As a consequence, about a thousand species (from bacteria to fishes) have been recorded in the ballast water entering European ports.[8] Of these, alien species of *European* origin still constitute the largest group, due to the importance of trade within Europe (and the Single Market). Intra-European trade has grown considerably, but trade with China, for instance, has also multiplied. The increasing spread of invasive alien species (IAS) is closely linked to the increasing volume of trade. Furthermore, as sources of trade become more diverse, a greater variety of IAS can be expected.[9] Additionally, as an important exporter, the EU contributes to the spread of IAS to other parts of the world, something for which it should take responsibility.[10]

The problem of invasive alien species and ships' ballast water is in many respects quite similar in Canada and the EU. The biogeographical conditions of the two regions are largely alike. The EU consists of numerous states, but Canada has had to address IAS issues in shared waters with the United States. Accordingly, Canadian responses to the problem can serve as useful examples for the EU to learn from. Furthermore, Europe shares the problem of invasive aquatic organism with Canada, as well as the United States, in the very practical sense that the risk of introductions of alien organisms via ballast water is often particularly high where traffic between these regions is concerned. For instance, evaluation of transport of ballast water to the western coast of Norway has shown that ballast water from the northeast coast of the United States poses a high risk all year round. The risk is equally high in case of ballast water from Vancouver, Canada. This is because the biogeographical compatibility level between these regions is high, as well as the overlap in temperature, salinity and other such conditions. Somewhat surprisingly, perhaps, shipping within Europe can pose much lower risks in this respect. For instance, water transported to the Norwegian coast from Greece (Mediterranean) is estimated to have a high risk level only in spring time; for the rest of the year, the risk level is only "medium." In a similar manner, the Atlantic coast of Spain is evaluated to have

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[6] Hulme, n. 3 above, p. 62.

[7] M. David, S. Gollasch, C. Hewitt, and L. Jakomin, "Ballast Water Management for European Seas – Is there a need for a decision support system," *OCEANS 2007 – Europe* (June 2007): 1–6, p. 2.

[8] Id.; Hulme, n. 3 above, p. 61.

[9] Hulme, n. 3 above, p. 75.

[10] "Developing an EU Framework for Invasive Alien Species," Discussion Paper (Final), available: <http://ec.europa.eu/environment/nature/invasivealien/docs/ias_discussion_paper.pdf> (retrieved 23 November 2008), p. 17.

a mere "medium" compatibility level in relation to the western coast of Norway.[11]

Often foreign organisms are not able to survive in a new environment. When they are, however, the economic, environmental, and social consequences of invasions can be significant. A Background Paper to a recent European Ballast Water Management Workshop organised by the European Maritime Safety Agency EMSA (see more below) described the European status of invasive aquatic species in the following manner:

> Numerous alien species have also been introduced into the North Sea, the Baltic Sea, the Mediterranean and the Black Sea. Only in a few cases has it been possible to estimate the cost of the damage caused by non-indigenous species. In the North and Baltic Seas, for example, the shipworm *Teredo navalis* has caused considerable damage by attacking coastal protection structures such as pilings made of domestic wood. A study from 2004 by the Hydrographic Service of the Federal Republic of Germany sought to determine the economic impacts of the introduction of exotic species in fisheries, aquaculture, coastal facilities for shipping and tourism, and other sectors. Its conclusion was that the shipworm, for example, has caused economic damage in the amount of an estimated 50 million Euro since its introduction into the Baltic Sea in 1993. The Chinese mitten crab has caused an estimated 73.5–85 million Euro economic damage in German waters.[12]

This chapter examines the ballast water issue in the European context in particular. It outlines existing and, above all, potential EU responses to the problem of invasive non-indigenous species affecting the marine environment through the introduction of ballast water. It starts with an overview of the problem in the European context. This is followed by a short introduction of ballast water management options. The study then examines EU law from the point of view of the ballast water issue. First, it sketches out the relationship of the EU and its Member States in terms of responsibility for responding to the problem. The relationship of EU legislation and international regulation of ballast water management is also discussed. In addition to existing regulation and expected future developments in ballast water management in the EU, the

[11] Endersen et al., n. 1 above, pp. 620–621.

[12] "Control and Management of Ships' Ballast Water and Sediments: Developing a European Approach," Background Paper, EMSA Workshop (November 2008), p. 2. For a more detailed assessment of aquatic IAS in Europe, see E. Leppäkoski, S. Gollash, and S. Olenin, eds, *Invasive Aquatic Species of Europe: Distribution, Impacts and Management* (Dordrecht, Boston: Kluwer Academic Publishers, 2003).

study examines the most important sub-regional attempts within Europe to address the problem. The conclusion sums up the present situation and outlines possible future approaches from a European perspective. It is argued that the Canadian responses to the problem of invasive alien species being transported in ships' ballast water could serve as a useful source of inspiration for European decision makers.

15.2. Ballast Water Management

Organisms transported in ships' ballast are clearly a problem. Aquatic IAS have caused a lot of damage worldwide and there hardly is disagreement about the need to control their movements and effects. Far less unanimity exists over how to do this in practice, however. In addition to differences of opinion, a significant restrictive factor is the state of development of suitable technologies for combating the problem.

At the moment, the method most often used for controlling the introduction of non-indigenous species in ships' ballast is the exchange of ballast water mid-ocean. The idea is that coastal aquatic organisms released at high sea are unlikely to survive there, and vice versa. Moreover, organism densities are significantly lower in the high sea areas.[13] However, such exchange is not always easy to perform. The safety critical significant wave height for open sea exchange is approximately three metres. An average ballast voyage by vessels engaged in international trade is seven days, of which five are spent on the high seas. Depending on the ballast water exchange method used, the exchange may take up to two days when larger ships are concerned.[14] The calculations concerning the possibility of performing ballast water exchange under the criteria of three metre wave height and five days show that of ships which need one day for ballast water exchange, seven percent will not be able to perform open sea exchange in practice (meaning that 93 percent of such vessels can do it). If a ship needs two days for the exchange, the chance of being able to exchange ballast water drops to only 70 percent, leaving 30 percent of these ships not capable of performing exchange. Variations in seasonal traffic, geography and weather conditions further influence the possibilities, often to the detriment of vessels operating in the northern

[13] David et al., n. 7 above, p. 2.

[14] Most ships (approximately 75 percent) use sequential exchange of ballast water. The so-called continuous flushing method is often a safer option, but it also significantly increases the exchange time and costs. See Endersen et al., n. 1 above, pp. 616–617.

hemisphere. Not surprisingly, the chances to perform ballast water exchange are significantly reduced in winter conditions.[15] Some of the European seas, for instance, are covered by ice for long periods of the year.

As pointed out in the Canadian part of this study (see Chapter 14 of this book), open sea exchange of ballast water is viewed by many as posing unacceptable safety risks, which can even be in contravention of the annexes to the 1974 International Convention for the Safety of Life at Sea[16] and its 1978 Protocol (SOLAS). The 2004 Ballast Water Management Convention (see more below) exempts ships from the duty to comply with its ballast water exchange requirements when the exchange would threaten safety or stability of the ship.[17] In addition to safety concerns, there are other factors which also limit the feasibility of open ocean exchange of ballast water in many areas. In the North and Mediterranean seas, for instance, ships use mostly shallow coastal routes. Also in the North Atlantic, 60 percent of vessels sail within 200 nautical miles from shore. In the Baltic Sea, ships have to operate in very narrow straits and shallow waters (see more below). In fact, a large amount of all ship traffic is regional or coastal trade; in Europe, for instance, some 60–65 percent of the traffic is regional.[18] Furthermore, ballast water exchange is not 100 percent biologically effective, and is thus considered only as an interim measure.

The Ballast Water Management (BWM) Convention of the International Maritime Organization (IMO)[19] will, once in force, provide global performance standards for ballast water and sediments management. The Convention requires phased implementation of its standards to replace ballast water exchange (D-1 Performance Standard) with ballast water treatment (D-2 Performance Standard) as suitable technologies become available. All ships will have to implement a Ballast Water and Sediments Management Plan (Regulation B-1), and have a Ballast Water Record Book (Regulation B-2). The same requirements apply to existing ships, after a phase-in period. However, the standards of the BWM Convention have been described as representing only a "minimum level of improvement"[20] and thus necessitating further development. The Convention establishes a review process for assessing whether its standards are achievable and if more progress could be made.

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[15] Id., pp. 617–618.

[16] *International Convention for the Safety of Life at Sea*, 1 November 1974, 1184 *U.N.T.S.* 2.

[17] Annex (Regulations for the Control and Management of Ballast Water and Sediments), Regulation B-4.4.

[18] Endersen et al., n. 1 above, p. 618.

[19] *International Convention on the Control and Management of Ships' Ballast Water and Sediments, 2004*, IMO BWM/CONF/36 16 February 2004 [hereinafter BWM Convention].

[20] I. Meliane and C. Hewitt, *Gaps and Priorities in Addressing Marine Invasive Species*, IUCN Information Document (Gland: IUCN, 2005), p. 4.

Additionally, tier-two regional measures can be adopted for the protection of particularly sensitive areas, for instance.[21] The phasing-in of ballast water treatment in all ships with a type-approved treatment technology is foreseen by the end of 2015 at latest.[22]

However, to date, the only viable ballast water management option has been ballast water exchange. Accordingly, the BWM Convention defines where ships are allowed to exchange ballast water during the transitional period, before treatment systems can and must be used. As a general rule, all ships must, whenever possible, conduct ballast water exchange at least 200 nautical miles from the nearest land and in water depth of at least 200 metres, taking into account the Guidelines developed by IMO (Regulation B-4.1). Where these requirements cannot be met, the port state may designate (in consultation with adjacent or other states) special areas where vessels can conduct the ballast water exchange (Regulation B-4.2). This must be done in accordance with the IMO Guidelines.

Unfortunately, in areas such as the Baltic Sea, the general requirements of the BWM Convention for conducting ballast water exchange cannot be met. The Baltic Sea has a mean depth of 55 metres only and all areas deeper than 200 metres are within less than 50 nautical miles to the nearest land.[23] In practice, ballast water exchange is a very limited option for ballast water management within the Baltic Sea.[24] Due to the specific conditions in this sea area, regional cooperation for minimising the risk of ballast water mediated introductions of unwanted alien organisms is particularly relevant. Prevention of invasions is of utmost importance because alien species once settled somewhere in the Baltic Sea can often easily spread even through natural

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[21] Regulations, Section C, "Special Requirements in Certain Areas." Additionally, Article 2.3 provides that states can take "individually or jointly with other Parties, more stringent measures with respect to the prevention, reduction or elimination of the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments, consistent with international law." Article 13.3 continues: "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 arrangements to develop harmonized procedures."

[22] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 6.

[23] *Ballast Water Scoping Study: North Western Europe,* Det Norske Veritas, Report No. 2005-0638 (Revision No. 02; 21 June 2006), p. 28.

[24] Sweden is considering postponing its ratification of the BWM Convention until 2016 (when all vessels are required to treat their ballast water) for the very reason that ballast water exchange is not very feasible in the Baltic Sea. Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

means. Possibilities for effectively preventing secondary introductions through ballast water within the region are also very limited. Accordingly, *internal* Baltic ship traffic is not of primary interest in this context.[25] The North Sea and some regions of the Mediterranean have similar constraints in respect to ballast water exchange.[26]

Ballast water issues were recently discussed in the IMO Marine Environment Protection Committee (MEPC) 58. The Ballast Water Review Group convened in early October 2008 to evaluate the availability of ballast water treatment systems on the market, and to consider whether it is possible to demand that new vessels built in 2010 are fitted with ballast water treatment equipment in accordance with the BWM Convention (D-2 Standard). Compliance with the requirement has already been postponed as concerns ships to be constructed in 2009. At the moment, however, there are already some type-approved treatment systems available.[27] Moreover, it has been estimated that by 2010, there will be several ballast water treatment systems on the market. Hence it should be possible to find suitable ballast water treatment equipment for most ships and shipping routes. The issue will be discussed further in MEPC 59. MEPC 58 also approved the last BWM Guideline (G2), on ballast water sampling (for controlling compliance with the BWM Convention).[28] Now that all 14 BWM Guidelines have been approved and an increasing number of ballast water treatment systems will be available, prospects for the BWM Convention to be ratified and, eventually, enter into force look better than ever.[29] The IMO is encouraging states to ratify the Convention as soon as possible. A significant step forward was the recent ratification by Liberia, a major seafaring country.[30]

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[25] Ballast Water Scoping Study, n. 23 above, pp. 30–31.

[26] David et al., n. 7 above, p. 3.

[27] For a current assessment of the availability of ballast water treatment technology, see *Ballast Water Treatment Technology – Current Status*, Lloyd's Register (September 2008), available: <http://www.lr.org/NR/rdonlyres/04FE9132-031E-4468-A567-F69359B3E86E/85364/BWT021008.pdf> (retrieved 23 November 2008). The systems approved by MEPC 58 are a South-Korean Electro-Clean system and a Norwegian OceanSaver system. Additionally, initial approval was given to three other ballast water treatment systems (Japanese, Dutch and German) which can be tested in international waters. Markus Helavuori, Maritime Inspector, FMA, pers. comm. (14 October 2008).

[28] The Guideline will be supplemented later by additional port state control instructions and an IMO circular letter for further guidance on sampling and analysing of samples. Id.

[29] Id. For a more detailed assessment of the present situation, see "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, pp. 7–9.

[30] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

15.3. European Union

The legal system of the European Community (EC) consists of exclusive competence of the Community in some specific areas of operation; competence shared between the Community and Member States in certain other areas; and, finally, areas of operation where EC Member States have, in principle, exclusive jurisdiction. Responsibility and jurisdiction to act in a particular area are determined by the level of competence. The Single Market is based on the principle of free movement of goods within the Community. Accordingly, the EC has exclusive competence in relation to the free movement of goods within Community territory (Treaty establishing the European Community,[31] Arts. 28–29). Quantitative restrictions imposed by Member States on imports and exports can be justified only in special cases (listed in Article 30). Even in these cases, Member States' restrictions are not allowed to "constitute a means of arbitrary discrimination or a disguised restriction on trade between Member States" (Art. 30).

In practice, IAS-related restrictions imposed by Member States could be treated as "disguised restrictions on trade," and hence a breach of Community legislation.[32] The European Court of Justice (ECJ) has examined thus far only two cases in relation to control of IAS.

> The first, in 1994, concerned imports of live freshwater crayfish to Germany (case C-131/93).[33] The Commission sued Germany for initiating a ban on live crayfish imports. The ban was a response to crayfish plague (*Aphanomyces astaci*), which was being spread mainly by the introduction of alien species of crayfish. The German law required an import licence to be obtained for the import of live crayfish into Germany. Even with such a licence, crayfish could be imported only for research and teaching purposes. A conditional exemption was provided to allow the import of crayfish for a limited time. The Commission argued that such restrictions were in violation of the EC Treaty because they established import bans against member states. The ECJ found in favour of the Commission, as it considered that the

[31] *Treaty establishing the European Community,* 25 March 1957, *Official Journal* C 325 (24 December 2002).

[32] C. Miller, M. Kettunen, and C. Shine, *Scope Options for EU Action on Invasive Alien Species,* Final Report for the European Commission, ENV.B.2/SER/2005/0078r, Institute for European Environmental Policy (Brussels, June 2006), pp. 53–54. For a more detailed assessment, see id., pp. 54 et seq.

[33] *Commission of the European Communities v. Federal Republic of Germany*, E.C.R. 1994, p. I-03303.

reduction in risks from the crayfish plague could have been achieved through measures that were less restrictive on intra-Community trade. Alternatives to a ban could have included requirements for health certification for the crayfish, or regulation of the marketing and management of crayfish within Germany.

The second case was the 'Danish bees case' (case C-67/97).[34] Danish law prohibited the keeping of any non-indigenous species of nectar-gathering bee on the island of Læsø, the only species permitted being the brown bee indigenous to that island. When the Danish government pursued a prosecution against an individual who was breaching this rule, he claimed that the law constituted a quantitative restriction on imports and was therefore contrary to Article 28 of the EC Treaty. The Court found that the law was indeed a restriction, but that it was justified under Article 30 of the Treaty, for the protection of the health and life of animals.[35]

Some additional guidance could be derived from more general case law of the ECJ concerning trade in goods.[36] Nevertheless, it remains quite unclear what could constitute a justifiable IAS-motivated restriction on trade. Some Member States perceive this as a barrier to their taking action in respect of the problem of non-indigenous invasive organisms; a state can understandably be reluctant to establish restrictions that may face legal challenges from the EC.[37] Of course, this is a very unfortunate situation—it is a pity if such uncertainty prevents states from combating the IAS problem and protecting its biodiversity. Responsibilities and competence between the Community and its member states should obviously be clarified. Most areas for action in the management of invasive alien species appear to be issues of shared competence between the Community and its Member States, however.[38]

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[34] *Criminal proceedings against Ditlev Bluhme*, reference for a preliminary ruling: Kriminalretten i Frederikshavn – Denmark, E.C.R. 1998, p. I-08033.
[35] "Developing an EU Framework for Invasive Alien Species," n. 10 above, pp. 8–9.
[36] Id., p. 22.
[37] Miller et al., n. 32 above, p. 83.
[38] For a more detailed treatment, see Miller et al., n. 32 above.

15.3.1. Existing Regulation

Reduction of pollution from shipping is a central part of EU's maritime safety policy. Transport of alien species in ships' ballast water is a long-known problem in this area. Tangible concerns that the issue has raised within the EU are, however, relatively recent.[39] EU measures in marine environmental protection have concentrated on reducing ship-generated waste and cargo residues. For instance, the European Parliament and the Council have adopted Directives 2000/59/EC[40] and 2005/35/EC[41] to complement the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL)[42] in this respect.

More relevant from the point of view of protecting the marine environment from non-indigenous invasive species is Regulation (EC) 782/2003[43] which phases out and prohibits the use on ships of paint with organotin or tributyltin (TBT) components.[44] This Regulation implements within EU law the 2001 IMO Convention on the Control of Harmful Anti-Fouling Systems on Ships,[45] which prohibits the use of highly toxic anti-fouling paints. The purpose of the Convention is, of course, to reduce detrimental impacts of environmentally harmful substances. Paradoxically, the control of the environmentally most harmful but effective anti-fouling systems is, however, likely to increase hull-fouling and hence the risk of unwanted transport of alien organisms.

As concerns ships' ballast water as a vector for IAS, EU law does not have much to offer. In fact, the EU has no regulation pertaining directly to

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[39] See "Preventing Pollution from Ships," n. 2 above.

[40] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, *Official Journal* L 332, 28 December 2000.

[41] Directive 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on ship-source pollution and on the introduction of penalties for infringements, *Official Journal* L 255/11, 30 September 2005.

[42] *International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto*, 2 November 1973, 1340 *U.N.T.S.* 61.

[43] Regulation (EC) No 782/2003 of the European Parliament and of the Council of 14 April 2003 on the prohibition of organotin compounds on ships, *Official Journal* L 115, 9 May 2003.

[44] It is supplemented by Directive 76/769/EEC (as amended), prohibiting the marketing and use of organostanic compounds within the EU (Council Directive of 27 July 1976 on the approximation of the laws, regulations and administrative provisions of the Member States relating to restrictions on the marketing and use of certain dangerous substances and preparations).

[45] *International Convention on the Control of Harmful Anti-fouling Systems on Ships*, 1 February 2002, IMO AFS/CONF/26 (2001).

ballast water management. Apparently, enactment of such regulation is not even planned at the moment.[46] The Commission has "strongly recommended" the ratification of the BWM Convention. On balance, the involvement of the EU in ballast water management has been described as "limited."[47] Nevertheless, the BWM Convention has clear links to existing Community maritime policies, notably the Marine Equipment Directive (96/98/EC),[48] the Directives on port state control (Directive 95/21/EC as amended)[49] and on port reception facilities for ship-generated waste and cargo residues (Directive 2000/59/EC),[50] and the Biocides Directive (98/8/EC).[51]

> For instance, the Marine Equipment Directive sets out Europe-wide requirements on the type approval of safety and pollution prevention equipment. The Directive moves arrangements for type approving such equipment to EU notified bodies who apply a mark of conformity based on accepted international standards. Since April 30, 1999, the testing standards in the amended Annex A of this Directive must be used to obtain an EC type approval certificate. However, as the BWM Convention has yet to come into force, type approval for ballast water management systems by one EU member state under this procedure only apply to the ships flagged to that state. When the BWM Convention comes into force, type approval under this procedure will be EU-wide, and any system type approved by one member state may have to be re-certified or re-tested to apply to all vessels flagged to EU member states.[52] Also the Directives on port state control and on port reception

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[46] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

[47] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 14.

[48] Amended by Directive 2002/84/EC of the European Parliament and of the Council of 5 November 2002 amending the Directives on maritime safety and the prevention of pollution from ships, *Official Journal* L 324/53, 29 November 2002.

[49] Council Directive 95/21/EC of 19 June 1995 concerning the enforcement, in respect of shipping using Community ports and sailing in the waters under the jurisdiction of the Member States, of international standards for ship safety, pollution prevention and shipboard living and working conditions (port State control), *Official Journal* L 157, 7 July 1995.

[50] Directive 2000/59/EC of the European Parliament and of the Council of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues, *Official Journal* L 332, 28 December 2000.

[51] Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market, *Official Journal* L 123/1 (24 April 1998).

[52] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 16.

> facilities for ship-generated waste and cargo residues may need to be updated once the BWM enters into force.[53]

The Commission has (through its Environment Directorate-General) provided its expertise in the discussions at IMO MEPC, particularly in respect of the methodology for indentifying and assessing active substances in connection to the Biocides Directive.[54] This Directive concerns the placing of biocidal products on the market within the EU, requiring treatment technologies that use active substances to undergo evaluation processes. Certain ballast water management systems fall under the requirements of both the Biocides Directive and the IMO BWM Convention's Guidelines. In order to provide a clear procedure and guidance for Member States on this issue, the Council Working Group on Transport developed a particular procedure in September 2006 (in response to systems being submitted to the IMO by EU Member States for approval under the IMO's G9 Guidelines).[55]

> This procedure states that prior to submitting an application for the basic approval of ballast water systems based on active substance to IMO, the member state in question would be expected to consult with other member states and the Commission on whether the concerned active substance falls within the scope of the Biocides Directive. If it does not, the application to IMO can proceed. If it does, the member state will be expected to ensure that the substance can be placed on the EU market before making any submission. This coordination is necessary in order to prevent cases where a system receives the IMO approval, yet cannot be placed on the EU market in accordance with the provisions of the Biocides Directive. However, there is still some uncertainty in practice as to when and how this procedure should be applied.[56]

The Biocides Directive is being revised.[57] Several issues identified for the revision are likely to have an impact on the interaction between the Biocides Directive and the BWM Convention.[58] Particularly significant appears to be the proposal that the Directive would apply not merely to the placing of biocidal

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[53] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).
[54] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 14.
[55] Id., pp. 14–15.
[56] Id., p. 15.
[57] The revision is expected to be ready in 2009, and the amended directive should enter into force in 2011 or 2012. At the same time, it will also turn into a regulation. Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).
[58] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 15.

products on the market (as it currently does) but also to *any use* of such products within the EU. In practice, this means that all vessels entering the waters of EU Member States would need an approval in accordance with the Directive for any biocides used in their ballast water treatment systems. Understandably, this is a very controversial suggestion. Such a requirement could obviously cause significant problems for vessels of non-EU states, but also for those vessels of EU Member States that have acquired their ballast water treatment systems from outside the EU.[59]

Finally, the problem of invasive alien species in the marine environment has been touched upon in the recent Marine Strategy Directive (2008/56/EC).[60] The Directive is based on an ecosystem approach, i.e., ecosystem-based regions of European marine waters. It recognises the introduction of exotic aquatic species as a major threat to European biodiversity. The main objective of the Directive is to achieve environmentally healthy marine waters ("good environmental status") by 2020. The aim is to draw marine strategies for EU marine regions and sub-regions, managed by Member States in an integrated manner. Good environmental status includes that "non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystems" (Annex I, para. 2). Measures used for achieving good environmental status can thus include control of invasive alien species, or prevention of introductions in the European seas. Further criteria and methodological standards to make this concept operational will be developed later, in consultation with the various European regional seas organisations (see more below).[61]

However, IAS issues in general have not had a particularly high profile at the Community level.[62] "Europe's practical programmes and coordination on invasive alien species lag behind many other regions of the world."[63] Furthermore, the approach of individual European states, including EU Member

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[59] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008). The participants (including all EU Member States) of a recent EMSA workshop on "Implementing the Ballast Water Management Convention – the EU dimension" (see more below) mostly opposed the proposal. Id.

[60] Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive), *Official Journal* L 164/19, 25 June 2008.

[61] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 16.

[62] E.g., Miller et al., n. 32 above, p. 87; P. E. Hulme, R. David, T. Cunha, and T.-B. Larsson, "A Pan-European Inventory of Alien Species: rationale, implementation and implications for managing biological invasions," in DAISIE, eds, *The Handbook of European Alien Species* (Dordrecht: Springer, 2008), available: <http://ec.europa.eu/environment/nature/invasivealien/docs/pan_european_inventory_ias.pdf> (retrieved 23 November 2008), p. 5.

[63] Id., p. 6.

States, to prevention and management of invasive non-indigenous organisms varies considerably.[64] As concerns ballast water management, formal, national policies are rare.[65] Apparently, very few EU Member States have at the moment any regulation for the purpose. In this sense, the situation is very different from that in the United States and Canada.[66] Nevertheless, EU countries are becoming more active in this respect. Finland, for instance, is currently drafting its national invasive alien species strategy, which relates, of course, to the ongoing developments within the EU, the upcoming strategy dealing with IAS, and criteria and methodological standards for non-indigenous species in particular (see more below).[67]

Invasive alien species in general relate to several fields of Community environmental policy. Nevertheless, the issue lacks inclusion in many relevant European policies and documents.[68] EU's policy framework for combating the problem of non-indigenous species' introductions is based in essence on the commitments under the Convention on Biological Diversity[69] (CBD) to which the EC, together with all Member States, is a contracting party. Article 8(h) of the CBD obligates convention parties to "prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species." Accordingly, the EC must ensure that its policies comply with, *inter alia*, Article 8(h) as far as possible. In practice, the Community has been relatively active in developing policy instruments in relation to *biodiversity* strategies.[70] It has been argued, however, that "European states rate implementation of Article 8h as a significantly lower priority than do non-European nations. This difference between policy awareness and implementation results in insufficient resources being made available to target invasive species."[71] Importantly, the CBD was supplemented in 2002 by fifteen "Guiding Principles for the prevention, introduction and mitigation of impacts of alien species that threaten ecosystems, habitats or species,"[72] which provide an international framework for the development of IAS strategies. The Principles affirm that prevention is

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[64] For a more detailed treatment of EU Member States in this respect, Miller et al., n. 32 above, pp. 39 et seq.

[65] *Ballast Water Scoping Study*, n. 23 above, p. 27.

[66] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (30 September 2008).

[67] Maria Laamanen, Professional Secretary, HELCOM, pers. comm. (30 September 2008). Finland and several other EU Member States have also initiated the ratification process of the IMO BWM Convention (see more below).

[68] Miller et al., n. 32 above, p. 68.

[69] *Convention on Biological Diversity*, 5 June 1992, 1760 *U.N.T.S.* 79.

[70] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 15.

[71] Hulme, n. 3 above, p. 75.

[72] COP 6 Decision VI/23, available: <http://www.cbd.int/decisions/?id=7197=> (retrieved 23 November 2008).

normally the most desirable measure in combating IAS. If an invasion nevertheless takes place, early detection and rapid eradication are essential. If eradication is not possible, containment and long-term control measures should be implemented.[73]

In 2003, a European Strategy on Invasive Alien Species[74] was adopted under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention),[75] to which most European states are parties. The challenges that European states face in their IAS efforts are often similar. The Strategy promotes coordinated measures and cooperative efforts to minimise adverse impacts of IAS in Europe. It aims to support development of realistic policies, measures and targets, and proposes priority actions. The Strategy covers, *inter alia*, marine environments under the sovereignty or jurisdiction of Bern Convention parties. Additionally, it provides guidance for activities carried out in areas beyond national jurisdictions, e.g., shipping. The European Strategy is "closely aligned with the CBD Guiding Principles," aiming to promote regional consistency and best practice in their regional implementation.[76]

Moreover, invasive alien species were identified already in the Sixth Environmental Action Programme of the EC (2002) as "a priority for action."[77] The Programme requires application of the ecosystem approach "wherever appropriate." The Commission's Communication, Halting the Loss of Biodiversity by 2010 – and Beyond, which was adopted in 2006, places substantial reduction of the impact on EU biodiversity of invasive alien organisms as a key Community policy and a priority objective.[78] It is also noted that the Community needs to "develop a comprehensive strategy to address this

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[73] Miller et al., n. 32 above, p. 16.

[74] P. Genovesi, and C. Shine, *European Strategy on Invasive Alien Species,* Council of Europe (Strasbourg, 5 December 2003), available: <http://www.jncc.gov.uk/pdf/ BRAG_NNS_ Genovesi&Shine-EuropeanStrategyonInvasiveAlienSpecies.pdf> (retrieved 23 November 2008).

[75] *Convention on the Conservation of European Wildlife and Natural Habitats*, 19 September 1979, 1284 *U.N.T.S.* 209.

[76] Miller et al., n. 32 above, pp. 17–18.

[77] Decision No 1600/2002/EC of the European Parliament and of the Council of 22 July 2002 laying down the Sixth Community Environment Action Programme, *Official Journal* L 242, 10 September 2002.

[78] Commission of the European Communities, *Halting the loss of biodiversity by 2010—and beyond—Sustaining ecosystem services for human well-being*, Communication from the Commission, COM(2006)216 final, p. 9 [hereinafter Commission of the European Communities]. More specific targets to this effect are laid down in the technical annex of the Biodiversity Action Plan, SEC(2006)621, p. 4 (*Halting the loss of biodiversity by 2010—and beyond—Sustaining ecosystem services for human well–being*, Commission staff working document, Annexes to the Communication from the Commission COM(2006)216 final).

issue."[79] One specific goal is to establish an early warning system for the exchange of information between European states on the emergence of IAS.[80] Also the need to ensure adequate (centralised) financing for IAS management is recognised.[81]

The European Commission (DG ENV) is currently preparing an EU strategy for IAS in the context of the Biodiversity Action Plan. The idea is that the strategy will follow a three-stage hierarchical approach in line with the CBD Guiding Principles (prevention – early detection and rapid eradication – long-term control and containment).[82] The Communication entitled Towards an EU Strategy on Invasive Species was adopted 3 December 2008.[83] The Communication examines the IAS issue in general (terrestrial, fresh water, marine), hence ballast-related marine invasions are viewed only as a part of a more comprehensive problem. The transport of alien organisms in ballast water is not touched upon in detail.[84] This is logical in the sense that the impulse for the EU to act in the area derives from its commitments under the Convention on Biological Diversity, above all. The Communication describes four possible policy options for the future EU strategy. These are (in order of increasing intensity) Option A: Business as usual; Option B: Maximising the use of existing legal instruments together with voluntary measures; Option B+: Adapted existing legislation; and Option C: Comprehensive, dedicated EU legal instrument.[85] The Communication will serve as a discussion paper between Member States, the European Parliament, and other stakeholders. The final EU strategy on IAS (with possible proposals for new legal instruments) is expected to be finished in 2010.[86]

Of course, binding legal instruments that may have some relevance to the IAS issue in general exist in EU law. The Strategic Environmental Assessment

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[79] Commission of the European Communities, id., p. 8.
[80] Id., p. 12.
[81] Id., pp. 13–14.
[82] "Developing an EU Framework for Invasive Alien Species," see n. 10 above, pp. 10–11.
[83] Commission of the European Communities, *Towards an EU Strategy on Invasive Species*, Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions, COM(2008)789 final [hereinafter Commission of the European Communities 2008].
[84] Nevertheless, the Communication notes that "prevention in relation to hitchhiker organisms brought in on the hulls or in the ballast water of ships would hugely benefit from the ratification and implementation of the Ballast Water Convention". Id., p. 6.
[85] Id., pp. 8–9. Pursuant to the Communication, "the choice for one option or combined options will depend on the results of a prior financial impact analysis". Id., p. 8 footnote. 15. At the moment, it remains unclear how much emphasis will be placed on economical versus ecological aspects in such analysis.
[86] Id., p. 10.

(SEA) Directive (2001/42/EC)[87] requires an environmental assessment for all "plans and programmes" for, e.g., transport and water management. Such an assessment should consider significant environmental effects of proposed plans and programmes. For instance, plans and programmes for transport could include development of transport corridors representing potential pathways for invasive non-indigenous species. Environmental impacts of IAS can be considerable, and should thus be taken into account in a SEA process (as well as in project-specific environmental impact assessments). Apparently, the SEA Directive has thus far never been applied to the IAS issue, however.[88]

Another instrument that deserves to be mentioned here is the Environmental Liability Directive (2004/35/EC).[89] In principle, it could be used to apply the polluter pays principle to those who introduce harmful IAS into an environment. However, the Directive requires, *inter alia*, that there is an identifiable polluter at fault (or at least negligent); a concrete and quantifiable damage; and that a causal link between the polluter and the damage can be established. In the case of IAS introductions, fulfilling all these requirements, and hence bringing successful proceedings can be quite difficult in practice.[90] Nevertheless, it should, in principle, be the carrier's responsibility to ensure that it does not contaminate waters anywhere with, *inter alia*, harmful alien organisms – neither through ballast water nor through other vectors.[91]

15.3.2. European Maritime Safety Agency

Although the EU has been relatively inactive in ballast water issues, there have been certain promising developments in this respect lately. One central actor in the area is the European Maritime Safety Agency (EMSA). EMSA was established in 2002[92] "to provide technical and scientific assistance to the

[87] Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment, *Official Journal* L 197, 21 July 2001.
[88] Miller et al., n. 32 above, pp. 26 and 55.
[89] Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage, *Official Journal* L 143/56, 30 April 2004.
[90] Miller et al., n. 32 above, p. 26.
[91] See P. E. Hulme, S. Bacher, M. Kenis, S. Klotz, I. Kühn, D. Minchin, et al., "Grasping at the Routes of Biological Invasions: A framework for integrating pathways into policy," *Journal of Applied Ecology* 45, no. 2 (2008): 403–414, p. 411. See also Hulme, n. 3 above, p. 74.
[92] Regulation (EC) No 1406/2002 of the European Parliament and of the Council of 27 June 2002 establishing a European Maritime Safety Agency, *Official Journal* L 208, 5 August 2002.

European Commission and Member States in the proper development and implementation of EU legislation on maritime safety, pollution by ships and security on board ships."[93] Among other things, the Commission has asked EMSA to "monitor the on-going international and regional developments" in respect of the BWM Convention and "to actively collaborate with the Commission to promote a coherent approach for the implementation of the IMO Convention in the various regional seas around Europe."[94] In compliance with this mandate, EMSA recently organised a workshop on "Implementing the Ballast Water Management Convention – the EU dimension" (Lisbon, 10–11 November 2008). Apparently, this was the first workshop to discuss ways to solve the ballast water problem in the European context.[95] It was aimed at, *inter alia*, sharing experiences with respect to ratifying the BWM Convention and identifying challenges related to ballast water management in Europe. The workshop discussed European cooperation in ballast water management, the role of the EU in the area, and measures to be taken in the future.

Currently, EMSA is trying to find out what kind of practical challenges EU Member States are facing in ratification and implementation of the BWM Convention. For instance, there are technical problems that could benefit from EU level cooperation, such as those related to risk assessment methodologies and the relationship between the IMO type approvals and the Biocides Directive. EMSA intends to make concrete proposals to the Commission (DG Environment and DG Energy and Transport) for advancing such cooperation and hence to facilitate the implementation of the BWM Convention within the European Union. Another central question that EMSA is currently working with is how the Marine Strategy Directive could provide EU Member States with a viable legal framework for strengthening measures to combat harmful aquatic invasions.[96]

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[93] European Marine Safety Agency (EMSA) website at <http://www.emsa.eu.int/> (retrieved 23 November 2008).

[94] "Preventing Pollution from Ships," n. 2 above.

[95] In addition to EU Member States, Norway, Iceland, Croatia, Turkey, the European Commission, HELCOM, REMPEC, and the Black Sea Commission (see more below) also participated in the workshop. Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

[96] Mirja Ikonen, Project Officer, EMSA, pers. comm. (13 November 2008).

15.4. Activities of European Sub-regional Organizations

Article 13.3 of the BWM Convention provides 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 arrangements to develop harmonized procedures.

Given the multitude of jurisdictions and the various aquatic ecosystems in Europe, the need for regional and sub-regional cooperation in addressing the IAS issue is obvious. The legal and political specificities in the different European seas are highly diverse.[97] Regional arrangements can usually better meet local demands and focus on specific pressures on a particular ecosystem. Regional (let alone national) regulation is also normally much easier to make than a global convention.[98]

Although the EU has not yet done much in the area of ballast water management, there are several regional seas organisations within Europe that have been more active in dealing with aquatic invasions. Also the European Commission has supported the development of ballast water management strategies through the European regional seas efforts.[99] These efforts are usually carried out under regional agreements. They include the OSPAR *Convention* for the Protection of the Marine Environment of the North-East Atlantic[100] and the Convention on the Protection of the Marine Environment of the Baltic Sea Area.[101] The problem of invasive aquatic species has been addressed in Europe

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[97] *Ballast Water Scoping Study*, n. 23 above, p. 28.
[98] See Endersen et al., n. 1 above, p. 615.
[99] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 16.
[100] *Convention for the Protection of the Marine Environment of the North-East Atlantic* (OSPAR), 22 September 1992, 32 *I.L.M.* 1069 (1993).
[101] *Convention on the Protection of the Marine Environment of the Baltic Sea Area*, 9 April 1992, 2099 *U.N.T.S.* 197.

also in the context of the Mediterranean Sea (Barcelona Convention)[102] and the Black Sea (Bucharest Convention).[103]

However, the regional seas agreements operate, of course, within their respective regions only. Given the highly cross-border nature of the ballast water problem, the need for additional coordination in ballast water management at least at the EU level is obvious.[104] The size and biogeographical characteristics of Europe and the free trade arrangements within the area make it particularly essential to promote consistency in approach against the threat of IAS.[105] Furthermore, most EU Member States have coastlines, several even along more than one sea. Along with the continuous enlargement of the EU (and the Single Market), possibilities for new invasions of aquatic as well as other non-native species are likely to increase further.[106]

15.4.1. OSPAR

More than 400 non-native species have been found in northwestern Europe. A vast majority of them occur in freshwater and, above all, marine habitats.[107] OSPAR is a mechanism by which fifteen Western European states,[108] together with the EC, cooperate to protect the marine environment of the northeast Atlantic. The 1992 OSPAR Convention consists of the 1972 Oslo Convention against dumping[109] and the 1974 Paris Convention which broadened the scope to cover land-based sources and offshore industry.[110] An annex on biodiversity and ecosystems was adopted in 1998 to cover non-polluting human activities

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[102] *Convention for the Protection of the Mediterranean Sea Against Pollution*, 16 February 1976, 1102 *U.N.T.S.* 27.

[103] *Convention on the Protection of the Black Sea Against Pollution*, 21 April 1992, 1764 *U.N.T.S.* 3.

[104] Mirja Ikonen, Project Officer, EMSA, pers. comm. (13 November 2008).

[105] Hulme, n. 3 above, p. 56.

[106] Id., p. 65.

[107] *Ballast Water Scoping Study,* n. 23 above, p. 23.

[108] Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom.

[109] *Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft*, 15 February 1972, 932 *U.N.T.S.* 3.

[110] *Convention for the Prevention of Marine Pollution from Land Based Sources*, 4 June 1972, 1546 *U.N.T.S.* 119.

that can adversely affect the sea.[111] Work under the Convention is managed by the OSPAR Commission.

The OSPAR Commission began to develop a ballast water management strategy for northwest Europe in 2003. The outcome was interim guidelines (based on the ballast water exchange requirements of the IMO BWM Convention) for voluntary measures to reduce the risk of marine invasions in the OSPAR area, pending the entry into force of the BWM Convention. In June 2007, OSPAR endorsed the General Guidance on the Voluntary Interim application of the D1 Ballast Water Exchange Standard in the North-East Atlantic. It was found that the Guidelines were prevalent also to ships operating in the Baltic, and hence they were expanded to include the Baltic Sea. Contracting states to HELCOM and OSPAR (a total of 21 countries) adopted the voluntary Guidelines[112] in spring 2008.[113] The Guidelines are also supported by the European Commission. In order to reduce the risk of non-indigenous species entering the OSPAR and HELCOM maritime areas through ballast water exchange, vessels entering the waters of northwest Europe are requested to voluntarily apply the BWM Convention's ballast water exchange guidelines, to prepare a ballast water management plan,[114] and to keep a record of their procedures related to ballast water management (paras. 4–5). The guidance is addressed specifically to vessels entering these areas from transatlantic routes and routes passing West Africa; the Guidelines do not apply to vessels coming from the Mediterranean (para. 6).

A second phase of this voluntary strategy should include the development of further guidance and appropriate management measures for ships operating within the OSPAR and HELCOM regions.[115] The idea is to use a risk assessment based management approach to identify high risk voyages and to provide guidance on appropriate management measures in order to reduce the

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[111] Annex V on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area, available: <http://www.ospar.org/html_documents/ospar/html/OSPAR_Convention_e_updated_text_2007.pdf#nameddest=annex5> (retrieved 23 November 2008).

[112] The new title of the Guidelines is accordingly *General Guidance on the Voluntary Interim Application of the D1 Ballast Water Exchange Standard in the North-East Atlantic and the Baltic Sea,* HELCOM 29/2008 (March 2008), available: <http://www.helcom.fi/stc/files/Guidelines/2-8%20HELCOM&OSPAR%20Voluntary%20Guidance%20for%20Ballast%20Water%20Exchange.pdf> (retrieved 23 November 2008).

[113] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 11.

[114] Pursuant to Appendix 1 of IMO's Guidelines for ballast water management and development of ballast water management plans (G4): Standard Format for the Ballast Water Management Plan.

[115] *Joint Notice to Shipping from the Contracting Parties of HELCOM and OSPAR on General Guidance on the Voluntary Interim application of the D1 Ballast Water Exchange Standard in the North-East Atlantic and the Baltic Sea*, para. 3.3. [hereinafter Joint Notice].

risk of secondary introductions.[116] Furthermore, it has been proposed that the strategy be strengthened by some kind of a certification mechanism or some other systems to make shipping companies more interested in the issue.[117] In compliance with the interim nature of the voluntary strategy, the measures put forward by the Guidelines will become mandatory once the BWM Convention comes into force. Eventually, the ballast water exchange requirements will, of course, be phased out, once the BWM Convention's D-2 Performance Standard for the treatment of ballast water is applied.[118]

15.4.2. HELCOM

HELCOM, or the Helsinki Commission, is the governing body of the Convention on the Protection of the Marine Environment of the Baltic Sea Area (or Helsinki Convention).[119] It works to "protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental co-operation between Denmark, Estonia, the European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden."[120] The introduction of alien organisms via ships' ballast water and hulls is one of the main negative environmental effects of shipping in the Baltic Sea.

In November 2007, HELCOM adopted the Baltic Sea Action Plan, which is a ministry-level instrument containing, *inter alia*, a management objective ("No introductions of alien species from ships") and actions for preventing introduction of alien species.[121] The 2007 HELCOM ministerial meeting also adopted a Road Map Towards Harmonised Implementation and Ratification of the 2004 International Convention for Control and Management of Ships' Ballast Water and Sediments within the HELCOM area.[122] HELCOM countries

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[116] "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 12.

[117] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (30 September 2008).

[118] Joint Notice, n. 115 above, para. 3.2.

[119] *Convention on the Protection of the Marine Environment of the Baltic Sea Area*, n. 101 above.

[120] Helsinki Commission (HELCOM), "About us," available: <http://www.helcom.fi/helcom/en_GB/aboutus/> (retrieved 23 November 2008) [hereinafter HELCOM].

[121] For more information, see HELCOM, *Baltic See Action Plan* (November 2007), available <http://www.helcom.fi/press_office/news_helcom/en_GB/BSAP_full/> (retrieved 23 November 2008).

[122] HELCOM, *Road Map Towards Harmonised Implementation and Ratification of the 2004 International Convention for Control and Management of Ships' Ballast Water and Sediments within the HELCOM area* (2007), available: <http://www.helcom.fi/BSAP/ActionPlan/otherDocs/en_GB/roadmap/_print/> (retrieved 23 November 2008).

have agreed to ratify the BWM Convention by the year 2013. Measures included in the Road Map will be taken before ratification to combat the urgent threat of invasion of non-native marine species in the Baltic Sea.

The 17 action points of the Roadmap now form part of the Baltic Sea Action Plan. In the Road Map, HELCOM states agreed, *inter alia*,

> … to select and agree by the end of 2008 on the HELCOM Target Species, i.e. species that may impair or damage the environment, human health, property or resources in the Baltic Sea region, relevant for risk assessments according to the IMO Guidelines G7 (para. 4);
>
> [t]o conduct by the end of 2008 baseline surveys of prevailing environmental conditions in major ports and to outline the major long-distance high risk voyages in order to gather data necessary to conduct and/or evaluate and consult risk assessments according to the IMO Guidelines G7 (para. 5);
>
> [t]o specify and agree as soon as possible but not later than 2009 on criteria to distinguish between unacceptable high risk scenarios and acceptable low risk scenarios for regional voyages … (para. 6).

Currently, HELCOM is compiling a list of invasive alien species and collecting environmental and traffic data from major ports for the purpose of risk assessments.[123] The states also agreed

> … for voyages connecting the Baltic Sea and the North Sea where no areas exist that meet the Ballast Water Exchange criteria according to the BWM Convention, to consider jointly with OSPAR adequate management measures, including possibilities for ballast water exchange (para. 8);[124]
>
> [t]o join the OSPAR initiative to request vessels transiting the Atlantic or entering the North-East Atlantic from routes passing the West African Coast to conduct on a voluntary basis ballast water exchange before arriving at the OSPAR area or passing through the OSPAR area and

[123] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

[124] However, "[b]allast water exchange areas, if designated, should only be in use until the D-2 Performance Standard of the BWM Convention becomes obligatory and for vessels/voyages posing an unacceptable high risk" (para. 8).

heading to the Baltic Sea and to notify jointly with OSPAR the IMO of this action (para. 9);

[t]o undertake a similar initiative for vessels leaving the Baltic and transiting through the OSPAR region to other destinations so the ballast water would not be exchanged until the vessel was 200 nm off the coast of North West Europe in waters greater than 200 m deep (para. 10);

[t]o cooperate with OSPAR on any other relevant topics for the benefit of both regions and as necessary for harmonised implementation of the BWM Convention (para. 11).

As mentioned above, HELCOM joined OSPAR in supporting the voluntary Guidelines of the OSPAR Ballast Water Management Strategy. The aim is to strengthen the cooperation between HELCOM and OSPAR further.

Within the HELCOM cooperation, the states involved have not thus far discussed the EU dimension of the ballast issue to any significant extent; their focus has been on the IMO and its BWM Convention. However, most HELCOM states are also EU Member States and must thus take into consideration the treatment of the problem within the EU as well. As mentioned above, Finland, for instance, is presently drafting its national invasive alien species strategy, which closely relates to the current developments within the EU. It should also be mentioned that the Russian Federation, the only HELCOM state outside the EU, recently has been very active in the IAS sector, not only in HELCOM cooperation but in IAS-related scientific research in general.[125] In 2006, the Russians established a new electronic journal, *Aquatic Invasions*, which is described as "an important part of developing European early warning system on aquatic invasive species."[126]

[125] Maria Laamanen, Professional Secretary, HELCOM, pers. comm. (30 September 2008).

[126] V. Panov, et al., "New electronic journal "*Aquatic Invasions*": an important part of the developing European early warning system on aquatic invasive species," Assessing large scale environmental risk for biodiversity with tested methods (ALARM) Integrated Project, available: <http://ec.europa.eu/environment/nature/invasivealien/docs/alarm_deliverable.pdf> (retrieved 23 November 2008).

15.4.3. Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea

Out of 121 species listed as Europe's "worst invasive," as many as 105 have been reported in the Mediterranean Sea.[127] The total amount of known aquatic alien species in the Mediterranean Sea is over 660.[128] Hence there is an obvious interest to minimise and control the spread of alien, potentially harmful aquatic organisms in the Mediterranean. Ballast water management is a very important issue, as ballast water is a major vector for marine introductions in the area. However, the Mediterranean is by no means a uniform ecosystem, as climatic conditions throughout the region vary significantly. This affects the pattern of invasions. Additionally, in some parts of the Mediterranean, such as the Adriatic Sea, the waters are so shallow that ballast water exchange is not a feasible option.[129] Furthermore, the Middle East and North Africa are particularly heavily influenced by imported ballast water because they are oil exporting countries (contributing to some 90 percent of all ballast water volumes introduced to the Mediterranean from outside the region).[130]

The Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC)[131] organised a workshop in September 2008 to initiate the development of a regional strategy addressing the transfer of harmful aquatic organisms and pathogens via ships' ballast water and sediments for the Mediterranean with the help of the GloBallast Partnership.[132] As a consequence, eighteen Mediterranean coastal states and the European Commission established a regional task force and four focus groups on specific subject matters to develop such a strategy. The task force discussed principles,

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[127] Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea (REMPEC), *The Development of a Mediterranean Strategy on Ships' Ballast Water Management on the Right Track* (17 September 2008), available: <http://www.rempec.org/newsmore.asp?id=247&lang=en> (retrieved 23 November 2008) [hereinafter REMPEC].

[128] David et al., n. 7 above, p. 2.

[129] See id., p. 3. States along the Adriatic Sea have been particularly active in the ballast water issue. There is also a GloBallast Partnership Project for this area. Croatia is planning to propose at IMO MEPC 59 that the Adriatic Sea be designated as a particularly sensitive sea area (PSSA) under the IMO. One of the Associated Protective Measures for PSSAs would relate to ballast water management in the Adriatic Sea. Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

[130] *Ballast Water Scoping Study*, n. 23 above, pp. 33–34.

[131] See REMPEC website at <http://www.rempec.org> (retrieved 23 November 2008).

[132] GEF/UNDP/IMO Project, "Building partnerships to assist developing countries to reduce the transfer of harmful aquatic organisms in ship's ballast water," for further information see <http://globallast.imo.org/index.asp?page=GBPintro.html&menu=true> (retrieved 23 November 2008).

key elements and an appropriate format for the future strategy, and agreed that the strategy should also include an action plan containing operational arrangements. Additionally, the task force will promote bringing into effect the BWM Convention in the Mediterranean.[133]

15.4.4. Black Sea

The Black Sea is the most isolated sea in the world. Nevertheless, it has over 200 alien species.[134] As with many other seas, also the Black Sea has a special convention for its protection, the 1992 Convention on the Protection of the Black Sea against Pollution (Bucharest Convention, or Black Sea Convention), which entered into force in 1994. Among other issues, the Bucharest Convention has put ballast water on its agenda. The Commission on the Protection of the Black Sea against Pollution (Black Sea Commission) is the intergovernmental body established for the implementation of the Black Sea Convention.[135] Additionally, there is regional cooperation on ballast water management through a regional task force. The Black Sea states have developed a regional action plan to minimise the transfer of harmful aquatic organisms and pathogens in ships ballast water (2001), as well as a short-term regional action plan (apparently to support implementation of the regional action plan). National initiatives and legislation relating to the IAS issue also exist in Ukraine and Georgia, at least.[136]

If compared to other regional seas in Europe, Black Sea countries started developing ballast water management and policies relatively early on. One reason for them to take such an active stance on IAS is the unfortunate fact that the local fisheries, and thereby the entire ecosystem of the Black Sea, have collapsed due to the introduction of a non-indigenous invasive aquatic species, the American comb jelly. Additionally, Ukraine has been one of the six developing countries participating in the GloBallast Programme.[137] Interestingly, ballast water exchange is not very effective in the Black Sea either. Although there is a relatively large area in the Black Sea where ballast water exchange can be performed in accordance with the requirements of the

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[133] REMPEC, n. 127 above.
[134] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).
[135] See Black Sea Commission website at <http://www.blacksea-commission.org/main.htm> (retrieved 23 November 2008).
[136] *Ballast Water Scoping Study*, n. 23 above, p. 38.
[137] Id., p. 37.

BWM Convention, the local conditions are such that ballast released anywhere in the Black Sea finds is way to the coast very quickly. Consequently, the risk for the spread of species is high, no matter where in the Black Sea they are released.[138]

15.5. Conclusion

The word "alien" in the term "invasive alien species" refers to ecosystem borders, not national ones. The fact that both causes and effects of IAS introductions are largely international seems to call for international management of the problem.[139] Given the inherent internationality of shipping in particular, regional and national regulation can normally not be as effective as international rules. Accordingly, the role of the IMO is central in combating the problem of invasive aquatic species; in practice, the BWM Convention is the only chance of addressing the ballast water issue in an effective manner. The slow ratification of the Convention derives from several reasons, among them the practical challenges in ballast water exchange and the lack of approved and feasible ballast water treatment technologies. However, such technologies are constantly being developed, and thus compliance with the BWM Convention should soon be viable also in practice (if it is not already).[140]

Despite the importance of the IMO BWM Convention, global regulation does not necessarily always reflect the specific circumstances of particular areas in an optimal way. Measures tailored to the unique circumstances of biogeographical regions and ecosystems are often advantageous. Ecological regions could benefit from, *inter alia*, designation of regional ballast water exchange zones, where needed. Given the patterns of invasion for aquatic species, cooperation is needed in the context of the northern hemisphere, for instance. One interesting proposal is that for negotiating a new global treaty on IAS in the form of a framework convention.[141] The more or less regional approach that the unique characteristics of the northern sea areas, for instance,

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[138] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

[139] See, e.g., C. Shine, N. Williams, and L. Gündling, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species* (Gland, Cambridge, and Bonn: IUCN, 2000), pp. 31–32.

[140] Markus Helavuori, Maritime Inspector, FMA, pers. comm. (30 September 2008).

[141] E.g., W. M. Jastremski, "A Proposed International Framework Convention on Bioinvasive Species," in L. Susskind, W. Moomaw, and K. Gallagher, eds, *Transboundary Environmental Negotiation: New Approaches to Global Cooperation* (San Francisco: Jossey-Bass Publishers, 2002), pp. 361–375.

call for could be realised by adopting a specific protocol or protocols to the main convention. An IAS network of all states along the northern seas is another idea worth consideration. Such a network should include at least information system(s) for data exchange, consultations, early warning, and emergency measures. An emergency response fund could facilitate prompt action to eradicate new invasions.[142] Then again, a regional approach, particularly an ecosystem approach, can be difficult to implement because jurisdictional boundaries seldom coincide with those of ecological units.[143]

Accordingly, there is need for regulation at different levels: national legislation for IAS transfers within a country, bilateral agreements between source and recipient states, coordinated regional (or sub-regional) approaches, and international regulation. Regulation at all these levels should be consistent and complement each other—at the least it should not be contradictory. Moreover, whatever type of regulation is used, it needs to be able to balance a variety of interests such as trade, shipping, and environmental protection. This can be demanding as the IAS issue is sensitive for many stakeholders. Additionally, the interests and preferences of different states and regions can vary significantly. Ballast water management, particularly through ballast water treatment, tends to be costly, which obviously is likely to generate opposition at many levels.

The design of regulatory regimes is of utmost importance. Equally important is that their implementation is made feasible by the availability of suitable technologies, cooperation mechanisms, and adequate funding. However, ships do not always comply with international environmental standards even if they could (and should). Some operators/crews may be less sincere in their intentions and breach legal obligations in order to save costs or purely for convenience reasons. Therefore all the better, of course, if international regulation could provide incentives making compliance with its norms more attractive than non-compliance. In the context of the ballast issue, one could think about coupling compliance with ballast water treatment obligations (and even non-binding guidelines) with reduced port fees, for instance.[144]

All the above mentioned challenges in ballast water management are evident also within the EU. The EU is a large free-trade region. Unfortunately,

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[142] See, e.g., Meliane and Hewitt, n. 20 above, p. 6.

[143] E.g., Shine et al., n. 139 above, pp. 31–32; P. Genovesi and C. Shine, *European Strategy on Invasive Alien Species*, 3rd draft T-PVS (2003), available: <http://www.iucn.org/places/medoffice/invasive_species/docs/european_strategy_ais.pdf> (retrieved 9 January 2008), p. 24.

[144] See, e.g., International Joint Commission, *Great Lakes Water Quality 11th Biennial Report, The Challenge to Restore and Protect the Largest Body of Fresh Water in the World* (Washington, DC and Ottawa: International Joint Commission, 2002), p. 39.

free trade also facilitates the transfer of alien organisms. Combining free trade and the single market ideology with environmental protection can be complicated.[145] Furthermore, Europe covers a variety of biogeographical zones. In a certain EU Member State a particular species may pose no risk whatsoever (and even be native to the country), whereas the consequences that its introduction to another member state entails can be devastating to the local ecosystem.[146] Unfortunately, the geography of Europe is such that species introduced into the territory of one European state can in most cases spread to the neighbouring countries relatively easily.[147] Negligence of one state could thus water down the efforts of others. At the same time, EU countries are exposed to invasions of species in a very heterogeneous manner. Obviously, coastal states on the EU borders have the highest probability of receiving new invasions.[148] This affects the recognition of risks, as well as prioritisations in IAS management.[149] Moreover, many measures that are needed for combating IAS effectively are likely to be "financially demanding." Leaving these costs on Member States alone could severely hamper compliance with any new obligations (let alone recommendations).[150] Consequently, the development and implementation of unified IAS policies, regulations and systems within Europe can be challenging.

Nevertheless, a common European approach to the problem of invasive alien species being transported in ships' ballast water is essential. Cooperation should be improved at all levels (EU, regional, national, and local). Fortunately, many (if not most) EU Member States are apparently planning to ratify the IMO BWM Convention in the near future.[151] However, there are still significant practical problems involved: those related to risk assessments (in accordance with IMO G7 Guidelines; see more below), port state control sampling and analysing of samples, and ballast water treatment system type approvals, above all. Furthermore, ballast water exchange is problematic in most parts of Europe

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[145] Hulme et al., n. 91 above, p. 412. Obligations and proposals of the World Trade Organization can be equally problematic in the management of invasion pathways. Hulme, n. 3 above, pp. 75–76. For a more detailed assessment of the Single Market and the WTO in this respect, see "Developing an EU Framework for Invasive Alien Species," n. 10 above, p. 22.

[146] Hulme et al., n. 91 above, p. 412.

[147] Hulme et al., n. 62 above, p. 4.

[148] "Developing an EU Framework for Invasive Alien Species," n. 10 above, p. 24.

[149] Hulme et al., n. 62 above, p. 6.

[150] See "Developing an EU Framework for Invasive Alien Species," n. 10 above, pp. 23–24.

[151] At least Belgium, Croatia, Cyprus, Finland, Greece, The Netherlands, Poland, Portugal, and Turkey have already started or are about to start in 2009 the ratification process for the BWM Convention. France, Norway, and Spain have ratified the Convention. Markus Helavuori, Maritime Inspector, FMA, pers. comm. (21 November 2008).

due to the characteristics of the European seas.[152] Fortunately, these are largely "technical," not ideological problems. Most of them can be solved with money. For instance, an EU fund could be established for eradication and control of IAS.[153] Thus one can still be optimistic about the prospects for the development of a common regulatory regime for Europe in the area of ballast water management.

The compatibility and collaboration of any new European regime with other management systems, organisations, institutions and programmes pertaining to ballast water must be guaranteed. Moreover, it needs to be a dynamic and proactive system. Essential for its efficiency is the capability to adapt to improved scientific knowledge, changing circumstances, and advances in technology. Most importantly, the various uncertainties connected to IAS necessitate utmost precaution. This seems to call for risk assessment based management combined with prevention strategies.[154] Risk-based decision support systems require accurate, timely information about potentially invasive species, port characteristics and invasion patterns, for instance. The development of good monitoring mechanisms and databases, as well as systems for using all the information gathered, is essential. Otherwise risk cannot be assessed reliably, which makes prioritisation and hence differentiated treatment levels of ballast water impossible without compromising risk levels.[155] Obviously, the voyage-specific selective approach in ballast water management is more demanding for the port state than a so-called blanket approach where the same measures are categorically required from all ships, without any consideration of their risk potential.[156]

Risk assessments can be used for "environmental matching" between the areas of ballast water origin and discharge, and hence for making estimations of the capability of survival of species in a new environment. Additionally, risks related to the invasiveness of a particular species and the potential harm it can cause in the new environment can be assessed.[157] In the European context, it has been suggested that risk assessment could be used, *inter alia*, for developing lists of species for regulating the spread of IAS (white list for low risk species; black list for prohibited or strictly regulated species; grey for species which have not been assessed yet, etc.). Such lists call for flexibility in

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[152] Helavuori, id.
[153] "See Developing an EU Framework for Invasive Alien Species," n. 10 above, p. 24.
[154] On problems related to the risk assessment approach, see, e.g., M. McConnell, *GloBallast Legislative Review – Final Report*, GloBallast Monograph Series No. 1 (London: IMO, 2002), p. 18.
[155] See, e.g., Endersen et al., n. 1 above, p. 619.
[156] David et al., n. 7 above, p. 4.
[157] Id., p. 3.

administrative procedures in order to be able to accommodate rapid response to emerging threats. On the other hand, they should be able to cater for regional differences, which can be quite difficult given that one Member State's native species can be a highly invasive, harmful alien species in another Member State.[158]

At least the adoption of legally binding measures (such as directives and regulations within the EU) would seem to call for strict risk assessment procedures.[159] Thus far risk assessment based ballast water management has been used in many of the regional IAS strategies in Europe. Models employed for undertaking the assessments vary, but most of them are based on the IMO G7 Guidelines for risk assessment[160] or the model developed through the GloBallast Programme.[161] The G7 Guidelines are very specific, and a number of risk assessment tools will be used. The application of such risk assessments in practice is still subject to uncertainty, however.[162]

Some kind of a standardised European approach to risk assessment in ballast water management could be helpful.[163] One of the biggest problems in this respect is lack of information.[164] The development of a standardised European approach to risk assessment would require further research at least about ballast water discharge patterns and presence/absence of non-indigenous species in the European waters.[165] There exists, for instance, a North European and Baltic Network on Invasive Alien Species (NOBANIS), which is a network of common databases on IAS in this particular region.[166] However, this network covers only Northern Europe. The European Strategy on Invasive Alien Species (2002) encouraged the development of a Europe-wide inventory of invasive alien species. As a consequence, the European Commission funded a three-year Strategic Targeted Research project, DAISIE (Delivering Alien Invasive

[158] "Developing an EU Framework for Invasive Alien Species," n. 10 above, p. 13.
[159] Id., pp. 13–14.
[160] Guidelines for risk assessment under Regulation A-4 (G7) approved by MEPC 56 in July 2007.
[161] For more, see "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, p. 14.
[162] Id., pp. 6–7.
[163] Id., p. 6.
[164] For a more detailed treatment, see, e.g., Hulme et al., n. 62 above.
[165] See "Control and Management of Ships' Ballast Water and Sediments," n. 12 above, pp. 6–7.
[166] See North European and Baltic Network on Invasive Alien Species (NOBANIS) website at <http://www.nobanis.org/> (retrieved 23 November 2008).

Species Inventories in Europe), which was launched in 2005.[167] DAISIE focused on the following areas of information gathering and dissemination: 1) the European Alien Species Expertise Registry; 2) the European Alien Species Database; and 3) the European Invasive Alien Species Information System.[168] It can thus provide useful tools for the further development of European risk assessment mechanisms for IAS. The European Commission is currently examining the feasibility of a Europe-wide Early Warning and Information System based on existing activities such as NOBANIS and DAISIE.[169]

Risks that are already known call directly for prevention, which is generally a far more effective and desirable option than reactive measures taken after an invasion has occurred.[170] Prevention is particularly critical for aquatic ecosystems as detecting IAS in water can be very challenging and the organisms can disperse quickly.[171] Furthermore, invasions of marine alien species are largely irreversible; eradicating an IAS once it has become established in the marine environment can even be considered unrealistic.[172] Many of the management options used in terrestrial ecosystems are not available or at least harder to apply.[173] In the northern hemisphere, harsh weather conditions and geographical remoteness can make operations particularly challenging and expensive. Hence minimisation of future species introductions is fundamentally important. On the other hand, given that prevention of all invasions is an impossible goal, more effective rules on liability for IAS introductions and improved insurance mechanisms are needed.[174] Besides, well-designed liability rules can also have a significant preventive effect and work as powerful economic incentives promoting

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[167] *DAISIE Handbook of Alien Species in Europe* (2009) has just been published by Springer. Unfortunately, it came out so recently that the author of this chapter was unable to get hold of a copy.

[168] For more information, see Delivering Alien Invasive Species Inventories for Europe (DAISIE) website at <http://www.europe-aliens.org/> (retrieved 23 November 2008).

[169] Commission of the European Communities 2008, n. 83 above, pp. 8 and 10.

[170] See, e.g., Genovesi and Shine, n. 143 above, p. 25; J. A. McNeely et al., eds, *Global Strategy on Invasive Alien Species* (Gland, Switzerland and Cambridge: IUCN, 2001), pp. 24–25.

[171] Genovesi and Shine, n. 143 above, p. 25; see also Meliane and Hewitt, n. 20 above, p. 1.

[172] L. S. Godwin, L. G. Eldredge, and K. Gaut, *The Assessment of Hull Fouling as a Mechanism for the Introduction and Dispersal of Marine Alien Species in the Main Hawaiian Islands*, Bishop Museum Technical Report No. 28 (Honolulu: Bishop Museum, 2004), p. 6. However, this is not always the case. Sometimes aquatic invasive species do not spread rapidly beyond control (beyond the initial site of introduction). Additionally, eradication can be feasible, at least in the early stages of invasions. S. L. Williams and E. D. Grosholz, "The Invasive Species Challenge in Estuarine and Coastal Environments: Marrying Management and Science," *Estuaries and Coasts* 31 (2008): 3–20, p. 6.

[173] Shine et al., n. 139 above, pp. 17–18; Meliane and Hewitt, n. 20 above, p. 1.

[174] See, e.g., McNeely et al., n. 170 above, p. ix; Shine et al., n. 139 above, pp. 28–30.

compliance with environmental regulation.[175]

On balance, a strong precautionary approach is absolutely essential for the development and operation of any IAS regime, both in Canada and the European Union. Hopefully, the two can learn from each others' efforts to address the challenge of non-native aquatic species—a large number of which are constantly transported between these very regions. The EU in particular should examine carefully the Canadian regime for ballast water management, given that Canada has been very active in this sector. One area where the Canadian efforts could serve as a source of inspiration for the Europeans is the utilisation of risk assessment methodologies in responding to the IAS issue.

[175] International Joint Commission, n. 144 above, p. 39.