STOP THE INVASION!

A majority of the world's trade is conducted by ship. In order for large ships to safely navigate along coasts and in open water, these ships take on water as ballast to increase the ship's stability. As a result of this practice, over 10 billion tones of ballast water is transported each year. This ballast water has been linked to the introduction of invasive species into the marine environments it is discharged into. It has estimated that on average one tanker releases about 240 million organisms into the surrounding water on each voyage.[1]These invasions cause significant economic, ecological, and health threats. In an attempt to curb the problem, the International Maritime Organization (IMO) adopted the *International Convention for the Control and Management of Ships' Ballast Water and Sediments* on February 13, 2004 (the "Convention"). This paper will look at the international responses to the problem of invasive ballast organisms including the Convention in order to evaluate the Convention's potential effectiveness and will examine Canada's response to the problem via domestic legislation, specifically evaluating the *Ballast Water Control and Management Regulations* (the "Regulations").

I. Overview of the Convention

According to Tomme Rosanne Young (IUCN Senior Legal Officer) the Convention is intended to help address the ballast water issue by focusing on minimizing current risks and side effects to the environment and human health arising from the transfer of species in ships' ballast water and sediments, and beginning the process of

[1] Rudiger Wittenberg & Matthew J.W. Cook eds., Invasive Alien Species: A Toolkit of Best Prevention and Management Practices, (Wallingford: CAB International, 2001) 63.

eliminating such harmful transfers in the future.[2] Before assessing the potential effectiveness of the Convention, it is important to outline some of the obligations and responsibilities of party states contained in it. In accordance with Article 18(1) the Convention shall "enter into force twelve months after the date on which not less than thirty States, the combined merchant fleets of which constitute not less than thirty-five percent of the gross tonnage of the world's merchant shipping, have either signed it without reservation as to ratification, acceptance or approval, or have deposited the requisite instrument of ratification, acceptance, approval or accession in accordance with Article 17."[3] To date, only 6 States have ratified the Convention representing 0.62% of the gross tonnage of the world's merchant ships.

Article 2 of the Convention outlines the general obligations of parties to the convention. Some of the noteworthy obligations include the obligation to "encourage the continued development of Ballast Water Management and standards to prevent, minimize and ultimately eliminate the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments;"[4]Parties to the convention must also take action pursuant to the Convention shall to endeavor not to impair or damage their environment, human health, property or resources, or those of other States.[5] Also, Parties should ensure that Ballast Water Management practices used to comply with this Convention do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.

Parties to the Convention are also to encourage ships entitled to fly their flag to avoid the uptake of Ballast Water with "potentially Harmful Aquatic Organisms and Pathogens, as well as Sediments that

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[2] T.R. Young, "The Proposed Ballast Water Convention – a major advance in marine environmental protection" (2003) 13 Ballast Water News 4, 5.
[3] International Convention for the Control and Management of Ships' Ballast Water and Sediments, *available online at*: <http://svsunepibmdb.net/?q=node/178>, Art. 18(1).
[4] *Ibid*., at Art. 2(5).
[5] *Ibid*., at Art.2(6).

may contain such organisms, including promoting the adequate implementation of recommendations developed by the Organization."[6] In addition, each party state is required to develop, subject to its particular conditions and capabilities, national strategies or program for ballast water management in its ports and waters under in jurisdiction.[7] Additionally, in order to combat the problem of invasive species introduced by water of ballast tank sediments, Parties undertake to ensure that in ports and terminals where cleaning or repair of ballast tanks occurs, adequate facilities are provided for the reception of Sediments.[8]

One of the objectives of the Convention is the promotion of ballast water management technology. Article 6 calls for parties to endeavor, jointly or individually, to promote and facilitate scientific and technical research on ballast water management and monitor the effects of ballast water management in waters under its jurisdiction. In addition, each party is required to share such information with other parties who request it.[9]

Ships are required to be surveyed and certified. And as set out in Article 9, a ship to which the convention applies may be inspected by port state control officers in another party state to determine whether the ship is in compliance. Inspections are limited to verifying that there is a valid certificate onboard; inspecting of the Ballast Water book; and/or a sampling of the ship's Ballast Water. If the ship does not hold a valid certificate, if the condition of the ship or equipment does not correspond substantially with the Certificate, or the master or crew are not familiar with shipboard procedures relating to ballast water management a more detailed inspection may be carried out and the ship will be unable to discharge ballast water until it can safely do so.[10] All though inspections are authorized, all possible efforts should be made to avoid a ship being unduly detained

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[6] *Ibid*., at Art. 2.
[7] *Ibid*., at Art. 4.
[8] *Ibid*., at Art 5.
[9] *Ibid*., at Art 6.
[10] *Ibid*., at Art 9.

or delayed. When a ship is unduly detained or delayed, it is entitled to compensation for any loss or damage suffered.[11] Any Violations of the requirements are prohibited and sanctions are established under the law of the Administration of the ship concerned regardless of where the violation occurs.[12] If a dispute arises between parties to the convention, then Article 15 states that settlement should be achieved by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements or other peaceful means of their own choice.[13]

The Convention also has an Annex consisting of several regulations which provide for the technical obligations of the Convention. Regulation B includes specific requirements for ballast water management plans and ballast water record books. It also contains the basic requirements for the conduct of ballast water exchange and sets out the timetable for implementation of the Convention's requirements to specific vessels. Under Regulation B-4 Ballast Water Exchange, all ships using ballast water exchange should: "Whenever possible, conduct ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth and in cases where the ship is unable to conduct ballast water exchange in accordance with those guidelines, exchange should be as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 metres in depth." [14] If these requirements are unable to be adhered to, States may designate areas where ships can conduct ballast water exchange safely and without risk to the marine environment.[15]

Regulation C-1 allows Parties, individually or jointly with other Parties, to impose additional measures to prevent, reduce, or eliminate the transfer of Harmful Aquatic Organisms and Pathogens through ships' Ballast Water and Sediments.[16] A Party or Parties

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[11] *Ibid*., at Art 12.
[12] *Ibid*., at Art 8.
[13] *Ibid*., at Art. 15.
[14] *Ibid*., at Reg. B-4
[15] Canada has recently adopted four alternate exchange zones on the East Coast.
[16] *Supra*., note 3 at Reg. C-1.

intending to establish more stringent requirements are required consult with adjacent or other States that may be affected by such standards or requirements and, in some cases, will have to gain approval of the IMO.[17]

Section D sets out the standard for ballast water management. Regulation D-1 required at least 95% efficiency of volumetric exchange of Ballast Water when conducting ballast water exchange. And, when using the pumping through method ships are required to pump through three times or until 95% efficiency can be established. In addition, ships are required to meet a specific performance standard which is outlined in regulation D-2. Regulation D-4 allows for ships participating in a program approved by the Administration to test and evaluate promising Ballast Water treatment technologies to have an additional five years before having to comply with the requirements.[18] Section E (Survey and Certification Requirements for Ballast Water Management) outlines the requirements for initial renewal, annual, intermediate and renewal surveys and certification requirements.

II. Strengths of the Convention

Perhaps the most important aspect of the Convention is the uniformity it provides to the world's commercial shipping industry. As stated above, the lack of uniformity as a result of the series of voluntary guidelines provided little incentive for the shipping industry to apply potentially expensive ballast water management programs. The Convention requires that all party states bring vessels into compliance with the ballast water management standards as established in Section D of the Annex to the Convention. Additionally, even non-parties to the treaty may have to bring their ships into compliance if they wish to enter the jurisdiction of a party

[17] *Ibid*., at Reg. C-2
[18] *Ibid*., at Reg. D-4

state. Thus, the treaty requires positive change, as opposed to the previous voluntary guidelines.[19]

The next strength of the convention is closely related to the first. Prior to the convention, the main body of International regulation consisted of IMO resolution A.868(20) as outlined above. This resolution merely recommended. In contrast, the Convention provides a legally binding framework. It can be seen then that the main difference between the Guidelines and the draft Convention relates to the shift in IMO regulatory emphasis to flag State responsibility and equipment based water treatment.[20] Indeed, the role of dealing with violations under the Convention is placed in the hands of the flag State. Article 8 of the Convention states that "any violation of the requirements of this Convention shall be prohibited and sanctions shall be established under the law of the Administration of the ship concerned, wherever the violation occurs."[21]

The Convention also provides specific standards for ballast water management. It was crucial that the Convention set a biologically meaningful ballast water treatment standard in order the curb the problem.[22] Various regulations found in the Annex to the Convention provide specific standards for ballast water exchange as well as a specific ballast water performance standard. For example, two size classes were distinguished and maximum concentrations for each were set in Regulation D-2, which states that ships shall discharge less than 10 viable organisms per cubic metre greater than or equal to 50micrometres in minimum dimension and less than 10 viable organisms per millilitre less than 50 micrometres in minimum dimension and greater than or equal to 10micrometres in minimum

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[19] Albert G. McCarraher, "The Phantom Menace: Invasive Species", (2006) 14 N.Y.U. Envtl. L.J. No. 3, 748.
[20] M. McConnell, 2002. GloBallast Legislative Review: Final Report. GloBallast Monograph Series No. 1. IMO London, 18.
[21] *Supra*., note 3 at Art. 8
[22] Cato C. ten Hallers-Tjabbes, "Prevention: Marine biodiversity threatened by Ballast water transported by ships; curbing the threat." Proceedings of a Global Synthesis Workshop on 'Biodiversity Loss and Species Extinctions: Managing Risk in a Changing World' Sub Theme: Invasive Alien Species – Coping with Aliens, 3.

dimension. In addition to providing Convention ships with an established target, these standards provide an internationally recognized performance standard for prototype ballast water technologies, the lack of which was formerly a problem in developing these new technologies.

The recognition of prototype ballast water treatment methods provides party states and individual organizations with the ability to test emerging technology without fear of breaching the Convention and thus being subject to sanctions under the Convention. Regulation D-4 allows ships who, prior to having the Ballast Water Performance Standard apply to it, participates in a program approved by the Administration to test and evaluate promising ballast water treatment technologies, be exempt from the standard in regulation D-2 for five years from the date on which the ship would otherwise be required to comply with such standard. Ships who participate in similar approved program after the date to which the standard as set out in Regulation D-2 is applied are exempt from the standards for five years from the date the technology is installed.[23] This allows ships to test one of the several new promising technologies in development or ones that may be developed in the future. These include: Physical treatment methods such as ultra violet light sterilization;[24] Mechanical methods such as filtration and temperature treatments;[25]Chemical treatment methods;[26]and combinations of the above.

Recognition of these treatments will enable the Convention to remain effective once one or more of these ballast water management practices becomes viable.

III. Weaknesses of the Convention

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[23] *Supra*., note 3 at D-4
[24] *Supra*., note 1 at 71.
[25] *Ibid*.
[26] Global Ballast Water Management Programme ,"Treatment Technology", *available online* at:
<http://globallast.imo.org/index.asp?page=ballastw_treatm.htm&menu=true>.

The Convention is also subject to several limitations or weaknesses that may reduce its effectiveness in dealing the problem. For example, ballast water exchange, as recommended by IMO Resolution A.868(20) and reinforced in the Convention, is currently the most viable form of ballast water management. Although it may be the most viable, it is by no means the ideal solution. During discussion of the MEPC when establishing the Convention, it was clear that only a 100 percent removal or inactivation standard can be guaranteed to be effective in eliminating the transfer of unwanted organisms and pathogens, but the 95 percent standard was adopted due to the lack of an effective treatment.[27] There are two main issues with respect to ballast water exchange.

Firstly, there are serious safety concerns for ships undertaking ballast water exchange at sea. Factors such as the weight of huge volumes of cargo, fuel and ballast water, in many different loading conditions must be considered when conducting ballast water exchange. Damage to the ship's structural integrity can result if these weights are not properly balanced. Other safety concerns associated with ballasting include ship stability, maneuverability, forward visibility and potential hazards to the crew.[28] The safety concern is recognized in a series to exceptions in Regulation B-4 which states that "vessels must exchange their ballast water in waters at least 200 meters deep and at least fifty nautical miles from the nearest land subject to two exceptions: If there is a threat to the safety or stability of the ship; compliance would cause deviation or delay; or geography does not allow for compliance.[29]

Secondly, the technique is not 100 percent effective in eliminating harmful aquatic organisms.[30] The numbers of individuals in some taxonomic groups were reduced drastically by ballast water

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[27] Steve Raaymakers, "Convention Update", (2002) Ballast Water News 8, 3.
[28] International Joint Commission Canada and the United States, "The Challenge to Restore and Protect the Largest Body of Fresh Water in the World", 11th Biennial Report on Great Lakes Water Quality (2002), 34.
[29] *Supra*., note 3 at B-4.
[30] *Supra*., note 26.

exchange, other were not significantly effected whatsoever.[31] Any efficacy that ballast water exchange has is related to the inability of open-ocean organisms to survive in coastal waters. Thus, it is ineffective for coastal voyages where the ship would be replacing near-coastal ballast water with similar water. The Global Ballast Water Management Programme even suggests that ballast water exchange at sea may itself contribute to the wider dispersal of harmful species. In particular, island states located 'down-stream' of mid-ocean ballast water exchange areas may be at risk from this practice.[32]

In addition to the problems associated with ballast water exchange, costs to Convention States and ship owners to implement their respective obligations under the Convention could be substantial. For example, party states will incur costs related to the purchase and development of equipment, data management, enforcement of the regulations and inspections. But possibly the largest expense is the requirement in Article 5(1) that States provide adequate sediment reception facilities. For many coastal States, this requirement is simply not feasible. Vessel owners will have similar costs such as equipment and reporting costs, development costs and costs associated with the necessary delay of vessels when subject to mandatory ballast water exchange which, according to *The Eleventh Biennial Report on Great Lakes Water Quality*, may be anywhere from 15 to 41 hours for ocean-going ships.[33]

Another weakness of the Convention lies in the fact that it fails to address the issue of hull fouling, an additional vector for the introduction to invasive marine organisms. Fouling organisms on ships hulls have been a source of economic loss since the first ships sailed the oceans.[34] Organisms attached to ship hulls can also easily survive a long voyage and establish themselves in foreign ports. A variety of substances and procedures are currently used by the

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[31] Supra., note 1 at 71
[32] Supra., note 26.
[33] *Supra*., note 28 at 34.
[34] *Supra*., note 1 at 64.

shipping industry to limit hull fouling. While reducing the presence of invasive species, anti-fouling hull coatings can contain toxic substances.[35] The recent decrease in the use of paints containing tributyltin (TBT), may lead to the increase of fouling organisms on certain vessels.[36]

Other factors leading to increased hull fouling include that increased Water quality in many harbours and ports around the globe may lead to more abundant and diverse fouling organisms on the hulls of visiting ships.[37] Additionally, the faster speeds of modern ships may enhance the survival rate of certain organisms, such as oligohaline species that would not survive longer exposures to full-strength seawater. Also, many slow moving vessels such as semisubmersible drilling platforms still regularly travel from continent to continent.[38] Although not technically associated with ballast water, the problem of hull fowling will allow the problem of marine invasive species to continue, regardless of any success the Convention may enjoy.

Finally, the convention does not address specific procedures for dealing with ships that carry only residual ballast water and ballast water sediments. These ships, which make up as much as 70 percent of vessels entering the Great Lakes, are known as "no ballast on board" ships pose a risk of introducing invasive species if ballast is added in one area and discharged in another.[39] Any effective solution to the problem of invasive organisms will have to adequately deal with these ships.

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[35] Canadian Council of Fisheries and Aquaculture Aquatic Invasive Species Task Group, "A Proposal for a National Action Plan to Address the Threat of Aquatic Invasive Species" available online at:< http://www.dfo mpo.gc.ca/science/environmental-environnement/ais/AIS_ConsultationDraft_e.pdf >, 13.

[36] [36] Paul Fofonoff et al. "In Ships or on Ships? Mechanisms of Transfer for Nonnative Species to North America", in Gregory M. Ruiz and James T. Carlton eds., *Invasive Species: Vectors and Management Practices* (Washington: Island Press, 2003), 153.

[37] *Ibid*.

[38] *Ibid*.

[39] *Supra*., note 35 at 13.

IV. Canada's Approach to Invasive Ballast Organisms

Canada's *Ballast Water Control and Management Regulations*, which came into force on June 8 2006, were made pursuant to section 657.1 of the *Canada Shipping Act*. The Regulations made mandatory a number of the existing voluntary guidelines outlined in Transport Canada Publication No. 13617, "Guidelines for the Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction."

Canada chose not incorporate the Convention directly into the new Regulations because it has not yet entered into force and it appeared that it may be some time before it does. According to the "Regulatory Impact Analysis Statement" as published in the Canada Gazette, incorporating the Convention's provisions before it came into force would be ineffective given the fact that other states would be under no obligation to ensure that ships under their authority meet the requirements for certification, inspection and fitting of approved ballast water treatment systems.[40]

After reviewing the Regulations, there seems to be few instances of the domestic legislation imposing a higher standard for ships entering Canadian ports than that imposed in the Convention, but one such higher standard involves the significant problem discussed above of NOBOB ships. Section 4(3) of the Regulations states:

> (3) A ship shall manage ballast water taken on board the ship in waters under Canadian jurisdiction, in the United States waters of the Great Lakes Basin or in the French waters of the islands of Saint Pierre and Miquelon if the ballast water is mixed with other ballast water that was taken on board the

[40] "Regulatory Impact analysis Statement." *Canada Gazette* Vol. 139, no. 24, available online at: < http://canadagazette.gc.ca/partI/2005/20050611/html/regle6-e.html#avis>

> ship outside waters under Canadian jurisdiction and that was not previously subjected to a management process …[41]

Since NOBOB ships coming from outside waters under Canadian jurisdiction will carry some residual ballast water (including sediment settled out of the ballast water), ships destined to the Great Lakes Basin declaring no ballast on board, which would be exempt from the Convention, will still have to ensure that the ship complies with the following best management practices, as indicated in section 5 of the Regulations. These best management practices include conducting saltwater flushing of ballast water tanks that contain the residual amounts of ballast water in an area at least 200 nautical miles from shore before entering waters under Canadian jurisdiction. Saltwater flushing is defined as "… the addition of mid-ocean water to ballast water tanks that contain the residual amounts of ballast water, the mixing of the flush water with the residual water and sediment in the tanks through the motion of the ship and the discharge of the mixed water so that the salinity of the resulting residual ballast water in the tanks exceeds 30 parts per thousand or is as close to 30 parts per thousand as possible."[42] Ships that comply with this standard are required to keep a record book of compliance for 2 years.[43]

The Regulations also impose a higher standard than the Convention with respect to ballast water salinity. Paragraph 8(2)(b) of the Regulations states "a ballast water salinity of at least 30 parts per thousand, if the exchange of ballast water is conducted in an area not less than 50 nautical miles from shore."[44] The Regulations go beyond the standard as stated in Regulation D-1 of the Convention, which does not include the any such standard as stated in s. 8(2)(b).

Section 9 sets out the applicable ballast water treatment standard. This standard mirrors the standard as outlined in

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[41] *Ballast Water Control and Management Regulations* SOR/2006-129, s. 4(3).
[42] *Ibid*., at 5(2).
[43] *Ibid*., at 5(3).
[44] *Ballast Water Control and Management Regulations SOR/2006-129, s.* 8.

Regulation D-2 (Ballast Water Performance Standard) of the Convention with one exception. Canada does not have an equivalent clause to Regulation B-3 (Ballast Water Management for Ships) which allows ships constructed before 2009 with a Ballast Water Capacity of between 1,500 and 5,000 cubic metres to fail to meet the standard in D-2 until 2014, and ships constructed before 2009 with a Ballast Water Capacity of less than 1,500 or greater than 5,000 cubic metres to fail to meet the standard until 2016. Ships constructed in or after 2009 with a Ballast water Capacity of less than 500 cubic metres are required to meet the standard while ships constructed in or after 2009 with a Ballast Water Capacity of more than 5,000 cubic metres does not have to meet the standard till 2016. Until a time where all ships are to be compliance with Regulation D-2, Canada will be enforcing a higher standard than that required by the Convention.

The Regulations fail to meet the requirements and standards of the Convention in several aspects. For example, Article 5(1) of the Convention recognizes the importance of the provision of sediment disposal facilities. Canada's Regulations fail to address this issue. In fact, s. 10(2) only suggests that carry out the disposal of the sediment at a reception facility.[45] This policy is farter outlined in TP 13617 E (A Guide to Canada's Ballast Water Control and Management Regulations), which states that the removal of sediment from ballast tanks *should preferably* be undertaken under controlled conditions in port, at a repair facility or in dry dock and that the removed sediment should preferably be disposed of in a sediment reception facility if available, reasonable and practicable.[46] In order to be effective, the Regulations should make the use of sediment disposal facilities mandatory.

As well, the Regulations fail to address several aspects of the Convention completely. For example, the Regulations do not provide for any method of inspection as set out in Article 9 of the Convention. Although according to the "Regulatory Impact Analysis Statement",

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[45] *Ibid*., at 10(2).
[46] *A Guide to Canada's Ballast Water Control and Management Regulations*, TP No.13617 E 20.

enforcement of the Regulations will be in the hands of Marine Safety inspectors, who will enforce the standards during normal periodic inspections,[47] a failure to specifically address the inspection process in the Regulations could result in delays, lack of uniformity, and a failure to properly address all requirements of the Regulations.

The Regulations also fail to address the issue of penalties for ships found to be in non-compliance with the Regulations. Although the Regulations are made under the authority of the *Canada Shipping Act*, since the addition of s. 657.1 on October 31,1998 there have been no amendments to the offences provisions found in part XV of the Act. The lack of deterrence could pose a potentially crippling effect on the obtainment of the goals of the Regulations themselves.

Finally, the Convention foresees the possibility of compensation for ships subject to undue delay. By requiring ships to comply with extensive regulations and longer inspections, there is potential for economic losses for ship owners subject to delays. If Canada is going to require similar standards to be enforced in its jurisdiction, a similar standard should be adopted ships which may become subject to undue delay. In addition to compensating ship owners, the possibility of expense to Canada for failing to ensure ships get on their way in a timely manner should encourage the Canadian government to ensure that the process is streamlined and that inspections are carried out with expediency in mind.

V. Conclusion

Although the introduction of a mandatory set of international regulations is a positive step forward in the prevention of the introduction of marine invasive organisms into marine ecosystems, the limitations of the Convention may overcome any potential positive effects. As discussed, limitations such as the lack of an effective and safe ballast water treatment method, the costs associated with the implementation of the Convention requirements to the ship

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[47] "Regulatory Impact analysis Statement." Canada Gazette Vol. 139, no. 24, available online at: < http://canadagazette.gc.ca/partI/2005/20050611/html/regle6-e.html#avis>

owner and flag States, the failure to address hull fouling, and the failure to recognize the potential introduction of invasive organisms in residual ballast water in NOBOB ships may continue to allow the introduction and spread of invasive organisms. Canada has attempted to regulate the issue with its own set of Regulations. The Regulations, in some instances, meet or exceed the requirements of the Convention but also fail to address some of its key provisions contained and are also subject some of the same limitations and weaknesses of the Convention. As such, it remains unclear if the Regulations will serve to protect Canada from the next species waiting silently in the ballast tanks of one of the thousands of ships entering Canadian jurisdiction everyday.