BALLAST WATER MANAGEMENT CONVENTION, 2004: TOWARDS COMBATING UNINTENTIONAL TRANSFER OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS

by

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DEDICATION

This thesis is dedicated to the glory of Almighty God, the Most Gracious, the Most Merciful, the Sovereign Owner of life who has generously showered His love, grace, protection, and blessings upon me in unprecedented and wonderful ways over the years. It is also dedicated to my parents, Mr. Abdul Ganiy Lawal (Late) and Mrs. Halimah Idowu Lawal, for the care and disciplined upbringing they provided me with. My mother, I pray you reap the fruits of your labour. My father, May God grant you Al-janah fridaos.

TABLE OF CONTENTS

ABSTRACT

The introduction of harmful aquatic organisms and pathogens transferred through ships' ballast water and sediments from one coastal region to another has ecological, economic, environmental, and human impacts. The international community, through numerous binding and non-binding instruments adopted to protect the marine environment, ecosystems and biodiversity has, by those instruments, also sought to combat this problem. Ultimately, the *International Convention for the Control and Management of Ships' Ballast Water and Sediments*, 2004 was adopted by the International Maritime Organization as the dedicated legal regime intended to prevent, control and ultimately eradicate the introduction and spread of harmful aquatic organisms and pathogens through ships' ballast water and sediments. By its Regulations, the Convention sets out coastal/port and flag State obligations along with subsequently adopted technical Guidelines by which to implement it. Despite the importance of this problem, the Convention has not yet entered into force. This study assesses the potential of the Convention to promote achievement of the goal to prevent and eliminate this source of marine and biodiversity degradation and destruction. The study finds that the Convention constitutes a useful global legal regime within which steps can be taken to establish uniform ground rules, standards and practices to combat the introduction, transfer and spread of harmful aquatic organisms and pathogens across the world's coastal and marine areas. Nevertheless, its potential is undermined, among others, by the exemption of some categories of ships from its application, financial costs, especially to developing States, of implementing its requirements, and by the fact that its provisions do not account for other salient sources by which harmful aquatic organisms and pathogens are spread. Suggestions are made to encourage more ratification to bring the Convention into force and on remedying some of the weaknesses in the formulation of its rules. It is concluded that if it is ratified by sufficient and wide number of States as well as conscientiously implemented by States, adopting additional national laws and policies to regulate areas which are not addressed by the Convention, it would facilitate progress in the global effort to improve the protection of marine environments, ecosystems, and biodiversity, specifically, as regards the contribution towards combating the introduction and transfer of harmful aquatic organisms and pathogens *via* ships' ballast water and sediments.

LIST OF ABBREVIATIONS USED

AIS	Aquatic Invasive Species
ANIS	Aquatic Non-indigenous Species
AQIS	Australian Quarantine and Inspection Service
BOB	Ballast on Board
BWE	Ballast Water Exchange
BWM	Ballast Water Management
BWMC	International Convention for the Control and Management of Ships' Ballast Water and Sediments
BWMP	Ballast Water Management Plan
BWRF	Ballast Water Report Form
CBD	Convention on Biological Diversity
COP	Conference of the Parties
CRISTAL	Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution
EEZ	Exclusive Economic Zone
GEF	Global Environmental Facility
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Environment Protection and Advisory Committee on Protection of the Sea
GISP	Global Invasive Species Programme
GLOBALLAST	Global Ballast Water Management Programme
GT	Gross Tonnage
HAOP	Harmful Aquatic Organisms and Pathogens
ICS	International Chamber of Shipping
IGCC	Interim Guinea Current Commission
IHR	International Health Regulations
IMCO	International Maritime Consultative Organization

IMO	International Maritime Organization
INTERTANKO	International Association of Independent Tanker Owners
ISM	International Safety Management Code
LOSC	1982 United Nations Convention on the Law of the Sea
MAJ	Maritime Authority of Jamaica
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973 as amended
MEA	Multilateral Environmental Agreement
MEPC	IMO Marine Environment Protection Committee
MSC	IMO Marine Safety Committee
NIMASA	Nigerian Maritime Administration and Safety
NOBOB	No Ballast on Board
PSC	Port State Control
PSCO	Port State Control Officer
PSP	Paralytic Shellfish Poisoning
RO	Recognized Organization
SBSTTA	Subsidiary Body on Scientific, Technical, and Technological Advice
SOLAS	International Convention for Safety of Life at Sea, 1974
TOVALOP	Tanker Owners' Voluntary Agreement Concerning Liability for Oil Pollution
U.S.A	United States of America
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
WHO	World Health Organization.
WSSD	World Summit on Sustainable Development

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CHAPTER 1: INTRODUCTION

Shipping is widely recognized as a key component of international trade.[1] It provides the most effective means of transporting bulk goods over long distances. In fact, "ships carry over 90 percent of all global trade."[2] For safety, ships require ballast to maintain stability throughout their voyages. Over the years, sands, rocks, stones, or heavy iron rods were used as ballast to balance seagoing vessels. Their utilization was expensive, and time and energy consuming.[3] In modern times, specifically in the late 19th century, as a result of the advent of steel-hulled ships,[4] the marine world turned to the utilization of salt water as a means of balancing vessels, especially when not fully laden with cargo, as it is much easier to load and off load, and more efficient and economical in comparison to solid ballast.[5] By this process, ship ballast tanks are filled with water to maintain their balance.

As essential as ballast water is to ships' operations, it serves as a vector through which harmful aquatic organisms and pathogens (HAOP) are transferred or introduced

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1 Edgar Gold, Aldo Chircop & Hugh Kindred, *Essentials of Canadian Law: Maritime Law* (Toronto, Ontario: Irwin Law, 2003) at.75.

2 Andrew Airahuobhor, " Nigeria: International Collaboration to Protect Marine Environment from Ballast Water" online: http://allafrica.com/stories/201006180445.html accessed on October 31st, 2010.

3 Moira L. McConnell, "Ballast and Biosecurity: The Legal, Economic and Safety Implications of the Developing International Regime to Prevent the Spread of Harmful Aquatic Organisms and Pathogens in Ships' Ballast Water" (2003) 17 Ocean Yearbook 213 at 218.

4 Gregory M. Ruiz & David F. Reid, "Current State of Understanding About the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introduction to the Great Lake Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information" in Emily G. O'Sullivan, ed, *Ballast Water Management: Combating Aquatic Invaders* (New York: Nova Science Publishers Inc. 2010) 25 at 50.

5 GloBallast Partnerships, "The GloBallast Programme", online: http://globallast.imo.org/index.asp?page=gef_interw_project.htm accessed on March 28, 2011.

from one part of the world to another.[6] The introduction of these organisms into another locality through ships' ballast water is generally considered as either operational or unintentional.[7] Aside from ships' ballast water and sediments, there are other media through which HAOP may be introduced into the marine environment. These include hull fouling, cargo, and other areas of the ship, aquaculture escapes, fishing bait releases, disposal of solid waste or waste water (sewage), which may eventually find their ways into, decompose and breed organisms in the marine ecosystems.[8] But, as a medium for the transfer of HAOP, ships' ballast water has been identified as one of the four main threats to the world's oceans.[9] It is estimated that between 10 and 14 billion tonnes of ballast water are transferred globally each year, and that 7,000 species are carried around in ballast water every day.[10]

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6 Airahuobhor, "Nigeria: International Collaboration to Protect the Marine Environment from Ballast Water", *supra* note 2.

7 Moira L. McConnell, "Responsive Ocean Governance: The Problem of Invasive Species and Ships' Ballast Water- A Canadian Study" in T. Koivurova et al, eds, *Understanding and Strengthening European Union — Canada Relations in Law of the Sea and Ocean Governance,* (2009) 35 Juridica Lapponica 433 at 434. See also Erik Jaap Molenaar, *Coastal State Jurisdiction Over Vessel-Source Pollution* (The Hague, Boston, London: Kluwer Law International,1998) at 20.

8 United States Environmental Protection Agency, "Pathways for Invasive Species Introduction" online: http://water.epa.gov/type/oceb/habitat/pathways.cfm accessed on August 2, 2011.

9 Other threats to the marine world include land-based marine pollution, over-exploitation of living marine resources and physical alteration of marine habitats. Land-based pollution and activities are the major threats to the marine environment and biodiversity. It accounts for 80 per cent of total marine pollution. See David L. VanderZwaag & Ann Powers, "The Protection of the Marine Environment from Land-Based Pollution and Activities: Guaging the Tides of Global and Regional Governance" (2008) 23 Int'l J Mar & Coast L 423 at 423-424. See also Efihimios E. Mitropoulos, Secretary-General, International Maritime Organization, Foreword in Maria Helen Fonseca de Souza Rolim, *The International Law on Ballast Water*: *Preventing Biopollution* (Leiden , Boston: Martinus Nijhoff Publishers, 2008).

10 J. Tamelander et al, *Guidelines for the Development of a National Ballast Water Management Strategies*, Globallast Monographs no.18, (London, UK and Switzerland, IMO, 2010). See also Sue Matthews & Kobie Brand, *Africa invaded: The Growing Danger of Invasive Alien Species* (The Global Invasive Species Programme (GISP), 2004) 40, online: http://www.gisp.org/downloadpubs/gisp%20africa%202.pdf accessed on November 26, 2010.

In the 1980s, the transfer of these organisms began to be recognized as a major threat to the marine world. This was when Canada and Australia were experiencing difficulties with invasions of alien species[11] and brought their concerns about the problem of HAOP to the International Maritime Organization (IMO). The problem began to be recognized as a major international concern by the United Nations Conference on Environment and Development in 1992 at Rio de Janeiro.[12]

The need to combat the threat posed by HAOP resulted in various global attempts to that end. Before 2004, the international organizations adopted numerous conventions and regulations imposing obligations on States to protect the marine environment. The IMO also adopted non-binding Guidelines to specially address this issue of HAOP in ships' ballast water. However, none of these binding instruments were adopted for the direct purpose of dealing with the problem of HAOP. In 2004, the *International Convention for the Control and Management of Ships' Ballast Water and Sediments*, 2004 (BWMC)[13] was adopted by the IMO. It is the first Convention to principally address the issue of HAOP resulting from ships' ballast water and sediments. This Convention was adopted to curb the unintentional transfer of HAOP through ships' ballast water.

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11 Such as the invasion of Zebra Mussel into North America and *Asteria Amurensis* into Autralia waters. See GloBallast Programme, "Ten of the Most Unwanted" online: http://globallast.imo.org/poster4_english.pdf accessed on February 4, 2011.

12 See, IMO, "International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM)", online: http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the- Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-%28BWM%29.aspx accessed on January 14, 2011, See also Mitropoulos, *supra* note 8.

13 *International Convention for the Control and Management of Ship's Ballast Water and Sediments*, IMO Doc. BMW/CONF/36, 16 February 2004, [hereinafter BWMC].

The overall objective of the Convention is "to prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships' Ballast Water and Sediments…."[14] The Convention stipulates the obligations of parties, sets standards for the management of ships' ballast water, establishes procedures for ship surveys and certificate of compliance with the Convention. Although the Convention is not yet in force, after the adoption of this Convention, numerous Guidelines[15] have been adopted, related to implementation of the Convention, to ensure the protection of the marine environment against the transfer of HAOP through ships' ballast water and sediments.

The objective of this present study is to examine the provisions of the BWMC.[16] The question asked is whether the provisions of the Convention, when implemented by States, can successfully achieve its objective of preventing, minimizing and ultimately eliminating the risk posed by the transfer of HAOP. The study determines whether the provisions of the Convention are adequate or sufficient to be utilized to combat the menace posed by the transfer of HAOP through ships' ballast water and sediments. In other words, are there any inherent ambiguities in the text of the Convention which may hinder its successful implementation, and what are the challenges that could hinder the achievement of its objectives to combat HAOP. Prominent among these challenges is that since 2004 that the Convention has been adopted, it has not come into force. However,

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14 BWMC*, ibid* at preamble.

15 Seventeen (17) Guidelines are foreseen by the Convention, but fifteen (15) have been adopted so far. Some of the adopted Guidelines are: *Guidelines for Sediment Reception Facilities* (G1), adopted on 13 October 2006 and *Guidelines for Ballast Water Management Equivalent Compliance* (G3) adopted in July 2005. See Chapter 4.2 for the rest of the Guidelines.

16 BWMC, *supra* note 13.

fifteen (15) technical Guidelines to aid its implementation have been adopted so far.[17] As at July 31, 2011, 28 States have ratified the Convention. This represents 25.43% world merchant shipping tonnage.[18] This is of great concern to the IMO, who reiterated their invitation to States that have not ratified BWMC to do so at their earliest possible time.[19] The non-ratification also constitutes a great challenge to the implementation and the realization of the objectives of the Convention.

To deal with these issues, the study examines, *inter alia*, the provisions of the Convention as to obligations imposed on flag and coastal States regarding ballast water management, sediments management, survey and certification of ships, as well as the standards for ballast water management. The examination of the provisions of the Convention is intended to assess its prescriptive strengths and accompanying challenges as to implementation. The study identifies ratification of the Convention as a challenge to realizing the objective of the Convention and canvasses the efforts that should be made to ensure widespread ratification to bring the Convention into force and to ensure that its objectives are achieved.

Other global instruments adopted by the General Assembly of the United Nations (UN), and other UN organizations, (WHO and IMO) before the BWMC, setting out the

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17 See GloBallast Partnerships, "The IMO Guidelines" online: http://globallast.imo.org/index.asp?page=resolution.htm.

18 IMO, "Status of Conventions" online: http://www.imo.org/About/Conventions/StatusOf Conventions/Pages/Default.aspx accessed on August 8, 2011. Its present status is against the required number of not less than 30 states, representing 35% or more of the world merchant shipping tonnage to bring it into force.

19 See IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, 15 July 2011, item 2.23. See also IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/15, 6 May 2011, par. 2. Online: http://www.amtcc.com/imosite/meetings/IMOMeeting2011/MEPC62/MEPC%2062-2-15.pdf accessed on August 6, 2011.

obligations of States for the protection of marine ecosystems, environments and biodiversity against pathogens or any other threats are also examined. These instruments include the *United Nations Convention on the Law of the Sea,* 1982 (LOSC),[20] the *International Health Regulations,* 1969 (IHR) as amended in 2005[21], *Convention on Biological Diversity,* 1992 (CBD)[22] and various Resolutions. The purpose of examining these instruments is to demonstrate why, in spite of their existence, the BWMC was adopted.

This study is useful for a number of inter-related reasons. First, shipping is very important in the day to day economic activities of the world trade. The bulk of goods and oil are carried by ships and oil tankers to and from importing and exporting countries. Ships serving this trade also provide a pathway for the transfer of HAOP from one coastal region to another. As a result of the importance of shipping and the importance of combating the transfer of HAOP, a study of this nature is important.

Second, the study seeks to highlight the specific obligations and responsibilities of coastal/port and flag states to protect their marine environment and ecosystems from HAOP transferred through ships' ballast water and sediments as well as regulating the conduct of ships flying their flags. Thus, the study discusses in detail the procedure for the implementation of ballast water management and the requirements for different ships to execute compliance with the provisions of BWMC, and its Guidelines.

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20 *United Nations Convention on the Law of the Sea*, 10 December, 1982, 1833 U.N.T.S. 3, [hereinafter LOSC].

21 *International Health Regulations*, 1969 now *International Health Regulations*, 2005, 2nd ed., (Switzerland, World Health Organization 2008), online: http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf accessed on April 16, 2011.

22 *Convention on Biological Diversity of the United Nations Conference on the Environment and Development*, 5 June 1992, 31 I.L.M. 818.

Third, there are States that might not want to ratify the Convention because of the general nature of most international conventions. The provisions of international conventions are not binding on non-parties to the conventions. However, the provisions of BWMC regarding ballast water management and standards are enforceable against all ships that sail to or anchor at the ports of State parties to the BWMC.[23] In other words, the provisions of BWMC, respecting the ballast water management can be enforced against ships belonging to parties and non-parties to the Convention when they are in the ports of State parties.[24]

Fourth, the study is important because its analysis facilitates making recommendations regarding how the weaknesses inherent in the Convention, and the challenges to be faced in its implementation, can be dealt with. The suggestions proposed may be useful to future committees of IMO that may work on amendments to the Convention, or that may adopt additional guidelines to foster the implementation of the Convention. Some of the ambiguities the Convention presently contains relate to: the exemption of "No Ballast On Board" (NOBOB) ships; the exemption of coastal trading ships from the application of the Convention; gaps regarding liability and compensation; lack of provision for port/coastal State baseline surveys; unspecific and ambiguous use of phrases in addition to the conferment of wide discretionary power on States; freedom of State parties to adopt additional or stringent standards than the one set under the Convention, which may eventually lead to uneven implementation of the Convention;

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23 BWMC, *supra* note 13, art. 3 (3).

24 BWMC*, ibid.*

and the lack of incentives for developing countries to set up facilities required to facilitate implementation of the Convention.

Fifth, of personal importance to me is that I am from an oil producing, a port and a coastal State, although Nigeria also has minimal number of ships operating under it. This study highlights how to regulate ships flying its flag. Also, in the course of shipping oil from my country, Nigeria, to other countries, oil tankers have to de-ballast in order to load crude oil. The de-ballasted water may contain harmful aquatic organisms, which may eventually harm Nigeria's marine ecosystem and biodiversity. This study is thus meant to highlight for Nigeria and other countries in the same category, the need to regulate the discharge of HAOP from ships' ballast water into their marine environments, either by designating alternative zones for such discharge or mandating ballast water exchange on the open sea. For unlike an oil spill that can be cleaned up,[25] once foreign species attack local coastal and marine species, leading to the loss of the local ones, the effect is always long lasting.

This study contains five chapters. This present chapter is the first of the five. It offers an overview of the study. Chapter 2 examines the nature of aquatic organisms, the general nature of HAOP and whether the menace of HAOP should be classified as pollution or not. This chapter also defines various terms used to characterize aquatic organisms. Finally, it examines the ecological, environmental, economic, and human health impact of ships' ballast water and sediments serving as the media for the transfer of harmful aquatic organisms and pathogens into marine ecosystems.

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[25] GloBallast Programme, "Which is the Bigger Threat?" Online: http://globallast.imo.org/poster1_english.pdf accessed on January 25, 2011.

Chapter 3 discusses the legal regimes pre-dating the BWMC. This background consists of the binding and non-binding international instruments pre-dating BWMC, that were either adopted for the general protection of the marine ecosystems and biodiversity against any threat or specifically, to prevent the transfer of HAOP through ships' ballast water and sediments. The more specific regulatory instruments include various Resolutions and Regulations, such as IMCO Assembly Resolution 18, *Research into the Effect of Discharge of Ballast Water Containing Bacteria of Epidemic Diseases*, 1973,[26] IMO Assembly Resolution A.774 (18), *Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediment Discharges*, 1993,[27] IMO Assembly Resolution A.868 (20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*, 1997,[28] as well as WHO's *International Health Regulations,* 2005.[29] The chapter also discusses the relevant provisions of some binding instruments such as the LOSC[30] which by its article 192 places a general obligation on States to protect and preserve the marine environment, and the CBD,[31] the objective of which is the conservation of biological diversity and the sustainable use of its components for the benefit of present and future generations.[32]

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26 Resolution 18, *Research into the Effect of Discharge of Ballast Water Containing Bacteria of Epidemic Diseases,* MP/CONF/WP.29, 31 October 1973, 24.

27 IMO Assembly Resolution A.774(18), *Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediments Discharges*, 4 November 1993, online: http://www.sjofartsverket.se/upload/5121/774.pdf accessed on April 19, 2011.

28 IMO Resolution A.868(20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Organisms and Pathogens*, 27 November 1997, online: http://www.islandnavigation.org/Library/A868.pdf accessed on April 21,2011.

29 *International Health Regulations*, *supra*, note 21.

30 LOSC, *supra* note 20.

31 *Convention on Biological Diversity*, *supra* note 22.

32 *Convention on Biological Diversity, ibid*, at preamble.

Chapter 4 analyzes the BWMC. It describes the provisions of the BWMC[33] and the Regulations adopted as annex to it as well as some of the Guidelines subsequently adopted for the effective control of the transfer of HAOP, and to prevent and ultimately eliminate their effects on the marine environment.

As already pointed out, the Convention aims at preventing HAOP because of the difficulty of remediation once HAOP is introduced. Thus, pursuant to Chapter 4, Chapter 5 evaluates the Convention by highlighting its strengths and the challenges of implementing it in light of its objectives. Some of the strengths of the Convention include the standards of ballast water management it establishes for ships to adhere to; the minimum standards it establishes in order to aid its compliance by States; the departure from the general international principle of exclusive flag State jurisdiction and enforcement over ships; the treatment of non-parties' ships under the Convention, when they enter State parties' jurisdictions; provisions on technical assistance, regional co-operation, ballast water sampling by port States, as well as the comprehensive nature of the Convention.

Nevertheless, the Convention has weaknesses which also indicate the challenges its implementation would face. Some of these are the exclusion of NOBOB ships and coastal trading ships from the application of the Convention; absence of a provision on liability and compensation; non-regulation of other vectors of the transfer of HAOP; and States' freedom to adopt additional or stringent measures to prevent the transfer of HAOP without limitation or proviso. Other challenges include enforcement of baseline surveys and risk assessment, lack of financial capability on the part of State parties, in particular,

[33] BWMC, *supra* note 13.

the developing nations to implement the Convention, a capital intensive undertaking and the problem of gaining sufficient and wide ratification in order to bring the Convention into force and achieve its objectives.

The problem of ratification is the greatest challenge presently facing the coming into force and implementation of the Convention. The ratification is necessary because, only wide ratification of the Convention by States from various regions can actualize the objectives of the Convention. For instance, the ratification by all States from the European Union will make little or no difference in the combat of HAOP, where all States of the African Union fail to ratify. Sufficient and wide ratification is thus necessary as the world is linked up with ocean. Concerned about the alarming rate at which the rate of harmful aquatic organisms continues, the IMO's Marine Environment Protection Committee (MEPC) reiterated the invitation to all member States, yet to ratify BWMC to do so as soon as possible, as "the only way to restrict further risks is to prevent the further spread of invasive species through ballast water at source by prompt ratification and implementation of the BWM Convention."[34] This indicates how essential the ratification of the Convention is to achieve the objectives of the Convention of combating HAOP.

Finally, Chapter 5 also draws lessons and makes recommendations for ratification by sufficient number of States to bring the Convention into force. The ratification is needed to ensure the coming into force of the Convention and its speedy implementation

[34] IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/15, 6 May 2011, *supra* note 19 at par. 3.

to enhance a cleaner shipping industry.[35] It is also recommends that States should consider the weaknesses of the Convention as identified in Chapter 5 as well as the suggestions made therein, to adopt national laws and policies to regulate those areas left out by the Convention. Some of which include regulation of NOBOB and coastal trading ships, and regulation of other vectors that can aid the introduction of HAOP into the marine environment.

Also, it is recommended that future committees of IMO that may likely work on amendments to the Convention, or adopt additional Guidelines to foster the implementation of the Convention, may consider the suggestions made in this study for implementation in the future. Although, immediate amendment of the Convention is not feasible, as the Convention itself has not come into force, after almost eight years of its adoption, and coupled with the complex nature of amending multilateral convention. But, the IMO can adopt Guidelines, although non-binding, to be upgraded as a binding instrument in the future, by way of an Annex or a Protocol to the Convention in order to incorporate the suggestions for the improvement and achievement of the objectives of the Convention. Some of the suggestions or recommendations are to include NOBOB under its purview; regulation of other vectors that can aid the transfer of HAOP; assistance to the developing nations to aid their implementation of the Convention; and provision of a liability and compensation regime. The study also advocates for sufficient and wide ratification to bring the Convention into force to aid the implementation and realization of its objectives.

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[35] See IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, 15 July 2011, *supra* note 19 at item 2.23. At this session, the MEPC calls on all IMO member States that have not ratified the BWMC to do so.

Although eradicating the existing transferred and established HAOP is the ideal option by which to combat the threats posed by HAOP through ships' ballast water and sediments, the immediate achievement of eradication is arguably impractical. Preventing the transportation of HAOP by controlling the pathways and vectors for the transportation is handy, realistic, viable and cost effective. More so, States have existing obligations under the LOSC and CBD to take action to protect the marine environment and biodiversity against any threat. The BWMC is clearly a way to implement these obligations, specifically regarding the introduction of HAOP through ships' ballast water and sediments. The study concludes optimistically, arguing that if the provisions of the BWMC, the Regulations made under it and the recommendations made to improve it are effectively implemented and enforced, it will go a long way to reduce the menace posed by HAOP introduced into different coastal regions by ships' ballast water and sediments. The result will be cleaner and safer marine ecosystems.

CHAPTER 2: THE CONCEPT AND IMPACTS OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS

2.1 INTRODUCTION

Many organisms exist in both coastal and high seas, with positive and negative impacts. When their impacts adversely affect the marine environment, society and human life, the organisms are referred to as "harmful organisms." As noted in Chapter 1, ships' ballast water is one of the vectors through which aquatic organisms may be transferred from one coastal region to another. This chapter seeks to examine the nature of aquatic organisms, in particular, harmful aquatic organisms and their resultant diseases, the pathogens, as well as the need to regulate the source of their introduction in order to combat their adverse impacts. The chapter examines the conceptualization of the subject as pollution of the marine environment and also the impacts that the harmful aquatic organisms and pathogens (HAOP) have on the marine ecosystems, environment, economic and human life.

2.2 THE NATURE OF AQUATIC INVASIVE ORGANISMS

Various organisms of different species and pathogens exist in nearly all aquatic systems, both coastal seas and the high seas. The majority of these organisms are invisible at an early stage of their life circle, without the use of a microscope. But their presence becomes visible when they have negatively affected both the environmental and ecological spheres of marine ecosystems. There are several entry pathways and vectors

through which these aquatic organisms may be transferred from one location to another. Pathways are the routes through which organisms or species enter new habitats, while vectors are the means by which they travel to such new habitats.[1] These pathways include shipping activities, (such as hull fouling, attachment of aquatic organisms to cargo, ships' chests, anchor, and other parts of ships), disposal of solid waste or waste water (sewage), aquaculture, home aquaria, recreational boating, water garden, natural disasters, hydrocarbon exploration, etc.[2] Aside from natural disasters or movements, all other pathways are influenced by human activities, and human activities have surpassed natural dispersal as means of transfer of aquatic organisms.[3]

As noted earlier, as a pathway, shipping may transfer aquatic organisms through several vectors. These include hull fouling, cargo, sediments and other areas of the ship, in addition to ballast water. Among the mechanisms serving as vectors for the transfer of aquatic organisms or species, "the global movement of ships' ballast water is considered the largest transfer mechanism for aquatic non-indigenous species (ANIS)"[4] and the

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1 United Nations Environment Programme (UNEP), Subsidiary Body on Scientific, Technical and Technological Advice, *Invasive Alien Species: Status, Impacts and Trends of Alien Species that threaten Ecosystems, Habitats and Species*, (United Nations doc. UNEP/CBD/SBSTTA/6/INF/11, 2001) at 6, online: http://www.cbd.int/doc/meetings/sbstta/sbstta-06/information/sbstta-06-inf-11-en.pdf accessed on April 01, 2011.

2 Gregory M. Ruiz et al, "Global Invasions of Marine and Estuarine Habitats by Non-Indigenous Species: Mechanisms, Extent and Consequences" (1997) 37 American Zoology 621at 622. See also United States Environmental Protection Agency, "Pathways for Invasive Species Introduction" online: http://water.epa.gov/type/oceb/habitat/pathways.cfm accessed on August 2, 2011.

3 Gregory M. Ruiz & David F. Reid, "Current State of Understanding About the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introduction to the Great Lake Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information" in Emily G. O'Sullivan, ed, *Ballast Water Management: Combating Aquatic Invaders* (New York: Nova Science Publishers Inc. 2010) 25 at 49.

4 O'Sullivan, ed, *ibid* at viii.

mechanism has resulted in many successful invasions of the organisms throughout the world.[5]

The invasion of aquatic organisms occurs in the process of ballasting operations when billions of organisms inevitably enter ships' ballast.[6] Ballast "is any material used to weight and/or balance an object",[7] while ballast water is the "water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship."[8] Ordinarily, ballast water is the port's sea water taken on board the ships' tanks to stabilize the ship during voyage in the absence of cargo or inadequate cargo to balance the ship during its voyage. Globally, it is estimated that between 10 and 14 billion tonnes of ballast water is transferred each year, and that 7,000 species are carried around in ballast water every day.[9]

The operational carriage of aquatic organisms in ships' ballast water and sediments makes the shipping industry, not only important in international trade, but a major player in the transfer of HAOP through ballast water and sediments. Sediments are "matter settled out of ballast water within a ship."[10] The amount of sediments taken on board a ship depends, *inter alia*, on the conditions of the coastal or sea water where the ballast water is taken and these sediments contain organisms which accumulate in the bottom of ballast tanks or cargo holds and may be discharged or dumped into coastal or

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5 Gregory M. Ruiz & David F. Reid, *supra* note 3 at 25.

6 Fred C. Dobbs & Andrew Rogerson, "Ridding Ships' Ballast Water of Microorganisms" (2005) 39 Environmental Science and Technology 259 at 259.

7 GloBallast Partnerships, "The Problem", online: http://globallast.imo.org/index.asp?page=gef_interw_project.htm accessed on March 28, 2011.

8 *International Convention for the Control and Management of Ship's Ballast Water and Sediments*, IMO Doc. BMW/CONF/36, 16 February 2004, [hereinafter BWMC], art. 1(8).

9 Tamelander et al, *supra* note 8. See also Matthews & Brand, *supra* note 8 at 40.

10 BWMC, *supra* note 8, art. 1(11).

port water, open sea or on land.[11] The United States of America (USA) National Research Council of the National Academies, while commenting on the consequence of the opening of a route into the Great Lakes of North America for international shipping said:

> The rapid spread throughout the Great Lakes of the European Zebra mussel, discovered in Lake St. Clair in 1988, drew public attention to the fact that the sea way provides a route into the North American heartland not only for ships but also for potentially troublesome stowaways-namely, aquatic invasive species (AIS) inadvertently taken aboard in ballast water at previous ports of call.[12]

When aquatic organisms or species are transported to another region, they are given different terminologies by various authors, IMO instruments, and in national policies. They are described as alien, foreign, new, non-indigenous, exotic, as well as established species. These descriptions are used interchangeably.[13] The LOSC, under its Article 196 (1) describes them as "alien or new species."[14] It does not define these terms. Rather, it describes the consequence of introducing such species by obligating States to "[t]ake all measures necessary to prevent, reduce and control…the introduction of species, alien or new, to a particular part of the marine environment, *which may cause significant and harmful changes thereto*"[15] [emphasis added].

That these species "*may cause significant and harmful changes*" means that the LOSC envisaged two facts. The first is that new species may emerge, and that not all new

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11 See *generally,* RJ Williams et al, "Cargo Vessel Ballast Water as a Vector for the Transport of Non-Indigenous Marine Species" (1988) 26 Estuarine Coastal Shelf Science 409, cited in Andrew N. Cohen &Brent Foster, "The Regulation of Biological Pollution: Preventing Exotic Species Invasions From Ballast Water Discharged into California Coastal Waters" (2000) 30 Golden Gate UL Rev 787at 792.

12 National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, (Washington, D.C. Transportation Research Board, 2008) at ix.

13 UNEP, *supra* note 1at 5

14 *United Nations Convention on the Law of the Sea*, 10 December, 1982, 1833 U.N.T.S. 3, [hereinafter LOSC].

15 See LOSC, *ibid*, art. 196 (1).

or alien species are harmful in nature to their host ecosystems. Thus, what the States are required to guard against are harmful aquatic species as some alien species are useful for aquaculture.

Interpreting the intention of the LOSC with regard to the inclusion of the word "new" species, McConnell holds the view that the term suggests that the obligations of the States is not limited to pests and harmful organisms already identified, but includes the "broader issue of the introduction of nonindigenous or alien species that may cause significant changes in marine ecosystems."[16] In short, it is clear that the LOSC envisages "new" species which are non-existent at the time of adopting the Convention but which may emerge in the future to threaten marine ecosystems.

The LOSC conception of alien species suggests that it is not all exotic, alien, foreign, non-indigenous, non-native species that are harmful to their host environments, but that some are even beneficial to the host country. Thus, a species may be non-indigenous without being harmful. This situation may occur when such species pose no harm to the new locality it found itself in, either as a result of its incapability to compete with native species, or that it lacks ability to reproduce. According to Ruiz and Reid, some non-indigenous species exist but fail to establish self-sustaining populations in their new environments. They cite the example of the European Flounder which is non-

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[16] Moira L. McConnell, *GloBallast Legislative Review-Final Report* Globallast Monograph Series 1, (London: IMO, 2002) at 20. McConnell referencing M. Nordquist (ed. in chief), *United Nations Convention on the Law of the Sea 1982. A Commentary,* Vol IV (Dordrecht: Martinus Nijhoff, 1991) notes at n.49 that: "one of the difficulties that has arisen in connection with Article 196 relates to the distinction seemingly drawn in subsection 2 between this obligation and marine pollution. The negotiating history of Article 196 indicates that in the course of developing [the LOSC text], there were two distinct duties in mind, that of preventing pollution and the other, (closer to the more recent biodiversity concept) maintaining the natural state of the marine environment."

indigenous to the North American Great Lakes, but which has not established itself because "it cannot reproduce in a freshwater system such as the Great Lakes."[17]

Identifying the importance of non-indigenous, foreign, exotic, non-native-species, Rolim wrote:

> Some of the non-native species are extremely *beneficial*. Several aquatic nonindigenous species have significantly improved fishery harvest of wild catches or aquaculture (total yield, extension of fishing season, better quality and economic value of harvest.) In addition, and perhaps more importantly, many nonindigenous species and their larvae play an important role in coastal food webs, serving as food source for native species.[18]

On the other hand, where these organisms pose a threat to new ecosystem, they are referred to as stowaways, hitchhikers, noxious, aggressive, invasive, pests, nuisance, and harmful organisms or species.[19] The term "invasive" is commonly used. However, the term is capable of different meanings. Biologically, it means the ability of species to establish in a new area. According to MacDougall, et al., species are termed "exotic" when they live outside their normal range; "invasive" when they establish themselves and, subsequently have negative or positive impact once established. Species are said to have established themselves when the species occurred outside their normal range, having positive or negative impact on the ecosystems of their new range.[20] This, in essence, means that all species that are outside their local range and are established are

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17 Ruiz & Reid, *supra* note 3 at 29.

18 Maria Helen Fonseca de Souza Rolim, *The International Law on Ballast Water*: *Preventing Biopollution* (Leiden , Boston: Martinus Nijhoff Publishers, 2008), at 16.

19 UNEP, *supra* note 1at 6. Among the HAOP are alewife, rainbow smelt, round gobies (*neogobius melanostomus*), Eurasian ruffe (*Gymnocephalus cernuus*), Eurasian water milfoil, sea lamprey, comb jelly, and zebra mussel.The most popular of them is the zebra mussel (*Dreissena polymorpha*). See National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 40 at1 and 48.

20 Lesley A. MacDougall et al, "Marine Invasive Species in North America: Impacts, Pathways and Management" (2006) 20 Ocean Yearbook 435 at 437.

biologically referred to as invasive species, notwithstanding the impact they have in their host marine environment, whether beneficial or harmful. This view is different from the legal perspective of what invasive species are.

Legally, invasive in relation to species means species that are capable of endangering environmental and ecological aspects of marine ecosystems.[21] A United States Executive Order defines an alien invasive species as "an alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health."[22] For the purpose of clarity, the BWMC[23] uses the term "Harmful Aquatic Organisms and Pathogens."[24] According to the Convention,[25] HAOP means "aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create health hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas."[26]

It must be noted, that the fact that a species is harmful in a host country where it was transported does not mean it has been harmful in its native ecosystem. In Japan, the Northern Pacific kelp (*Undaria pinnatifida*) which was introduced to Tasmania and Port Philip Bay in Australia is extensively cultivated as food plant and utilized either in fresh

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21 See Ruiz & Reid, *supra* note 3 at 148.

22 Briony MacPhee quoting Executive Order No. 13,112,64 Fed. Reg. 6183 (Feb. 8, 1999) in Briony MacPhee, "Hitchhikers' Guide to the Ballast Water Management Convention: An Analysis of Legal Mechanisms to Address the Issue of Alien Invasive Species" (2007) 10 J Int'l Wildlife L & Pol'y 29 at 30-31.

23 BWMC, *supra* note 8, art. 1 (8).

24 The terms "aquatic invasive species" and harmful aquatic organisms and pathogens" may be used simultaneously in this work.

25 BWMC, *supra* note 8.

26 BWMC, *ibid*, art. 1 (8).

or dried form. However, in Australia where it was introduced, it competes with native seaweeds, thus becoming harmful to its host marine environment.[27]

When organisms are loaded with ballast water from one locality, they may either survive or die during the course of the long journey in the deoxygenation ballast tanks. It must be noted, however, that during the period that the foreign aquatic organisms are in the ship's ballast water tank, most of them will die but some will survive the stress of the long journey. Dobbs & Rogerson hold the view that deoxygenation occurs in the ballast tanks and the journey of the ship for several hours or longer certainly will kill most metazoans in the ships' ballast water.[28] They went further in their view that, not all the metazoans in the ballast water tank will die because "deoxygenation have little effect on bacteria and protists with metabolic systems that have evolved to routinely switch between oxic and anoxic environments."[29]

The current problem of HAOP is a consequence of globalization which evolved out of growth in world trade, resulted in technological advancement and the use of fleets of ships and rapid marine transport systems. While identifying "globalization" as one of the causes of the increasing level of the problem of harmful aquatic organisms associated with shipping activities, one scholar wrote:

> [T]he ordinary activities of shipping and transport, the foundation for international trade, are now also "vectors" or carriers of disease and harmful aquatic organisms. The problem is largely the result of increasingly seamless transport systems and larger ships moving

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27 IMO, "Alien Invaders- Putting a Stop to the Ballast Water hitch-hikers", online: http://www.imo.org/OurWork/Environment/BallastWaterManagement/Documents/LINK%2014.pdf accessed on March 30, 2011.

28 Dobbs & Rogerson, *supra* note 6 at 260.

29 Dobbs & Rogerson, *ibid* at 261.

> more rapidly between ports on continuous routes. It is also, therefore, a by-product of the increased globalisation of trade. It means that shipowners now find themselves operators of vectors that form part of a transport corridor for species and organisms that may pose a danger to human and ecological security.[30]

Although there is new increased level of introduction and concerns about the introduction of HAOP through ships' ballast water is not a new phenomenon. The problem was first discovered by scientists in the North Sea in 1903 when there was a mass occurrence of Asian phytoplankton algae.[31] In 1919, a bridge constructed between Lake Erie and Lake Ontario for modern ships to navigate from the Atlantic Ocean to the central Great Lakes was also used by a silent invader called the sea lamprey "to reach Lake Erie for the first time."[32] In the Great Lakes of North America, ships' ballast water has accounted for 55 to 70 percent of reported transfer of aquatic invasive species into the Great Lakes since 1959.[33] Some point out that, "136 nonindigenous species are known in the Great Lakes and at least 43 of these have arrived since 1960. Of the 150 nonindigenous species that have been discovered in San Francisco Bay, at least 21 of these have colonized the Bay since 1973...."[34] Likewise, the American comb jelly (*Mnemiopsis jelly*) was first sighted in the Black Sea in the 1970s.[35]

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30 Moira L. McConnell, "Responsive Ocean Governance: The Problem of Invasive Species and Ships' Ballast Water- A Canadian Study" in T. Koivurova et al, eds, *Understanding and Strengthening European Union — Canada Relations in Law of the Sea and Ocean Governance,* (2009) 35 Juridica Lapponica 433 at 435.

31 Efihimios E. Mitropoulos, Secretary-General, International Maritime Organization, Foreword in Rolim, *The International Law on Ballast Water*: *Preventing Biopollution, supra* note 18.

32 Christopher J. Patrick, "Ballast Water Law: Invasive Species and Twenty-Five Years of Ineffective Legislation" (2009) 27 Va Envtl LJ 67 at 67.

33 National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 12at 1. See also IMO, "Alien Invaders- Putting a Stop to the Ballast Water hitch-hikers", *supra* note 55.

34 John Coogan et al, "UV Disinfection of Ballast Waters: Effects of Organisms Size on System Scaling" in Judith Pederson, ed, *Marine Bioinvasions: Proceedings of the First National Conference, January 24-27, 1999*, (Cambridge, USA, Massachusetts Institute of Technology, 1999) 337 at 337. See also Mills, E.L., et al, "Exotic Species in the Great Lakes: A History

The above instances are confirmation that the problem of HAOP transported through ships' ballast water from a locality to a different locality has been in existence prior to the formal report of their invasion by Canada and Australia to MEPC in the 1980s.[36] What remains novel is the general awareness of the problem and national and international legislation to address the problem in order to combat the menace.

With the knowledge that HAOP threatens marine ecosystems and environments, and bearing in mind that anything that desecrates or causes harm to marine life and human beings and living resources constitutes pollution,[37] can we then regard HAOP resulting from ships' ballast water and sediments as pollution? This question is answered in the next sub-section.

2.3 THE LEGAL CONCEPTUALIZATION OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS

Some scholars regard the invasion of HAOP as pollution. Other say it amounts to biopollution, while some classify it as a threat to the marine environment. The variance in the conceptualization of introduction of HAOP relates to the fact that the problem this causes cuts through many issue-areas. Commenting on the nature of the difficulty, McConnell argues:

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of Biotic Crises and Anthropogenic Introductions" (1993) 19 Journal of the Great Lakes Research 1-57. See also Carlton, JT et al, "Remarkable Invasion of San Francisco Bay (California, U.S.A.) by the Asian Clam *Potamocorbula amurensis*.l. Introduction and Dispersal" (1990) 66 Marine Ecology Progress Series 81-94.

35 IMO, "Alien Invaders- Putting a Stop to the Ballast Water hitch-hikers", *supra* note 27.

36 See, IMO, "International Convention for the Control and Management of Ships' Ballast Water and Sediments (BWM)", online: http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the- Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-%28BWM%29.aspx accessed on January 14, 2011.

37 See the definition of "pollution" under the LOSC, *supra* note14, art. 1(1)(4) .

> [I]t is one of the contemporary breed of cross cutting-issues that pose a challenge to existing international institutions and the related interaction at the national level… it could be seen as purely a ship-source discharge problem and essentially addressed as a ship-source pollution issue. It could also be regarded as a health security problem, or as an environmental protection/biodiversity problem, or all of these.[38]

Rolim regards the problem of the introduction of HAOP as biopollution. To her, "Harmful aquatic organisms and pathogens that affect the biodiversity of the marine ecosystem can be described as biological pollution…referred to as "biopollution."[39] Essentially then, she sees it as pollution, a phenomenon the LOSC defines as:

> the introduction by man, directly or indirectly, of substances or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the seas, impairment of quality for use of sea water and reduction of amenities.[40]

As noted, ships' ballast water as a vector for the transfer of HAOP is operational or unintentional.[41] The question is whether we can classify the transfer or introduction of HAOP as "pollution of the marine environment"? The LOSC does not specifically apply to unintentional transfer of HAOP, but it applies to indirect introduction of substances into the marine environment. Literally, HAOP qualify as "substances" and, going by the definition of HAOP under the BWMC, the same negative effects that will result from the introduction of "substances" under the LOSC are similar to the effects that are consequential to the unintentional transfer of HAOP through ships' ballast water and

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38 McConnell, "Responsive Ocean Governance", s*upra* note 30 at 443-444.

39 Rolim, *supra* note 18 at 1

40 LOSC, *supra* note 14, art. 1 (1)(4).

41 It is unintentional because it is transferred during the cause of the ships' operations and not intentionally done by human manipulations or intentional introduction.

sediments. Thus, we can say that the introduction of HAOP in a locality different from their local range amounts to "pollution of the marine environment."[42]

Erik Jaap Molenaar also thinks that "[u]nder the definition provided by the LOSC only 'substances or energy' can lead to pollution of the marine environment…The expression 'substances' would also comprise the introduction of alien organisms into the marine environment caused by ships deballasting."[43]

Likewise, the LOSC obliges States to adopt measures to prevent, reduce and control pollution of their marine environment resulting from, *inter alia,* the accidental introduction of species, alien or new that may cause harm to the environment.[44] As well, Article 194 (1) of LOSC requires States, individually and collectively, to take all measures to prevent, reduce and control pollution of the marine environment from any source. The measures taken must include measures "to protect and preserve rare or fragile ecosystems as well as the habitat of depleted, threatened or endangered species and other forms of marine life."[45] The reference to "any source" in Article 194 (1) can be taken to refer to ships' ballast water and sediments because they are sources through which HAOP are transported, while reference to the "protection of ecosystem as well as its habitat of endangered species and other forms of marine life" can refer to the protection of host organisms and the marine environment from HAOP introduced through ships' ballast water and sediments.

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42 But see the problem relating to art. 196(2) at n. 16 above.

43 Erik Jaap Molenaar, *Coastal State Jurisdiction Over Vessel-Source Pollution* (The Hague, Boston, London: Kluwer Law International, 1998) at 17.

44 See LOSC, *ibid,* art. 196(1). The obligations to prevent "accidental introduction of species" used under the LOSC can be likened to obligations on States to protect their marine environment from unintentional transfer of HAOP.

45 LOSC, *supra* note 14, art. 194 (5).

McConnell also argued that when Articles 194 and 196 of the LOSC are read together, one is bound to conclude that "ballast water containing organisms and pathogens that may be harmful to or cause significant changes to a part of the marine environment is a form of pollution."[46] Adopting the definition under the LOSC for the purpose of defining HAOP or "biopollution", Rolim, while agreeing that HAOP qualify as "substances", substituted the word "substances" in the definition for "organisms and pathogens." According to her:

> a first approach to *biopollution of the marine environment* could be: the introduction by man, directly or indirectly, of *organisms and pathogens*[47] or energy into the marine environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the seas, impairment of quality for use of sea water and reduction of amenities.[48]

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46 See *generally*, McConnell, *GloBallast Legislative Review, supra* note 16 *especially* at 21. Similarly at the level of domestic law, the United States *Clean Water Act* (USA *Clean Water Act*, 33 U.S.C., 2006, sec. 1301) prohibits "the discharge of any pollutants by any person" except in compliance with the provisions of the Act. The Act defines "discharge of any pollutant" to include "any addition of any pollutant to the navigable waters from any point source." The Act specifically States that vessels are point sources (*Clean Water Act*, *ibid, sec*. 1362(14)) and that any pollutant includes "biological materials." (*Clean Water Act*, *ibid*, sec. 1362(6)). Although the Act did not define what constitutes biological materials, but takes cognizance of the objective of the Act to "restore and maintain the natural chemical, physical, and biological integrity of the Nation's waters… that consistent with the provisions of the Act, the discharge of pollutants into the navigable waters be eliminated…." See Water Pollution Control Act Amendments of 1972, *reprinted* in 1972 U.S.C.C.A.N. 3668, 3678, cited in Lisa Brautigan, "Control of Aquatic Nuisance Species Introductions Via Ballast Water in the United States: Is the Exemption of Ballast Water Discharges from Clean Water Act Regulation a Valid Exercise of Authority by the Environmental Protection Agency?" (2001) 6 Ocean & Coastal LJ 33 at 62- 63. Since the essence of the Act is to restore and maintain the natural State of the nations' waters, any substance that will alter this position must be regarded as biological materials. From this analogy, therefore, biological materials include invasive species, organisms, and pathogens because ships' ballast water contains these organisms. Brent Foster also reported that the State of Washington Pollution Control Board held that Atlantic salmon, when released into the waters of the Pacific Northwest constitute biological pollutants. See Brent C. Foster, "Pollutants Without Half-Lives: The Role of Federal Environmental Laws in Controlling Ballast Water Discharges of Exotic Species" (2000) 30 Envtl L 99 at 111. Clearly, the discharge of ballast water containing HAOP, by ship, constitutes discharge of pollutants.

47 Emphasise supplied.

48 Rolim, *supra* note 18 at 15.

From the foregoing, it can be concluded that although the introduction of aquatic organisms or species may not be regarded as pollution, when their existence in the host marine ecosystem constitutes a threat to the host environment, they become harmful organisms and pathogens. In such a situation, their introduction would amount to pollution. HAOP can have various negative effects on the host environments, ranging from ecological, environmental, economic, to human health effects. These impacts are dealt with next.

2.4 THE IMPACTS OF HARMFUL AQUATIC ORGANISMS AND PATHOGENS

Ships' ballast water has both positive and negative effects. On the positive side, ballast water is essential to the safe and efficient operation of modern shipping. This is because it stabilizes ships and ensures efficient propeller and rudder operation, in particular, where the ship has no cargo on board or has discharged part or all its cargo. On the negative side, it serves as a vector through which HAOP can be transferred from one locality to another. The adverse effects of HAOP range from economical, ecological, environmental, psychological, cultural, to social consequences. These effects are summed up as follows:

> [T]he introduction of alien invasive species poses one of the most serious threats to both terrestrial and marine biodiversity. In fact, habitat loss, climate change, and alien invasive species are generally considered to top the list of biodiversity threats. Concern about invasions is not limited to biodiversity per se but extends to its broader socio-economic impacts on agriculture, forests, fisheries, aquaculture, and other human activities dependent on the stability of living resources in a particular ecosystem.

> As a result, invasive species pose almost incalculable economic, socio-cultural and human health security risks….[49]

The ecology, economy, and human health consequences of the transfer of HAOP are discussed subsequently.

2.4.1 ECOLOGICAL EFFECTS

Ecologically, many of the HAOP compete with indigenous species for both food and space. Sometimes, these organisms feed on the indigenous species and, in most cases, feed on the eggs of the indigenous species. By all these, the food chain and the local ecological system are affected. For instance, the European green crab or *carcinus maenas* established itself on the east coast of North America, Australia and South Africa, subsisting on a variety of food organisms, fish, local crabs, algae etc.[50] Also, round gobies are aggressive fish and voracious feeders who restrict the feeding of other less aggressive species in the North America Great Lakes. Similarly, the zebra mussel competes with native fish for plankton.[51] The American comb jelly introduced in the Black Sea is another voracious organism that eats fish eggs and larvae. It developed rapidly due to the lack of natural predators to curb its multiplication, and to abundant zooplankton which "formed the base of the Black Sea food web."[52] The American comb jelly is believed to be responsible for the closure of fishing industries in the Black Sea in

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49 Meinhard Doelle, Moira L. McConnell & David L. VanderZwaag , "Invasive Seaweeds: Global and Regional Law and Policy Responses" (2007) 50 Botanica Marina 438 at 438. See also McConnell, "Responsive Ocean Governance", *supra* note 30 at 433.

50 Sylvia B. Yamada, Christopher Hunt & Neil Richmond, "The Arrival of the European Green Crab, *Carcinus maenias*, in oregan Estuaries" in Judith Pederson, ed, note 60, 94 at 94.

51 IMO, "Alien Invaders- Putting a Stop to the Ballast Water hitch-hikers", *supra* note 27

52 Patrick, *supra* note 32 at 71.

the 1990s.[53] According to Perry, the ability of the invasive species "[t]o out compete native species for food resources, high reproductive capacity, and wide environmental tolerances lend them the capacity to fundamentally alter community structure in coastal ecosystems."[54] The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection and Advisory Committee on Protection of the Sea (GESAMP) also noted that "[t]he populations of plankton crashed as the invaders ate them. Fish stocks collapsed partly because the jellyfish deprived them of their food and ate their eggs and larvae."[55]

Commenting generally on the overall ecological effects of harmful aquatic species, it was said:

> [I]nvasive alien species can compete with native biota, displace them, predate upon them, parasitise and transmit or cause diseases, reduce growth and survival rates, cause decline, extirpation (local extinction) of populations…thereby altering community structure…, affect growth and survival of other organisms in aquatic and marine environments by … decreasing the amount of dissolved oxygen in water, changing soil chemistry and its structure….[56]

The above, in essence, means that once harmful aquatic organisms reach a host marine environment, they affect the marine life of the local species and the ecosystems in general.

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53 IMO, "Alien Invaders- Putting a Stop to the Ballast Water hitch-hikers", *supra*, note 27.

54 Harriet Perry, "Carcinus maenas ", United States Geological Survey (USGS) Nonindigenous Aquatic Species Database, online: http://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=190 Revision Date: 4/25/2008 accessed on 06 March, 2011. See also MacDougall et al, *supra* note 68 at 435. See also Amy Browning, "Recent Development: The Current State of Ballast Water Regulations" (2007-2008) 2 Envtl & Energy L & Pol'y 327 at 328.

55 Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection and Advisory Committee on Protection of the Sea (GESAMP), *The Life of the Seas* (IMO/FAO/UNESCO-IOC/WMO/WHO/IAEA/UN/UNEP, 2001 No. 70) 1 at 13.

56 UNEP, *supra* note 1at 7.

2.4.2 ECONOMIC EFFECTS

Economically, the introduced HAOP from ships' ballast water and sediments may affect coastal and port States. These organisms can constitute threats to States' commercial and sport fishing.[57] The financial implication of cleaning up their ecosystems, replacing damaged infrastructure, or preventing their environment from adverse impacts of HAOP is so huge.[58]

Some species from the discharged ballast water may contaminate local filter-feeding shellfish. The contamination may lead to the death of the shellfish or other local fishes and these incidents may invariably cause fisheries to be closed, thereby causing loss of numerous jobs and income. Where fisheries are closed, the closure will definitely have negative impact on tourism. The GESAMP note that "[t]he catch of the former USSR States plummeted from 250,000 tonnes to 30,000 tonnes a year....At least $300 million was lost in falling fishery revenues between the mid1980s and the early 1990s, with grave economy and social consequences. Fishing vessels were put up for sale, and fishermen abandoned the sea."[59] In Canada, damage caused by HAOP, mostly to commercial and sport fisheries, costs $343 million annually.[60] Of recent, IMO notes that

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57 An instance is the Ruffe (*Gymnocephalus cernuus*) that grows very fast and has high reproductive capacity. It is considered a serious threat to commercial and sport fishing in the Great Lakes. See, IMO, "Alien Invaders- Putting a Stop to the Ballast Water hitch-hikers", *supra* note 27.

58 See *generally* IMO, *Economic Assessment for Ballast Water Management: A Guideline,* GloBallast Monograph Series No. 19 (London: GloBallast Partnerships Project Coordinating Unit, 2010) at 5-9. Online: http://globallast.imo.org/Monograph_19_Economic_Assesment_web.pdf accessed on April 12, 2011.

59 Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection and Advisory Committee on Protection of the Sea, *supra* note 55 at 13.

60 MacDougall et al, *supra* note 20 at 451.

"new invasions [of HAOP] with a rate of one every nine weeks lead to economic losses of US$100 billion per year".[61]

Similarly, when fish stocks are affected, fisheries are depleted, fish catches are affected, and minimal catches become expensive. Fishers expend more fuel on their boats and stay longer at sea to harvest fishes that are not really forth coming. This has psychological effects on the fishers, as their source of livelihood is destroyed by HAOP. The thought of how they will live, send their wards to school and maintain their livelihood continually agitate their minds. In a documentary on the invasion of HAOP in Iran, a man complained bitterly about the effects of the invasion. He lamented that until 1999, in Iran, fishing was good, and they were happy with their catches until the advent of the comb jelly which exploded and multiplied in the water. According to him, the comb jelly eats the food of local fishes, their eggs, and then, the local fishes. This disintegrated the Iranian fishing trade, psychologically traumatized those depending on fishery for survival.[62]

Aside from forcing the closure of fisheries, the containment of HAOP is very expensive. First, there is expenditure at the national level to contain the problem, and there is expenditure at the international level to do the same. At the national level, in USA, the cost of removing the explosive population growth of zebra mussels from marinas, navigation locks, drains, public and private drinking water treatment plants, etc., is estimated at over US$1 billion. Some held the cost to be as high as US$5 billion

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[61] IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/15, 6 May 2011 online: http://www.amtcc.com/imosite/meetings/IMOMeeting2011/MEPC62/MEPC%2062-2-15.pdf accessed on August 6, 2011.

[62] The IMO documentary was shown on February 14, 2011, at the Marine Affairs Programme, Rowe Building, Room 3001, Dalhousie University, Halifax, Nova Scotia, Canada.

between 1989 and 2004.[63] According to Paneta,[64] "[o]n land and in the sea, invasive species are responsible for about 137 billion dollars in lost revenue and management costs in the U.S. each year." Also, huge sums will be required to provide for infrastructure to manage HAOP from ships' ballast water. The huge expenses remain, notwithstanding the management measures adopted in regard to ballast water exchange and treatment methods.

At the international level, huge sums of money is used to assist developing countries to address the menace. At present, different programmes have been organized and sponsored. One such programmes is the *Removal of Barriers to the Effective Implementation of Ballast Water Control and Management Measures in Developing Countries*, is popularly known as Global Ballast Water Management Programme.[65] The GloBallast programme is co-sponsored by IMO, Global Environment Facility (GEF), and United Nations Development Programme (UNDP) was established in 2000, to assist six developing countries representing "six main developing regions of the world"[66] to implement the IMO *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*[67] in preparation towards implementing BWMC.[68] The project initially cost US$10.2 million.[69] Recently

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63 National Research Council of the National Academies, *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 12 at x, 8, and 48.

64 LE Paneta, "America's Living Oceans: Charting a Course for Sea Change". [Electronic version, CD] Pew Oceans Commission, 2003.

65 GloBallast Partnerships, "The GloBallast Programme", online: http://globallast.imo.org/index.asp?page=gef_interw_project.htm accessed on March 28, 2011.

66 GloBallast Partnerships, "The GloBallast Programme", *ibid*.

67 IMO Resolution A.868(20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Organisms and Pathogens*, 27 November 1997, online: http://www.islandnavigation.org/Library/A868.pdf accessed on April 21,2011.

68 See *generally*, McConnell, *GloBallast Legislative Review, supra* note 16.

69 GloBallast Partnerships, "The GloBallast Programme", *supra* note 65.

also, is the establishment of a trust fund where US$300,000 is deposited to provide technical assistance to developing countries on BWMC.[70]

Beyond economic impacts in relation to the cost of clean-up and containment are the "innumerable impacts to an irreplaceable ecosystem that could see the extinction of its native inhabitants."[71] The irreplaceable impacts on society is such that "[U]nlike other forms of marine pollution, such as oil spills, where ameliorative action can be taken and from which the environment will eventually recover, the impacts of invasive species are most often irreversible!"[72]

2.4.3 EFFECTS ON HUMAN HEALTH

Human health is not left out of the negative effects perpetrated by HAOP introduced through ships' ballast water. Some of these harmful aquatic organisms contaminate filter feeding fishes, making them toxic to humans. When they are consumed, the introduced pathogens may cause diseases which may sometimes lead to illness and eventual death. In 1991, toxigenic *Vibrio cholerae* was detected in oysters and the intestine of fish in Mobile Bay, USA. Analysis was carried out which revealed

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See also MacDougall et al, *supra* note 20 at 447. The project is a continuous one. The allocated cost of the project is a huge sum of money which would have been utilized for other programmes in the absence of HAOP.

70 IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, 15 July 2011 at 11.

71 Cited in Cory Hebert, "Ballast Water Management: Federal, States and International Regulations" (2009-2010) 37 SUL Rev 315 at 319-320. See also Loren Remsberg, "Too many Cooks in the Gallery: Overlapping Agency Jurisdiction of Ballast Water Regulations" (2007-208) 76 Geo Wash L Rev1412 at 1414.

72 GloBallast Partnerships, "The Problem", online: http://globallast.imo.org/index.asp?page=gef_interw_project.htm accessed on March 28, 2011. See also IMO, "Alien Invaders- Putting a Stop to the Ballast Water hitch-hikers", *supra* note 27.

similarities between the *Vibrio cholerae* detected in Mobile Bay and the one responsible for a cholera outbreak in South America. A further analysis was carried out on ships' ballast water arriving Mobile Bay from South America and the same *Vibrio cholerae* was detected.[73] In 1992, the Great Lakes Ballast Management, the Food and Drug Administration, and the Centers for Disease Control recognized as a public health issue, the contamination of shellfish beds in Mobile Bay by *Vibrio cholerae* transported in ships' ballast tanks entering Mobile Bay from South America.[74]

Another type of species affecting the health of human beings and aquaculture is toxic dinoflagellate which invaded several locations around the world and introduced the human disease called paralytic shellfish poisoning (PSP).This disease was unknown in Australia, New Zealand and the rest of the Southern Hemisphere before 1970. But by 1990, cases of the disease had spread not only to the Southern Hemisphere but also to the Northern Hemisphere.[75] As to the link between the disease, PSP, and ballast water, Dobbs and Rogerson pointed out that Dinoflagellate cysts have been reported in abundance in ballast tank sediments of ships arriving in Australia, Canada, New Zealand, United States of America, etc.[76] The ships are from Japanese and Korean ports and Japanese and

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73 Dobbs & Rogerson, *supra* note 6 at 262. See also Moira L. McConnell, "Introduction of Harmful Organisms from Ships to be regulated by Feds" (October 6, 2006) 26:21 The Lawyers Weekly.

74 Allegra Cangelosi, "Ballast Water Management: Developments in Policy and Technology" in Judith Pederson, ed, *Marine Bioinvasions: Proceedings of the First National Conference, January 24-27, 1999*, (Cambridge, USA, Massachusetts Institute of Technology, 1999) 273 at 273, 275.

75 Gustaaf M. Hallegraeff, "Transport of Toxic Dinoflagellates via Ships' Ballast Water: Bioeconomic Risk Assessment and Efficacy of Possible Ballast Water Management Strategies" (1998) 168 Marine Ecology Progress Series 297 at 297-298. See also Dobbs & Rogerson, *supra* note 6 at 260.

76 Dobbs and Rogerson, *ibid* at 261-262.

Korean coastal waters are believed to have wide-spread presence of toxic PSP dinoflagellates.[77]

Other aquatic invasive organisms that have negative effects on human health are the European Zebra Mussel (*Dreissena Polymorphia*) which was introduced to the North American Great Lakes, and the north pacific seastar (*asteras amurensis*) introduced to Southern Australia. The zebra mussel may accumulate and block water intake pipes and facilities and eventually foul drinking water passed out for human consumption.[78] Also, studies have shown that zebra mussel can accumulate pollutants into their tissues which they deposit as slug of mucous mixed with other matter they filter from the water. The pollutants may eventually be eaten by carnivorous animals, who may eventually pass on the pollutants, through food chain for human consumption.[79]Aside from endangering human health, these organisms also threatens commercial stocks of oysters and scallops.[80]

The MEPC, expressing concern with the continuous increase in the rate of the introduction of HAOP noted that, damage caused by the introduction of HAOP "to the environment and human health and high economic costs are many".[81] Thus, given the many effects that HAOP have, as noted by MEPC and as discussed above, it is clear that HAOP constitute a great and increasing threat, not only to marine ecosystems, but to host environments and the international community as a whole.

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77 Hallegraeff, *supra* note 75 at 300.

78 IMO, "Harmful Aquatic Organisms in Ballast Water", *supra* note 61 at 2.

79 Zebra Mussel Data Base, "Zebra Mussel" online: http://www.gma.org/surfing/human/zebra.html accessed on July 6, 2011.

80 GloBallast Programme,"Stopping the Ballast Water Stowaways", Global Ballast Water Management Programme, online: http://globallast.imo.org/water_stowaways_brochure.pdf accessed on January 15, 2011.

81 IMO, "Harmful Aquatic Organisms in Ballast Water" *supra* note 61 at 2.

2.5 CONCLUSION

Aquatic organisms exist in nearly all coastal systems of the world. When they are transported and introduced to another locality through ships' ballasting operations, they became alien or foreign in their host marine ecosystems. These transferred organisms become harmful in their host ecosystems by affecting biodiversity, ecosystems and also causing negative socio-economic impacts on society as a whole. In order to help prevent the negative impacts of these organisms and to combat their transfer, there must be control over their transport through ships' ballast water and sediments.

The BWMC adopted in 2004 is specifically designed to address this problem through an international binding instrument. It is supplemented by technical guidance adopted subsequently. However, despite evidence of increase in the problem, the BWMC still has not entered into force. While the BWMC is not the only active instrument needed, it is clearly an essential step to progress in addressing this issue. But prior to the adoption of BWMC, there have been numerous instruments, such as conventions, regulations, and resolutions adopted by international organizations, which impose obligations on States to protect their marine environments and biodiversity against threats. These instruments are examined in the next chapter.

CHAPTER 3: HISTORICAL EVOLUTION OF THE BALLAST WATER MANAGEMENT CONVENTION, 2004

3.1 INTRODUCTION

Due to the negative effects of harmful aquatic organisms and pathogens (HAOP) as discussed in Chapter 2, there have been global efforts to combat their transfer and the threat they pose. The legal regime governing the introduction of HAOP developed from various non-binding guidelines, resolutions, principles and declarations, to binding international conventions. These instruments apportion different responsibilities and obligations on coastal and port States, and on flag States, to protect marine ecosystems and to combat HAOP transferred through ships' ballast water and sediments.

Two international conventions reference the problem of the transfer of HAOP before the adoption of the *International Convention for the Control and Management of Ships' Ballast Water and Sediments*, 2004 (BWMC).[1] They are the *United Nations Convention on the Law of the Sea*, 1982 (LOSC),[2] and the *Convention on Biological Diversity*.1992 (CBD).[3] Although not a Convention, Agenda 21 of 1992[4] also addressed the issue. In addition, there are various more specific instruments, ranging from the

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1 *International Convention for the Control and Management of Ship's Ballast Water and Sediments*, IMO Doc. BMW/CONF/36, 16 February 2004, [hereinafter BWMC].

2 *United Nations Convention on the Law of the Sea*, 10 December, 1982, 1833 U.N.T.S. 3, [hereinafter LOSC]. note 1

3 *Convention on Biological Diversity of the United Nations Conference on the Environment and Development*, 5 June 1992, 31 I.L.M.818, [hereinafter CBD].

4 United Nations Conference on Environment and Development, June 3-14, 1992, Agenda 21, U.N. Doc. A/CONF.151/26/Rev.1 (Vol. I-II), Annex II (August 12, 1992), online: http://www.un.org/esa/dsd/agenda21/res_agenda21_00.shtml [hereinafter Agenda 21].

International Health Regulations, 1969 (IHR),[5] to Resolutions adopted by IMO and Marine Environment Protection Committee (MEPC) to combat the threats posed by HAOP introduced by ships' ballast water. The provisions of these predecessor binding and non-binding instruments are examined in this chapter in relation to the obligations they impose on States to combat the unintentional transfer of HAOP. This chapter will examine the legal regime prior to the adoption of the BWMC in 2004.

3.2 INTERNATIONAL CONVENTIONS PRE-DATING THE BALLAST WATER MANAGEMENT CONVENTION, 2004

3.2.1 THE UNITED NATIONS CONVENTION ON THE LAW OF THE SEA, 1982

The LOSC[6] resulted from the Third United Nations Conference on the Law of the Sea[7]. It was concluded in 1982 and came into force in November 1994. The State parties to LOSC, as of August 2011, are 162 countries and the European Community.[8] The convention is "the key source of State responsibility for protection of the marine environment."[9]

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5 *International Health Regulations*, 1969 as amended by *International Health Regulations*, 2005, 2nd ed., (Switzerland, World Health Organization 2008), online: http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf accessed on April 16, 2011, [hereinafter IHR].

6 LOSC, *supra*, note 2

7 It is commonly called "UNCLOS III".

8 United Nations Treaty Collection (UNTC), "Status As At 08-08-2011 07:02:22 EDT" online: http://treaties.un.org/pages/ViewDetailsIII.aspx?&src=TREATY&mtdsg_no=X accessed on August 10, 2011.

9 Moira L. McConnell, *GloBallast Legislative Review: Final Report,* GloBallast Monograph, Series 1, (London: IMO, 2002) at 29.

The Convention "introduced an holistic framework for addressing environmental rights and responsibilities."[10] Its Part XII deals with the protection and preservation of the marine environment. In particular, it establishes the obligation at Article 192 to prevent, reduce and control pollution of the marine environment. The LOSC imposes on States the general obligation "to protect and preserve the marine environment."[11] Also, Article 211(2) directs flag States to "adopt laws and regulations for the prevention, reduction and control of pollution of the marine environment from vessels."[12] In the enforcement of this general obligation, both flag and coastal States are required to adopt all necessary measures which are not inconsistent with the Convention to prevent, reduce and control pollution of the marine environment from any source.[13]

In addition, Article 196 specifically requires States to "take all measures necessary to prevent, reduce and control pollution…or accidental introduction of species, alien or new, to a particular part of the marine environment which may cause significant and harmful changes thereto."[14] The measures must, among others protect and preserve "rare or fragile ecosystems, habitat of depleted, threatened or endangered species and other forms of marine life."[15] There is also obligation on States to ensure that pollution caused by activities under their jurisdiction or control do not spread to other States.[16] Tsimplis said that "[a]rguably, shipping activities and operations including ballasting are

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10 J. Charney, "The Marine Environment and the 1982 Law of the Sea Convention" (1994) 28 Int'l Law 879, referenced in Moira L. McConnell, "Ballast and Biosecurity: The Legal, Economic and Safety Implications of the Developing International Regime to Prevent the Spread of Harmful Aquatic Organisms and Pathogens in Ships' Ballast Water" (2003) 17 Ocean Yearbook, 213 at 236.

11 LOSC, *supra* note 2, art.192.

12 LOSC *ibid*, art. 211(2).

13 LOSC, *ibid,* art. 194(1).

14 LOSC, *ibid,* art.196.

15 LOSC, *ibid*, art. 194(5).

16 LOSC, *ibid*, art. 194(1).

covered by this section."[17] Thus, it is the duty of the flag States to make such that ships flying their flags do not transport the harmful aquatic organisms from one place to another.

The measures taken must deal with *all sources of pollution of the marine environment*[18] and must include *inter alia*, those that are designed to minimize to the fullest possible extent "pollution from vessels, in particular measures for preventing accidents and dealing with emergencies..., preventing intentional and unintentional discharges, and regulating the design, construction, equipment, operation and manning of vessels."[19] The unintentional discharge of ships' ballast water that contains HAOP from a port State to another State's marine ecosystem is a source of pollution of the marine environment requiring measures to be taken to control. Thus, there is an obligation to prevent transfer of HAOP through ships' ballast water and sediments. These measures may be adopted jointly or individually as appropriate.[20] Thus, there is an obligation to prevent marine pollution and for States to take measures to address ship source marine pollution.

To aid the protection of the marine environment, regionally and globally, States are also obliged to co-operate on a global basis, as well as on a regional basis, either directly or through competent international organizations, to formulate and elaborate "international rules, standards and recommended practices and procedures"[21] for the

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17 Michael Tsimplis, "Alien Species Stay Home: The International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004" (2005) 19:4 Int'l J Mar & Coast L 411 at 413.

18 Emphasis supplied.

19 LOSC, *ibid,* art. 194(3)(b).

20 LOSC*, ibid*, art. 194(1).

21 LOSC, *supra* note 2, art. 197.

purpose of protecting and preserving the marine environment, taking into consideration differences in regional features.[22] Furthermore, when a State is aware that the marine environment is in danger of being damaged, or has been damaged by pollution, such a State is obliged to notify the competent international organizations and other States that are likely to be affected by such damage. The latter shall jointly develop contingency plans for responding to pollution incidents in their marine environment.[23]

All the above obligations on global and regional participation as well as notification, imposed on State parties of LOSC reflect the obligations imposed on States under the various voluntary guidelines and the BWMC adopted for the specific purpose of combating HAOP transported through ships' ballast water. Generally speaking, States have jurisdictional right and obligation to protect the marine environment. Under the LOSC, coastal States have an obligation and jurisdiction to protect the waters under their jurisdiction in accordance with the LOSC provisions. But a fundamental question relates to the scope of the exercise of the authority this confers in regard to specific jurisdictional waters. This issue is the limit to which a coastal or port State can limit the entrance of ships into its coastal waters, or how it could regulate the discharge of ballast water in order to protect its marine environment from invasion by HAOP. This is considered next.

3.2.1.1 Jurisdictional Limits and the Enforcement of Obligations Under Part XII of LOSC

The coastal State's jurisdictional right relative to foreign ships in their waters depends on the location of the ship. For the purpose of this thesis, the power of the coastal State shall be discussed in relation to internal waters, territorial sea, exclusive

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22 LOSC, *ibid*, art. 197.

23 LOSC, *ibid*. See *generally*, art. 198 and 199.

economic zones, and the contiguous zones, because the State's jurisdiction in these areas are not the same.

(i) Internal Waters

Except for the Archipelagic States, the internal waters of a State are "waters on the landward side of the baseline of the territorial sea."[24] Within these areas, the coastal State has full sovereign authority to enact laws, regulate the use of the areas and use any resources found there. There is no right of innocent passage of ships within internal waters except "where the establishment of a straight baseline has the effect of enclosing as internal waters areas which had not previously been considered as such."[25] Save for this exception, a port or coastal State may restrict the discharge or uptake of ballast water in its coastal water or specify particular conditions that must be met prior to the discharge within its internal waters.

In addition, a State has powers to determine which of their ports shall be opened to international shipping. A State may decide to close all its ports to international shipping when an epidemic disease occurs of which ships serve as vectors. Confirming the rights of port States to deny access to international shipping, Churchill and Lowe said:

> The practice of denying the right of entry, grounded in the concept of sovereignty, dates back many centuries. In early English practice the king often regulated trade by limiting or denying access to English ports. For example, on 12 March 1236, Henry III promulgated the order "Let no foreigner from greater France, or other power, go to England without license from the king"…. The same principle is prevalent in modern practice. For example, a Bulgarian Decree of 10 October 1951; … in China no foreign ship is allowed to enter or leave a port or

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24 LOSC, *ibid*, art. 8(1). See also LOSC, Part IV.

25 LOSC, *ibid*, art. 8(2).

> harbour on a boundary river except … with the approval of the Chinese Government.[26]

Where certain requirements are imposed for purposes of entering into the ports or internal waters, it is mandatory for the State to publicize the conditions and to communicate them to competent international organization, in most cases, the IMO. This is required under the LOSC which stipulates thus:

> States which establish particular requirements for the prevention, reduction and control of pollution of the marine environment as a condition for the entry of foreign vessels into their ports or internal waters or for a call at their off-shore terminals shall give due publicity to such requirements and shall communicate them to the competent international organization.[27]

Thus, a port State has the power within its internal waters to restrict the discharge of ballast water in any of its ports or determine by way of national laws the conditions under which such water can be discharged. This in essence it does for the purpose of protecting its water against any form of threat and to discharge its obligations of protecting its marine environment in accordance with the LOSC.

(ii) Territorial Sea

The territorial sea of a State is limited to 12 nautical miles from the baselines.[28] Within this area of sea, and subject to the right of innocent passage, the coastal State has power to make laws to regulate the use of the area and of any resources there. Thus, the coastal State is entitled to control foreign ships passing through or coming within its

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26 RR. Churchill & A. Lowe, *The Law of the Sea*, 3rd ed. (Manchester: Juris Publishing, 1999) at 610-622.

27 LOSC, *supra*, note 2, art. 211(3).

28 LOSC, *ibid*, art. 3.

territorial water with the aim to avoid the discharge of ballast water within the area not designated for de-ballasting subject to a right of innocent passage.

Article 211of LOSC provides that "[c]oastal States may, in the exercise of their sovereignty within their territorial sea, adopt laws and regulations for the prevention, reduction and control of marine pollution from foreign vessels, including vessels exercising the right of innocent passage.[29] The essence of this provision aside from generally requiring regulation of activities to prevent marine pollution in the territorial sea of a coastal State, is that foreign ships have the right of innocent passage within this area,[30] (unlike in the internal waters of coastal State where no such right exists).

Generally speaking, passage means navigation through the territorial sea for the purpose of traversing the territorial sea "without entering internal waters; or calling at a roadstead or port facility outside internal waters or proceeding to or from internal waters or a call at the roadstead or port facility."[31] The passage through the territorial water must be in an expeditious and continuous manner, although passage also includes stopping and anchoring in so far as the stopping and anchoring "are incidental to ordinary navigation or are rendered necessary by *force majeure* or distress or for the purpose of rendering assistance to persons, ships or aircraft in danger of distress."[32]

In accordance with Article 19(1) of the LOSC, passage is considered innocent when it is not "prejudicial to the peace, good order or the security of the coastal State."[33]

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29 LOSC, *ibid*, art. 211(4).
30 LOSC, *ibid*, art. 17.
31 LOSC, *ibid*, art. 18(1).
32 LOSC, *ibid*, art. 18(2).
33 LOSC, *ibid*, art. 19(1).

When a foreign ship within the territorial sea of a coastal State engages, amongst others, in any act of wilful and serious pollution contrary to Chapter XII of LOSC or any other activity having no bearing on passage, then, the ship's passage will not be considered as innocent.[34] In this instance, the coastal State may adopt necessary steps to prevent the passage of such a ship.[35]

Coastal State may also adopt laws for the preservation of its environment and the prevention, reduction and control of pollution[36] and in respect of conservation of living resources of the sea.[37] The general obligation is connected with Article 192, 194 and 196 of the LOSC. This means that a coastal State, could in principle adopt laws to regulate the ship operations, such as ballast water discharge in order to prevent harm, assuming it constitutes pollution to marine environment and biodiversity. The law so adopted must be adhered to by foreign ships passing though the territorial waters even when such laws are stricter than relevant provisions of the LOSC or other International Conventions. The laws adopted must not be in relation "to the design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards."[38]

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34 See *generally*, LOSC, *ibid* art. 19(2).

35 LOSC, *ibid* , art. 25(1)

36 LOSC, *ibid*, art. 21(1)(f)

37 LOSC, *ibid*, art. 21(1)(d). This obligation is necessary to this discourse because harmful aquatic organisms introduced into a host ecosystem may adversely affect the marine living resources of the host ecosystem as noted in Chapter 2. Also, see *generally*, art. 21(1) for other instances where coastal states have jurisdiction to regulate.

38 LOSC, *ibid*, art. 21(2).Prior to the adoption of the BWMC, McConnell noted that: "[o]ne of the more significant constraints of the coastal State legislative activity is found in Article 21(2)…. On the face of it, requiring a designated ballast water management officer on foreign flag vessels could be seen as affecting manning." See McConnell, *GloBallast Legislative Review*, *supra* note 9 at 26.

Where any law or regulation relating to the innocent passage of ships within the coastal State's territorial water is adopted, due publicity must be given to them by the coastal State.[39] The LOSC further makes provision regarding the enforcement of these laws and regulations. Article 220 (2) of LOSC provides thus:

> Where there are clear grounds for believing that a vessel navigating in the territorial sea of a State has, during its passage therein, violated laws and regulations of that State adopted … for the prevention, reduction and control of pollution from vessels, that State … may undertake physical inspection of the vessel relating to the violation and may, where the evidence so warrants, institute proceedings, including detention of the vessel, in accordance with its laws ….[40]

In the context of regulation directed to preventing the potential introduction of HAOP through ballast water discharge, the LOSC provision means that, where a foreign ship is within the territorial sea of a State, it must abide by all laws adopted for the control and prevention of marine environment. The main constraint under the LOSC is that the laws and regulations must not affect manning, ship design, etc., unless giving effects to international standards. In the situation of a violation, the coastal or port State can exercise its enforcement powers under the LOSC to institute proceedings against the erring ship. The coastal State can of course, regulate its own flag ships to its national standards.

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39 LOSC, *supra*, note 2 art. 21(3).

40 LOSC, *ibid*, art. 220(2).

(iii) Contiguous Zone

The contiguous zone is a limit of 24 nautical miles from the baselines from which the breath of territorial sea is measured[41] or 12 nautical miles beyond the territorial sea of a coastal State. Not all States declare a contiguous zone. However, if a State declares a contiguous zone, then, within this area, it may exercise the control necessary to prevent, *inter alia*, infringement of its sanitary laws within its delineated territorial sea.[42] Where there is an infringement of the laws and regulations within its territory or territorial sea, the coastal State may also take action in the contiguous zone to punish for the infringement.[43] Thus, if the regulation of ships' ballast water to prevent the introduction of HAOP is regarded as sanitary or quarantine matter, then arguably, action could be taken within the contiguous zone by States.

(iv) Exclusive Economic Zone

The exclusive economic zone (EEZ) is "an area beyond and adjacent to the territorial sea",[44] that does not extend beyond 200 nautical miles from the baselines from which the breath of the territorial sea is measured.[45] Within the exclusive economic zone,

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41 LOSC, *ibid*, art. 33(2).

42 LOSC, *ibid*, art. 33(1)(a). For example, Australia deals with this issue under a Quarantine law. See *Australian Quarantine Act 1908,* No.3, online: http://www.comlaw.gov.au/Details/C2011C00361, sec. 4(1)(b), and Australian Quarantine Amendment Regulations 01 July 2001, vol.1, no. 154, online: http://www.comlaw.gov.au/Details/F2001B00239 both accessed on August 8, 2011 and current as of July 31, 2011. See also, *International Health Regulations,* 1969, as amended by *International Health Amendment Regulations,* 2005, to be discussed below.

43 LOSC, *ibid*, art. 33(1)(b).

44 LOSC, *ibid*, art. 55.

45 LOSC, *ibid*, art. 57.

the coastal State has jurisdiction, among others, for the protection and preservation of the marine environment.[46]

Although under Article 58, all States enjoy freedom of the high seas within the EEZ, such as those freedom associated with the operation of ships, but in the exercise of the freedom, States must have due regard to the rights of the coastal State and must comply with laws and regulations adopted by the coastal State in accordance with the LOSC and other rules of international law.[47] Nevertheless, coastal States may adopt laws and regulations in respect of their EEZ for the purpose of preventing, reducing and controlling marine pollution from vessels. The adopted laws and regulations must however conform to generally accepted international rules and standards.[48]

In the event that the international rules and standards are inadequate to meet special circumstances as required by coastal State and it has reasonable grounds for believing that special mandatory or additional measures are necessary within its EEZ to prevent pollution from vessels, it shall communicate this matter to the IMO and any other States concerned. Where the IMO determines that the conditions in the area warrant the required measures by the coastal State, then, coastal State will have the right to adopt additional laws and regulations regarding its EEZ to prevent, reduce, and control pollution from vessels. But, as in the territorial sea, the law so adopted by a coastal State must not be in relation to the design, construction, manning or equipment of foreign

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46 LOSC, *supra* note 2, art. 56(1)(b)(iii).
47 LOSC *ibid*, art. 58.
48 LOSC *ibid*, art. 211(5).

ships, other than generally international rules and standards. It may however relate to discharge or navigational practices.[49]

Under Article 73(1), a coastal State, in the exercise of its sovereign rights within the EEZ has right to take measures, including boarding, inspection, arrest and judicial proceedings of any ship to ensure compliance with its laws and regulations, adopted in accordance with the LOSC.[50] Where a coastal State exercises its right of arrest or detention over a foreign ship, it must promptly notify the flag State of the ship of any action taken.[51] Consequently, a coastal State may adopt additional laws to regulate discharge of ballast water within its EEZ and any violation of this regulation by any foreign vessel may be sanctioned accordingly.

3.2.1.2 Conclusion to the provisions Under the LOSC Regarding HAOP

The LOSC establishes an obligation on a State to adopt all necessary measures to protect and preserve the marine environment.[52] This obligation includes protecting the ecosystem,[53] and prevention of the introduction of alien species into any part of the marine environment.[54] The flag State is also obliged to regulate ships under its flag.[55] In addition, the LOSC provides general obligations on all ratifying States to take action as flag and coastal States to address activities that may cause adverse impact on the marine environment within their States or elsewhere. As noted earlier, the problem regarding the introduction of HAOP could be classified as pollution. If so, then the general provisions

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49 LOSC *ibid*, see *generally,* art. 211(6).
50 LOSC *ibid*, art. 73(1).
51 LOSC *ibid*, art. 73(4).
52 LOSC *ibid*, art. 192.
53 LOSC *ibid*, art. 194(5).
54 LOSC *ibid*, art. 196(1).
55 LOSC *ibid*, art. 211(2).

regarding pollution of the marine environment as defined by LOSC[56] also apply to the introduction of HAOP through ships' ballast water.

But despite the various provisions of the LOSC obliging States to protect their marine environment, the Convention is "limited in its scope and application[57] as it contains only one specific provision on HAOP.[58] More so, the actions to be taken or guidelines to be enforced by States to prevent the transfer of HAOP are also not stipulated. Commenting on the importance of developing more technical requirements, Bostrom notes that"[t]he lack of specific mandates under LOSC for ballast water discharges is likely to lead to inconsistencies in how countries adopt regulatory mechanisms"[59] As with other ship sources of marine pollution, the specific of the operational regulation to implement the LOSC obligations are left to be developed by the IMO and other international organizations. This marks the importance of the BWMC to help ensure uniformity.

Ten years after the adoption of the LOSC, another Convention, geared towards the protection of the biological diversity was adopted. It provides for the obligations of States to protect ecosystems, including the marine ecosystems. It can be seen as complementary the LOSC in this respect. This Convention is the *Convention on Biological Diversity,* 1992, to be discussed next.

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56 LOSC, *supra*, art. 196(1) and 1(1)(4) read together. See also Chapter 2 above, *The Legal Conceptualization of Harmful Aquatic Organisms and Pathogens.*

57 Briony MacPhee, "Hitchhikers' Guide to the Ballast Water Management Convention: An Analysis of Legal Mechanisms to Address the Issue of Alien Invasive Species" (2007) 10 J Int'l Wildlife L & Pol'y 29 at 40.

58 LOSC *ibid*, art. 196(1).

59 Suzanne Bostrom, "Halting the Hitchhikers: Challenges and Opportunities for Controlling Ballast Water Discharges and Aquatic Invasive Species" (Summer 2009) 39 Envtl L 867 at 882.

3.2.2 CONVENTION ON BIOLOGICAL DIVERSITY, 1992

The *Convention on Biological Diversity* (CBD)[60] is a multilateral environmental agreement (MEA) that was adopted in 1992 by the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. The Convention is a complement to the LOSC regarding State obligations to protect fragile marine environments and habitats.[61] The Convention is primarily targeted at coastal States. States that are parties to this Convention cannot implement it in a way as to conflict with LOSC. This is because the Convention specifically provides that "[c]ontracting parties shall implement this Convention with respect to the marine environment consistently with the rights and obligations of States under the law of the sea"[62] Thus, the approaches recommended under the Convention to combat HAOP must not contradict the provisions of LOSC.

The CBD came into force in 1993. As at April 11, 2011, there are 198 parties to the Convention.[63] The Convention addresses responsibilities of coastal States to conserve biological diversity, sustainable use of its components and the fair and equitable sharing of the benefits arising thereof.[64] Because the Convention is widely ratified, it offers an opportunity to develop a broad global approach to both intentional and unintentional

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60 CBD, *supra* note 3.

61 Meinhard Doelle, Moira L. McConnell & David L. VanderZwaag, "Invasive Seaweeds: Global and Regional Law and Policy Responses" (2007) 50 Botanica Marina 438 at 440.

62 CBD, *supra* note 3, art. 22(2).

63 UNEP, "List of Parties" online: http://www.cbd.int/convention/parties/list/ accessed on April 08, 2011.

64 CBD, *supra* note 3, art. 1.

introduction of harmful alien organisms, as well as combating the threat these organisms pose to biodiversity.[65]

Biological diversity is defined as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this include diversity within species, between species and ecosystems".[66] The Convention provides in Article 8(h) that "[e]ach contracting party shall, as far as possible and appropriate prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species."[67] This provision does not offer specific implementation of this obligation. The reason is that the Convention is generally directed towards the conservation of biological diversity. Specifically, it addresses marine biodiversity. However, the provision on jurisdictional scope in Article 4 provides that:

> [t]he provisions of [the] Convention apply, in relation to each Contracting Party:
> (a) In the case of components of biological diversity, in areas within the limits of its national jurisdiction; and
> (b) In the case of processes and activities regardless of where their effects occur, carried out under its jurisdiction or control, within the area of its national jurisdiction or beyond the limits of national jurisdiction.[68]

This means the obligations under the CBD deal to some extent to waters under "national jurisdiction". In addition, the CBD provides in Article 22 that the provisions of

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65 See also Lyle Glowka & Cyrille de Klemm, "International Instruments, Processes, Organizations and Non-indigenous Species Introductions: Is a Protocol to the Convention on Biological Diversity Necessary?" in Odd Terje Sandlund, Peter Johan Schel & Aslung Viken, *Invasive Species and Biodiversity Management* (Boston, London: Kluwer Academic Publishers, 2001) at 390.

66 CBD *supra* note 3, art. 2.

67 CBD, *ibid*, art. 8(h).

68 CBD, *ibid,* art. 4.

the CBD shall not affect the rights and obligations of any party under any existing Conventions.[69] It specifically lays emphasis that its implementation with respect to the marine environment must be done consistently with the rights and obligations of States under the LOSC.[70] Thus, the CBD provisions impose an obligation to address the problem of HAOP through ships' ballast water. So, parties to the Convention are obliged to regulate, control or eradicate HAOP through ships' ballast water.[71]

The CBD requires regional or global co-operation. Under Article 5, parties are obliged to co-operate either directly or through international organizations to protect biodiversity outside their national jurisdictions as far as possible and as appropriate.[72] Article 14(1)(c) also makes provision for contracting parties to promote the conclusion of "bilateral, regional or multilateral arrangements"[73] regarding any activities within their jurisdiction or control that are likely to adversely affect the biological diversity of other States or areas beyond their national jurisdiction.[74] These provisions agree with Article 196 of LOSC. In particular, Article 5 and 14 are relevant because HAOP are transferred across national boundaries and the high seas through international shipping.[75] But the sweeping language of Articles 5, 8 and 14 asking parties "as far as possible and as appropriate" to co-operate to protect creates room for non-observance by some parties

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69 CBD, *ibid,* art. 22(1).

70 CBD, *ibid,* art. 22(2).

71 Christopher J. Patrick, "Ballast Water Law: Invasive Species and Twenty-Five Years of Ineffective Legislation" (2009) 27:1 Va Envtl LJ 67 at 75.

72 CBD, *supra*, note 3, art. 5.

73 CBD, *ibid,* art. 14(1)(c).

74 *Ibid.*

75 A. Charlotte De Fontaubert, David R. Downes & Tundi S. Agardy, "Biodiversity in the Seas: Implementing the Convention on Biological Diversity in Marine and Coastal Habitats" (Spring 1998) 10 Geo. Int'l Envtl. L Rev 753 at 804.

who may consider it inappropriate to implement the measures necessary to combat the transfer of alien invasive species.

The need for more specific guidance on implementing the obligation under Article 8(h) of CBD caused the Subsidiary Body on Scientific, Technical, and Technological Advice (SBSTTA), at its fifth meeting in 2000, to develop and recommend interim Guiding Principle for the effective implementation of the CBD's Article 8 (h).[76] In May 2000, the Conference of Parties (COP), at its fifth meeting urged that the interim Guiding Principles recommended by the SBSTTA be accepted and implemented.[77] The fifth COP urges parties "to develop mechanisms for transboundary co-operation and regional and multilateral co-operation" regarding the problem of aquatic invasive species.[78] The Guiding Principles annexed to the decisions are meant to aid the implementation of Article 8(h). The decision itself requires the Global Invasive Species Programme (GISP) to adopt ecosystem, precautionary and bio-geographical approaches and to ensure consistency with the provisions on alien invasive species under Articles 8(h) and 14 of the CBD.[79] The GISP was founded in 1997, to specifically address the issue of HAOP

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76 SBSTTA 5 Recommendation V/4, online: http://www.cbd.int/recommendations/sbstta/ and http://www.cbd.int/recommendation/sbstta/?id=7021 both accessed on April 08, 2011. The fifth SBSTTA meeting was held in Montreal between 31 January and 4 February, 2000.

77 COP 5 Decision V/8, from the 5th Conference of Parties, *Alien Species that Threaten Ecosystems, Habitats and Species*, online: http://www.cbd.int/decisions/cop/, http://www.cbd.int/decisions/cop/?m=cop-05 and http://www.cbd.int/decision/cop/?id=7150 accessed on April 08, 2011. See also Bostrom, "Halting the Hitchhikers: Challenges and Opportunities for Controlling Ballast Water Discharges and Aquatic Invasive Species", *supra* note 59 at 879.

78 COP 5 Decision V/8, ibid, par. 6 and 7.

79 COP 5 Decision V/8, *ibid*, par. 8 and 10.

and to help support national implementation of Article 8 of the CBD, including HAOP introduced into the marine ecosystem.[80]

The Guiding Principles were finalized in 2001 by SBSTTA,[81] and endorsed by the sixth meeting of the COP in 2002.[82] The parties reaffirmed their decision that "full and effective implementation of Article 8(h) is a priority"[83] to be attained in order to combat the threat of HAOP, and to this, the final Guiding Principles were directed.[84]

The COP acknowledged the political and socio-economic differences among States that would affect efforts to implement the Guiding Principles, and urges parties and other governments to identify *inter alia* the national needs and priorities of their States "when developing, revising and implementing national biodiversity strategies and action plans to address the threats posed by invasive alien species."[85] Parties and other governments are asked also to make use of risk assessment/analysis to address the problem and to promote and carry out research and assessment on the features of invasive species, the vulnerability of the marine ecosystems and habitats to invasions by the alien species.[86]

The fifteen Guiding Principles deal, *inter alia*, with the regulation of the pathways for unintentional introduction of alien invasive species. For this, States must put in place

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80 Patrick, *supra* note 71 at 76.

81 SBSTTA 6 Recommendation VI/4 (UNEP/CBD/SBSTTA/6/INF/11)", online: http://www.cbd.int/recommendation/sbstta/?id=7035 accessed on April 08, 2011.

82 See, COP 6 Decision VI/23, *Guiding Principles for the Prevention, Introduction and Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species* online: http://www.cbd.int/decisions/cop/ and http://www.cbd.int/decision/cop/?id=7197 both accessed on April 08, 2011.

83 COP 6 Decision VI/23*, ibid*, par. 1.

84 COP 6 Decision VI/23, ibid, par. 5.

85 COP 6 Decision VI/23, *ibid*, see *generally,* par. 10.

86 COP 6 Decision VI/23, *ibid*, par.12 and 24.

relevant legal and institutional regimes.[87] As well, at the national and regional levels, parties and governments must develop and provide technical tools and information that will aid efforts at preventing, eradicating, detecting earlier, monitoring and controlling harmful alien species.[88] In doing this, they must consider the cost effectiveness of the techniques adopted and their effects on the environment, humans and agriculture. In any case, the techniques must be "socially, culturally and ethically acceptable."[89]

The Guiding Principles pinpoint three approaches to be utilized to combat the threat of alien invasive species. They are the precautionary approach, the three-stage hierarchical approach and the ecosystem approach.[90]

The precautionary approach suggests that efforts must be made to identify and prevent *inter alia* the unintentional introduction of harmful alien species. The fact that there is no scientific certainty about the environmental, social and economic risks posed by either potential invasive alien species, or pathways such as ships, should not be the basis for failure to adopt preventive action against their introduction. Also, lack of certainty regarding the long term effect of invasion resulting from the transfer of the invasive alien species should not be used as the reason for postponing containment, eradication or control measures.[91]

The second approach is the three-stage hierarchical approach. This approach is based on prevention, containment, eradication and long term control measures. The idea

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87 COP 6 Decision VI/23, *ibid*, par. 10(c).
88 COP 6 Decision VI/23, *ibid*, par. 27.
89 COP 5 Decision V/8, *supra* note 77, principle 12.
90 COP 6 Decision VI/23, *supra* note 82.
91 COP 6 Decision VI/23, *ibid*, principle 1.

is that invasion of invasive by harmful aquatic organisms should be prevented because it is cost effective and environmentally desirable. Where prevention is impossible because the harmful aquatic organisms have already been transferred into the new ecosystem, their establishment and spread should be prevented by eradication at the earliest possible time. And where it is not possible to eradicate their establishment, and their spread or eradication is not cost effective, then, containment and long term control measures should be adopted.[92]

The criteria prescribed to guide application of the three-stage hierarchical approach are: first, where eradication is feasible and cost effective, it must be given priority over containment and long term control measures. Eradication measures are essential when the populations of the invasive alien species are small and localized. In this sense, community support is important for early detection to facilitate eradication of the alien invasive organisms.[93]

Second, containment is feasible only where the range of the invasive species is limited to defined boundaries. For this purpose, immediate action must be taken to eradicate any new outbreak of the alien invasive species.[94] Third, whenever there is need to adopt long-term control measures, they should be geared towards reducing damage caused by the alien invasive species, as well as reducing their numbers. The Guiding Principles also recommended biological control as a long term means to combat the

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92 COP 6 Decision VI/23, *ibid*, principle 2.
93 COP 6 Decision VI/23, *ibid*, principle 13.
94 COP 6 Decision VI/23, *ibid*, principle 14.

problem of harmful alien species,[95] along with "integrated management techniques" which include habitat management, chemical, biological, and mechanical controls.[96]

The third approach recommended by the COP is the ecosystem method.[97] The approach recognizes that human beings and their cultural diversity are integral component of many ecosystems.[98] This approach, however, does not preclude the use of other management approaches. Rather, it integrates them all with various methodologies for the purpose of combating the spread of HAOP.[99] All measures must be in accord with the provisions of the Convention[100] and decision V/6 of the COP.[101]

At the time the CBD was adopted, Agenda 21 was also adopted. Although it is not a binding instrument, it however references the problem of HAOP through ships' ballast water and the need to adopt uniform standards to combat the problem.

3.2.3 AGENDA 21: PROGRAMME OF ACTION FOR SUSTAINABLE DEVELOPMENT

Agenda 21[102] was adopted at the United Nations Conference on Environment and Development which was held in Rio de Janeiro in 1992, at the same time the CBD was adopted. At this conference, two global management plans were endorsed by the international community, namely, the *Rio Declaration on Environment and Development*

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95 See, COP 5 Decision V/8, *supra,* note 77.
96 COP 6 Decision VI/23, *supra* note 82, principle 15.
97 COP 6 Decision VI/23, *ibid*, Principle 3.
98 COP 5 Decision V/6, *Ecosystem Approach*, online: http://www.cbd.int/decision/cop/?id=7148 par. A(2) and C, accessed on April 24, 2011.
99 COP 5 Decision V/6, *ibid*, par. A(5).
100 CBD, *supra*, note 3.
101 COP 6 Decision VI/23, *supra* note 82, principle 3.
102 Agenda 21, *supra* note 4.

and *Agenda 21: Programme of Action for Sustainable Development.* In Chapter 17 of Agenda 21,[103] the conference called on the IMO and other international bodies to address the transfer of HAOP by ships by adopting an international instrument for this purpose. The Agenda also requests States, individually bilaterally, or regionally to develop rules guiding the discharge of ballast water.

Paragraph 17.30 states that:

> States, acting individually, bilaterally, regionally or multilaterally and within the framework of IMO and other relevant international organizations, whether sub-regional, regional or global, as appropriate, should assess the need for additional measure to address the degradation of the marine environment:
> (a) From shipping by:
> (iv) considering the adoption of appropriate rules on ballast water discharge to prevent the spread of non-indigenous organisms.[104]

A decade later, the World Summit on Sustainable Development (WSSD) was held, and the commitments made under Agenda 21 and its plan of implementation were reaffirmed. The WSSD also called for the fast development of measures to address invasive species in ballast water and for an international convention to combat the threat of HAOP.[105] But the obligations prescribed under Agenda 21 are not binding on States because Agenda 21 is not an international convention. It is a global programme of action to be carried out to achieve a clean and safe marine environment as prescribed under the LOSC. According to Doelle, Agenda 21 is non- binding, but "built upon initial

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103 Chapter 17 of Agenda 21 is titled *Protection of the Oceans, All Kinds of Seas, Including Enclosed and Semi-Enclosed Seas, and Coastal Areas and the Protection, Rational Use and Development of their Living Resources*.

104 GloBallast Partnerships, *Report of the United Nations Conference on Environment and Development (UNEP), Rio de Janeiro, 3-14 June 1992*, Agenda 21, par.17.30, online: http://globallast.imo.org/index.asp?page=UNCED.htm accessed on April 14, 2011.

105 GloBallast Partnerships, "The International Response" online: http://globallast.imo.org/index.asp?page=internat_response.htm accessed on April 14, 2011. The WSSD took place in Johannesburg, South Africa between August 26 and September 04, 2002.

acknowledgement of the invasive aquatic species issue under the Law of the Sea Convention (LOS)."[106]

Though commendable, the Guiding Principles and Agenda 21are not binding on State party to the CBD. Also, given the fact that CBD does not specifically address HAOP transferred through ships' ballast water, the COP in 2002[107] left it to the IMO "to complete … an international instrument to address the environmental damage caused by the introduction of HAOP in ballast water."[108] This effort eventually resulted in the BWMC, but prior to its adoption, other relevant more specific instruments, including in the forum of the IMO emerged to draw attention to the prevalence of the problem and the need to deal with it. I consider some of those instruments next.

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106 Meinhard Doelle, "Legal and Policy Responses to Invasive Species" (2001) Background Paper, Prepared for the Commission for Environmental Cooperation, online: http://www.cec.org/Storage/53/4582_Legal- Policy-Responses-InvasivesSpecies_en.pdf at 3 accessed on March 14, 2011.

107 Convention on Biological Diversity, "COP 6 Decision" accessed on May 20, 2011 online: http://www.cbd.int/decisions/cop/?m=cop-06.

108 COP 6 Decision VI/23, *supra*, note 82, par. 7.

3.3 OTHER INTERNATIONAL INSTRUMENTS PRE-DATING BALLAST WATER MANAGEMENT CONVENTION, 2004

3.3.1 INTRODUCTION

Aside from the two Conventions discussed above, there are also a number of other international instruments that reference the need to address the threat posed by HAOP. One of these instruments is the *International Health Regulations*, 1969[109] which address the issue as a health concern. Others address the issue as HAOP transfer through ships' ballasting operations. The IMO adopted several more specific Resolutions to address the problem of HAOP. In fact, the IMO began to consider the problem of HAOP more than three decades ago.[110] The first IMO Resolution addressing the pollution of the marine environment through ballast water is IMCO[111] Resolution 18, *Research into the effect of discharge of ballast water containing bacteria of epidemic diseases*.[112] The Resolution was adopted by the 1973 International Conference on Marine Pollution.[113] This was followed by a number of Resolutions consisting Guidelines in 1991, 1993 and 1997, all which laid the foundation for the adoption of the BWMC in 2004.

They were meant to promote uniform approaches to dealing with the problem of HAOP. They are also meant to complement obligations imposed for the purpose under

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109 IHR, *supra,* note 5.

110 McConnell, *GloBallast Legislative Review, supra* note 9.

111 IMCO means International Maritime Consultative Organization, now International Maritime Organization (IMO).

112 IMCO Resolution 18, *Research into the Effect of Discharge of Ballast Water Containing Bacteria of Epidemic Diseases,* MP/CONF/WP.29, 31 October 1973, 24. See generally, Gaetano Librando, "IMO and Codification of the International Law on Ballast Water Management" in Maria Helen Fonseca de Souza Rolim, *The International Law on Ballast Water: Preventing Biopollution* (Leiden , Boston: Martinus Nijhoff Publishers, 2008) at 86. According to the book, Gaetano Librando is Head of the Treaties and Rules, Legal Section of IMO, London.

113 Librando, "IMO and Codification of the International Law on Ballast Water Management" *ibid*.

other applicable international Conventions, such as the LOSC and the CBD. These Guidelines and the *International Health Regulations* are now discussed as to their provisions on combating HAOP.

3.3.2 INTERNATIONAL HEALTH REGULATIONS, 1969

The Assembly of the World Health Organization (WHO) is given authority to adopt regulations "designed to prevent the international spread of diseases".[114]Thus, the *International Sanitary Regulations,* 1951, were adopted. In 1969, the Regulations was renamed the *International Health Regulation*, 1969. The purpose of 1969 Regulations was to enhance global health and to prevent through quarantine, the spread of infectious diseases, such as cholera. The 1969 Regulations covered six quarantine diseases, later reduced to three by amendments in 1973 and 1981.[115] The growths of international trade and activities resulted in the international spread of diseases threats.[116] Consequently, the forty-eighth World Health Assembly in 1995 called for the revision of the 1969 Regulations, leading to the adoption of the *International Health Regulation* (IHR), 2005 at its fifty-eighth Assembly.[117] As an improvement on the 1969 Regulations, the 2005 Regulations make provision for a wider scope of diseases, that is, illness or medical

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114 *Constitution of the World Health* Organization, Forty-fifth edition, suppl. October 2006, online: http://www.who.int/governance/eb/who_constitution_en.pdf art. 21(a), accessed on April 16, 2011.

115 IHR, *supra* note 5.

116 IHR, *ibid.*

117 The Regulation was adopted on May 23, 2005 and they came into force on June 15, 2007.

conditions, *irrespective of origin or source*,[118] that present or could present significant harm to humans.[119]

As noted in Chapter 1, one of the impacts of the transfer of HAOP is ships' ballast water, is the spread of diseases, such as cholera.[120] As such, the IHR 2005 apply to ships' ballast water as a vector for spread of diseases. Indeed, the aim of the Regulations is "to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade."[121] The Regulations are to be implemented by WHO, and member States,[122] and the United Nations, IMO, WHO, and other international bodies are to co-operate and co-ordinate the activities of WHO.[123]

The 2005 Regulations oblige States to develop, strengthen and maintain capacity to detect, assess, notify and report disease occurrences.[124] They must also assess any event that occurs within their jurisdictions, and must notify WHO by the most efficient means of communication available of all events that may constitute an international public health emergency. They must also keep WHO updated about, *inter alia*, conditions affecting the spread of the disease, health measures utilized, the difficulties faced and the

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118 Emphasis supplied.

119 IHR, *supra* note 5, art. 1(1).

120 Fred C. Dobbs & Andrew Rogerson, "Ridding Ships' Ballast Water of Microorganisms" (2005) 39 Environmental Science and Technology 259 at 262. See also Moira L. McConnell, "Introduction of Harmful Organisms from Ships to be regulated by Feds" (October 6, 2006) 26:21 The Lawyers Weekly.

121 IHR, *ibid*, art. 2.

122 IHR, *ibid*, par. 2 of the preamble

123 IHR, *ibid*, par. 4 of the preamble and art. 14(1) read together.

124 IHR, *ibid*, art. 5(1).

support needed.[125] Also, where there is a public health risk outside the jurisdiction of a State, and which may cause international disease spread, the State must within 24 hours of receiving evidence of such information inform WHO.[126]

States are obliged "to ensure that conveyance operators comply with the recommended health measures."[127] According to the Regulations, a conveyance operator means "a natural or legal person in charge of a conveyance or their agent" while a conveyance means "an aircraft, ship, train, vehicle or other means of transport on an international voyage."[128] Thus, ship masters must comply with recommended health measures. However, a ship must not be refused *"free pratique"*[129] by port State parties for public health reasons,, and, in particular, ships must not be prevented from embarking, disembarking, loading or discharging cargo or taking on water. The grant of *pratique* may, however, be subject to inspection of the ship by the port State. If clinical symptoms or signs, and information based on fact or evidence of public health risk are found on board the ship, health measures must be initiated and completed without delay, and applied in a transparent manner.[130]

In order to avoid the spread of diseases through ships' ballast water and ships' operations, the port State is allowed to implement not only the measures under the Regulations, but additional measures put in place under its national law, and must comply

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125 IHR, *ibid*, art. 6.
126 IHR, *ibid*, art. 9(2).
127 IHR, *ibid*, art. 24(1).
128 IHR, *ibid*, art. 1.
129 *Free pratique* in accordance with the IHR, 2005 *ibid,* art. 1 *means* "permission for a ship to enter a port, embark or disembark, discharge or load cargo or stores…."
130 IHR, *ibid*, art. 42.

with obligations under international law[131] and applicable international agreements.[132] The additional measures may include isolating the ship to avoid the spread of disease. The measures must not conflict with international obligations, and their adoption must be reported to the National International Health Regulations Focal Point.[133] The measures must also not restrict international traffic. Where they interfere with international traffic, the State must provide to the WHO, the public health rationale and relevant scientific information for the measures.[134] Where control measures are carried out on the ship and to the satisfaction of the competent authority, and there are no conditions on board that could constitute a public health risk, then such conveyance or ship shall cease to constitute a public health risk.[135] But, where the State authority cannot execute the control measure against the ship, the ship may be allowed to depart but the competent State authority must note the evidence found and the control measures required in the Ship Sanitation Control Certificate.

Commendable in the IHR 2005 are provisions relating to ships' ballast water. The Regulations state that "[s]tates shall take all practicable measures … to monitor and control the discharge by ships of sewage, refuse, ballast water and other potentially disease-causing matter which might contaminate the waters of a port, river, canal, strait, lake or other international waterway."[136] Although the 2005 Regulations were adopted after the adoption of BWMC in 2005, IHR came into force in 2007. The BWMC is still

131 IHR, *ibid*, art. 43(1).
132 IHR, *ibid*, art. 28(1).
133 IHR, *ibid*, art. 27(1).
134 IHR, *ibid*, art. 43 (3).
135 IHR, *ibid*, see *generally*, art. 27.
136 IHR, *ibid*, art. 22 (1)(f)

not in force. Thus, Article 22 of IHR 2005 would have been handy to combat HAOP, except that the 2005 Regulations and its1969 predecessor, are non-mandatory.

3.3.3 IMCO ASSEMBLY RESOLUTION 18, RESEARCH INTO THE EFFECT OF DISCHARGE OF BALLAST WATER CONTAINING BACTERIA OF EPIDEMIC DISEASES, 1973

This Resolution called on both WHO and the International Maritime Consultative Organization (now IMO) to study the dangers posed by the spread of epidemic diseases through ships' ballast water operations and to prescribe general standards for combating the problem. The Resolution prohibited transboundary pollution and requested port/coastal and flag States to ensure that activities within their control or jurisdiction do not cause damage to areas outside their national jurisdiction or to the marine jurisdiction of other States.[137] It also "recognized the high level of technical-scientific knowledge of biopollution and the effects thereof on the marine environment required to draft technical and legal standards for the control and management of ships' ballast water and sediments."[138]

IMCO Assembly Resolution 18 urged port States to protect their marine environment by disallowing the discharge of ballast water containing organisms which may cause diseases. This was however hampered as the Resolution is a voluntary instrument requiring national implementation of standards, for the control of discharge of ballast water containing bacteria of epidemic diseases.

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137 Librando, "IMO and Codification of the International Law on Ballast Water Management", *supra* note 112 at 88.

138 See Librando, *ibid* at 88-89.

Between 1989 and 1993, Australia, Canada, New Zealand and IMO were largely concerned over zebra mussel and toxic dinoflagellates which were introduced into Canada and Australia respectively through ships' ballast water in the 1980s. Against this, IMO adopted guidelines on ballast water management.[139] These guidelines were Marine Environmental Protection Committee (MEPC) Resolution (50)31, *Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediments Discharges*, 1991,[140] and IMO Assembly Resolution A.774 (18), *Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediments Discharges*, 1993.[141] The latter Resolution confirmed the provisions of the former Resolution,[142] although with slight modifications.[143] These Guidelines were, however, not comprehensive enough to combat the threat posed by HAOP through ships' ballast water, and more comprehensive Guidelines were adopted in 1997.[144] These are IMO Resolution A.868(20), *Guidelines for the Control and*

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139 A. Locke et al, "Ballast Water Management as a Means of Controlling Dispersal of Freshwater Organisms by Ships" quoted in Andrew N. Cohen & Brent Foster, "The Regulation Of Biological Pollution: Preventing Exotic Species Invasions From Ballast Water Discharged into California Coastal Waters" (2000) 30 Golden Gate UL Rev 787 at 820.

140 The guidelines were originally drafted by Canada. As a result of further information from Australia, it was revised and Resolution A.774(18) of 1993 was adopted. See, Librando, "IMO and Codification of the International Law on Ballast Water Management" *supra*, note 112 at 86

141 IMO Assembly Resolution A,774(18), *Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships' Ballast Water and Sediments Discharges*, 4 November 1993, online: http://www.sjofartsverket.se/upload/5121/774.pdf accessed on April 19, 2011.

142 GloBallast Partnerships,"The International Response", *supra* note 105.

143 Jeremy Firestone & James J. Corbett, "Coastal and Port Environments: International Legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species" (2005) 36 Ocean Devel & Int'l L 291 at 294.

144 GloBallast Partnerships, "The International Response", *supra* note 105.

Management of Ships' Ballast Water to Minimise the Transfer of Harmful Organisms and Pathogens, 1997.[145]

3.3.4 IMO ASSEMBLY RESOLUTION A.774(18), GUIDELINES FOR PREVENTING THE INTRODUCTION OF UNWANTED ORGANISMS AND PATHOGENS FROM SHIPS' BALLAST WATER AND SEDIMENTS DISCHARGES, 1993

Resolution A.774(18) was adopted in 1993for the purpose of combating the transfer of HAOP through ships' ballast water and sediments. The Resolution include Guidelines directed to both port and flag States to require that ballast waters that are "loaded in their ports or harbour or carried in their ships do not contain HAOP that pose threats to the waters of other States."[146] The Resolution acknowledged the essential role of ballast water in the safe and effective operation of ships, but also its negative effects on society as a medium for the spread of epidemic diseases.[147] The port State has authority to determine the extent of applicability of the Guidelines to ballasting operations in the port.[148] However, regulating ballast water is to follow the standards that would apply to both uptake and discharge operations at zones. States are therefore encouraged to adopt procedures to combat ballast water and sediment discharges so as to protect the health of

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145 IMO Resolution A.868(20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Organisms and Pathogens*, 27 November 1997, online: http://www.islandnavigation.org/Library/A868.pdf accessed on April 21,2011.

146 Resolution A.774(18), *supra*, note 141 at preamble.

147 Resolution A.774(18), *ibid,* at preamble.

148 Resolution A.774(18), *ibid*, guideline 3.

their citizens from foreign infectious diseases, to safeguard fisheries, and generally, to protect the environment.[149]

The procedures to be adopted to minimize the risk of importing HAOP include adoption of national regulations. In that respect, the Guidelines recommend specific approaches, such as the retention of ballast water on board the ship, ballast water exchange at open sea or in areas designated by the port State, uptake of ballast water in areas less likely to contain HAOP, and discharge of ballast water to shore-based facilities for treatment.[150] Whatever the procedures or approaches adopted, a port State must consider their practicability, effectiveness, cost, environmental acceptability, and the safety of ships and those on board the ships to avoid subjecting them to maritime risk, and the procedures must not cause delays to ships.[151] Whenever compliance with an adopted procedure results in ship safety problems, the Guidelines require the flag State or ship administration to report the incident to the IMO.[152]

The Guidelines require States to provide IMO with details of annual compliance and non-compliance records of procedures adopted to combat HAOP. The record must contain the name of the non-complying ship, its official number and the flag of the State it is flying.[153]

To avoid the spread of infectious diseases and harmful aquatic organisms, the Guidelines also oblige member States to notify IMO of "any local outbreaks of infectious

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149 Resolution A.774(18), *ibid*, guideline 4, par.1.
150 Resolution A.774(18), *ibid*, see *generally,* guideline 7, par. 1(2).
151 Resolution A.774(18), *ibid*, see *generally,* guideline 4 and 7, par.1(1).
152 Resolution A.774(18), *ibid*, see *generally,* guideline 5, par.5
153 Resolution A.774(18), *ibid*, guideline 5, par. 6.

diseases or water borne organisms that have been identified as a cause of concern to health and environmental authorities in other countries and for which ballast water or sediment discharges may be vectors of transmission…."[154] IMO would forward this information to all member States and non-governmental organizations. When there is an HAOP endemic in the port water of a State, this State must ensure that the problem species are not transferred from the locally loaded ballast water. This obligation can be met in two ways: by notifying the masters of ships of the existence of the threat, and by advising the masters of ships to treat the ballast water and sediment once ballast water exchange is conducted.[155]

The Guidelines recommended application of the precautionary approach to controlling and containing the risk of transfer of HAOP. They ask that, first, the environmental sensitivity of the port State should be determined to know the areas where ballast water may be discharged.[156] Second, when loading ballast water into ships' tanks, efforts should be made to ensure that clean waters free from harmful species are loaded. Also, the uptake of sediment with ballast water should be minimized. Third, where it is practicable, ballast water should not be taken in shallow areas or in areas of dredging operations. These precautions are intended to reduce the likelihood of taking silt which may harbour the cysts of HAOP and the probability of the presence of the organisms. Again, the uptake of ballast water should be avoided in areas where there is known outbreak of diseases that are communicable through ballast, water or where

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154 Resolution A.774(18), *ibid*, see *generally,* guideline 5, par. 7.

155 *Ibid.*

156 Resolution A.774(18), *ibid*, guideline 5, par. 8.

phytoplankton blooms are occurring.[157] Notwithstanding the provisions of Resolution A.774(18), it was considered as not comprehensive enough to prevent the harmful organisms transferred through ships' ballast water and sediments discharge.[158] Consequently, IMO Resolution A.868(20) was adopted in 1997. This latter Resolution is the next subject.

3.3.5 IMO ASSEMBLY RESOLUTION A.868(20), GUIDELINES FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER TO MINIMISE THE TRANSFER OF HARMFUL ORGANISMS AND PATHOGENS, 1997

3.3.5.1 Overview

In 1997, IMO Assembly Resolution A.868(20), the Guidelines for the Control and Management of Ships' Ballast Water to Minimise the Transfer of Harmful Aquatic Organisms and Pathogens[159] was adopted. The Guidelines were developed and implemented individually on State level, by some IMO member States prior to its adoption by the IMO Assembly in 1997.[160] Upon adoption, they became the basic international instrument implemented under individual national laws for the control and management of HAOP transferred through ships' ballast water and sediments[161]. Also, Librando notes that "[s]ince the 1990s, comparative legal analysis of the [Ballast Water

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157 Resolution A.774(18), *ibid*, guideline 6, par. 1.

158 GloBallast Partnerships, 'The International Response", *supra* note 105.

159 Resolution A.868(20), *supra* note 145.

160 IMO, "GloBallast Partnerships: The International Response", *supra* note 105. In essence, States have different individual Guidelines regulating the transfer of HAOP.

161 This fact is noted in the preamble of the BWMC that "[s]everal States have taken individual action with a view to prevent, minimize and ultimately eliminate the risks of introduction of HAOP through ships entering their ports…."

Report Form] reveals the influence of Resolution A.868(20) on national laws prior to adoption of the 2004 Convention."[162] Indeed, currently the 1997 Guidelines have been used as a framework for developing many national legal regimes in order to foster international co-operation to effectively prevent and control the transfer of HAOP through ships' ballast water.[163]

The Guidelines adopted by IMO advises on how to lower the chances of taking on board HAOP with ballast water, and this constitutes a distinctive feature of the guidelines. As McConnell noted, "[o]ne of the more significant features of the revision was the formal adoption of a risk minimization and management approach to the problem, as reflected in the new title, Guidelines for the control and management of ships' ballast water to *minimize* the transfer of harmful aquatic organisms and pathogens."[164] The Guidelines are directed to port States, flag States and other members of IMO[165] on the means of mitigating the transfer of HAOP through ballast water. In that respect, they differ from other IMO instruments that usually emphasize flag State obligations.[166] In fact, they impose more obligations on the port States than on flag for this purpose.

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162 Librando, "IMO and Codification of the International Law on Ballast Water Management", *supra*, note 112 at 85.

163 Jason R. Hamilton, "All Together Now: Legal Responses to the Introduction of Aquatic Nuisance Species in Washington Through Ballast Water" (2000) 75:1 Wash L Rev 251 at 258. at 264.

164 Moira L. McConnell, "Responsive Ocean Governance: The Problem of Invasive Species and Ships' Ballast Water: A Canadian Study" in T.Koivurova, eds, *Understanding and Strengthening European Union — Canada Relations in Law of the Sea and Ocean Governance* (2009) 35 Juridica Lapponica 433 at 450.

165 Resolution A.868(20), *supra* note 145, guideline 1, par. 3.

166 McConnell, "Responsive Ocean Governance", *supra* note 164 at 450.

The objectives of the Guidelines are meant "to assist Governments and appropriate authorities, ship masters, operators and owners, and port authorities, as well as other interested parties, in minimizing the risk of introducing HAOP from ships' ballast water and associated sediments while protecting ships' safety"[167] Thus, the protection of the marine environment and safety of life and property aboard a ship are essential considerations for implementation of the Guidelines.

Port States still retain the authority under Resolution A.774(18)[168] to determine the extent of their applicability.[169] They could exempt ships within their jurisdiction from part or all of the relevant provisions of the Guidelines.[170] A State may restrict the application of ballast water operations, but in so doing, it should follow the Guidelines when developing its national legislations or adopting procedures for the purpose.[171] The Guidelines also advise all governments, ship operators, other appropriate authorities and interested parties to apply its provisions in order to develop a standard and uniform manner of implementing its prescriptions.[172]

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167 Resolution A.868(20), *supra*, note 145, guideline 1, par. 1.
168 Resolution A.774(18), *supra*, note 141.
169 Resolution A.868(20), *ibid*, guideline 3.
170 Resolution A.868(20), *ibid*, guideline 4, par.2.
171 Resolution A.868(20), *ibid*, guideline 4, par. 2.
172 Resolution A.868(20), *ibid*, guideline 4, par. 3.

3.3.5.2 Obligations of States

As noted earlier, the Resolution specifies obligations for port and flag States as to combating the transfer of HAOP. These obligations are respectively set out below.

(i) Port State Rights and Obligations

The Resolution gives port States the right to manage ballast water by national regulations. But they are expected to inform IMO about how they apply the Guidelines and where there is any discharge restriction, IMO must also be notified.[173] This notification allows IMO to publicize the discharge restriction to all member States. It must be noted that this provision appears to be consistent with the rights and obligations on port States under the LOSC,[174] and de facto, the shipping industry

Port States must set out the procedures they consider acceptable, for the conduct of ballast water exchange at sea, irrespective of the method adopted by the ship to do this exercise. The procedure must account for "weather routeing in areas seasonably affected by cyclones, typhoons, hurricanes, or heavy icing conditions."[175] It is however advised that ballast water exchange at sea should be avoided in freezing weather conditions, unless it is absolutely necessary.[176] Other information to be provided to the ship include wave-induced hull vibration, documented records of ballasting and/or de-ballasting, the

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173 Resolution A.868(20), *ibid*, guideline 11, par. 1 and 2.

174 See, McConnell, *GloBallast Legislative Review, supra* note 9 at 12. See also LOSC, *supra* note 2. See also art. 211(3).

175 Resolution A.868(20), *supra* note 145, appendix 2, guideline 2, par.1(4).

176 Resolution A.868(20), *ibid*, appendix 2, guideline 2, par.3.

time to complete the ballast water exchange or an appropriate sequence thereof, contingency procedures for situations which may affect the ballast water exchange, etc.[177]

Port States are requested to notify IMO of specific requirements for ballast water and sediment discharge procedures. In addition, copies of any regulations, exemptions, standards or guidelines must be submitted to IMO for the information of other member States and non-governmental organizations. As well, the port State must provide the widest possible distribution of any information regarding requirements for the management and treatment of ballast water and sediment that are being applied in shipping.[178] This is necessary in order to avoid undue delays for ships intending to enter the ports. Information relating to location and terms of use of alternative exchange zones, details of requirements regarding ballast water management, port contingency arrangements and availability, capacities and applicable fees relevant to the provided reception facilities must also be provided to ships.[179]

Under the Resolution, the port States are encouraged to maintain and exchange information through the IMO. Such information will include those regarding any severe outbreak or infestations of HAOP that may pose a risk; technical and research information; current domestic laws and regulations; fees; education and printed materials; location and terms of use of alternative exchange zones; reception facilities; contingency strategies; etc.[180]

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177 Resolution A.868(20), *ibid*, see *generally*, appendix 2, guideline 2.
178 Resolution A.868(20), *ibid*, guideline 5, par.2 and 3.
179 Resolution A.868(20), *ibid*, guideline 8, par.2(1).
180 Resolution A.868(20), *ibid*, guideline 5, par.1.

To prevent the uptake and eventual spread of HAOP, the port State must "inform local agents and/or the ship of areas and situations where the uptake of ballast water should be minimized."[181] These include areas with current phytoplankton blooms, those near sewage outfalls or dredging operations, areas with poor tidal flushing or outbreaks, infestations or known population of HAOP, and turbid tidal streams.[182]

In implementing its ballast water management programme, the port State is to be guided by a number of considerations. First, it must note the differences between conditions that may exist between ports of origin and the port in which ballast water is discharged. Second, the length of time within which organisms stay in ballast tanks as this determines the number of surviving organisms. Third, in circumstances where it is possible to determine the presence of one or more target organisms present in the water of a specific port, and which have been ballasted in a ship, the receiving port State authority may invoke necessary management measures. The adoption of necessary management measures is also advisable, even where target species are not present in the ballast water as the ship may be carrying untargeted harmful organisms. The port State must also execute biological baseline survey in their ports and to disseminate the results of their investigations for assessment of risks.[183]

A port State must, however, not enforce the Guidelines through its national laws, in a manner that exposes a ship and/or the lives of those on board to risk. But the measures it adopts must be "environmentally safe, practicable, designed to minimize

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181 Resolution A.868(20), *ibid*, guideline 8, par.2(2).
182 Resolution A.868(20), *ibid*, see *generally*, guideline 8, par.2(2).
183 Resolution A.868(20), *supra*, note 145, see *generally*, guideline 10.

costs and delays to the ship"[184] and must be in accordance with the Guidelines whenever possible.[185]

Enforcement and monitoring by the port State authorities must be uniform, fair and nationally consistent in all respects at all ports within the port State. Where any situation warrants different rules and procedure, to be adopted among the ports, the deviation must be reported to IMO. Port States must monitor ship compliance with the measures, such as by "taking and analysing ballast water and sediment samples to test for the continued survival of harmful aquatic organisms and pathogens."[186] The sampling methods adopted for research and compliance monitoring are left to the discretion of the individual port State, but compliance monitoring must not cause unnecessary delays to ships.[187] Meanwhile, it must notify the ship that sampling will occur, and indicate to the master of the ship or responsible officer the purpose for which a sample is taken, either for the purpose of monitoring, enforcement or research. The result of the analysis must be made available to the master of the ship or responsible officer upon request.[188]

Where a port State adopts new or innovative methods of sampling and /or analysis, it must inform IMO.[189] Where its analysis of a sample of ballast water and sediment finds that either or both contain harmful aquatic organisms, the port State may apply its contingency plan, or not. The relevant provision of the guidelines reads as follows:

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184 Resolution A.868(20), *ibid*, guideline 11, par.4.
185 Resolution A.868(20), *ibid*, guideline 11, par.3 and 4.
186 Resolution A.868(20), *ibid*, guideline 11, par.8.
187 Resolution A.868(20), *ibid*, guideline 11, par.7, 8, 9 and 12.
188 Resolution A.868(20), *ibid*, guideline 11, par. 13.
189 Resolution A.868(20), *ibid*, guideline 11, par.12.

> Port State authorities may sample or require samples to analyse ballast water and sediment, before permitting a ship to proceed to discharge its ballast water in environmentally sensitive locations. In the event that harmful aquatic organisms or pathogens are found to be present in the samples, a port State's contingency strategy may be applied.[190]

Because of the voluntary nature of the Guidelines, the port States "may" implement or not. Indeed, the discretion to either analyse ballast water and sediment, or not, raises a high probability that water containing harmful aquatic organisms may be discharged into an environmentally sensitive area of port State waters, thereby endangering local species. McConnell observes that the Guidelines were not intended to require the sampling of ballast water and sediments from all ships, but rather of those ships perceived to pose risk to the marine environment of the port State "perhaps because of the origin and likely content of the water…."[191] But clearly, the origin or likely content of water cannot determine the existence or non-existence of harmful organisms in ballast water until risk analysis is performed. The fact that a ship is coming from a marine environment free of HAOP a week ago does not make the same environment automatically free from HAOP this week. Thus, where the ship loaded water into its ballast tank from that area, such ballast water may contain HAOP which may likely subsist the condition of the ballast tanks as well as its new environment and subsequently adversely impact the marine environment of the port State that receives that water without sampling it for analysis prior to the discharge. To guard against this, it is suggested that port States should try as much as possible to sample ballast water to be

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190 Resolution A.868(20), *ibid*, see *generally*, guideline 11, par.14.

191 McConnell, *GloBallast Legislative Review*, *supra* note 9 at 14. The "*perhaps*" used could be tantamount to "may be" which signifies a personal opinion which might be the rational for the provision.

discharged in their ports in order to avoid the adverse impacts of HAOP, as noted in Chapter 2.

Aside from the weakness of the Resolution in terms of its non-binding nature, it has provided for management standards through which the containment of HAOP may be successful. The obligations imposed on port States to implement uniform national regulations within their various ports, the sampling and analyzing of ships' ballast water, the State's contingency plan as well as the precautionary means of ensuring that ships are made to be aware of the areas with high density of HAOP points to the fact that the Resolution has requirements to combat the transfer of HAOP, but for its voluntary nature.

(ii) Flag State Obligations

Regarding flag States, the officers and ratings of their ships engaged in ballast water exchange at sea must be trained in, and must be familiar with particular methods of sea exchange and safety precautions adopted for their ships. They must know when to conduct the various ballast water exchange operations, the ships' pumping plan, etc.[192] The training given to these officers should also include instructions on the maintenance of records, logs and generally on the application of ballast water and sediment management and treatment procedures.[193]

The training requirements of ship officers and ratings must include "knowledge of duties regarding the control of pollution of the sea by harmful aquatic organisms and

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192 Resolution A.868(20), *supra* note 145, appendix 2, guideline 3, par.2.

193 Resolution A.868(20), *ibid*, guideline 6, par.1.

pathogens."[194] The flag State shall require a ballast water management plan (BWMP) to all ship which carries ballast water. The BWMP must offer safe and effective procedures for ballast water management in order to minimize the transfer of HAOP.[195] A plan should be specific to each ship. As well, the location and suitable access points for sampling ballast water and sediment must be described in the ships' BWMP.[196] This is to aid the crew members to provide maximum assistance when a port State requires sample of their ballast water or sediment.[197]

The flag State must ensure that ships flying its flag observe particular requirements as part of their operations. First, ship must obtain and verify detailed information regarding the requirements of a port State for ballast water and sediment discharge procedures before they arrive at its port.[198] This obligation must be met by both the shipping company and ship managers. Second, where a port State requires that a particular ballast water procedure and/or treatment option be conducted and for the purpose of safety to life and property on board a ship, such procedures and/or treatment cannot be done due to bad weather, operational impossibility, sea conditions, etc., it is the duty of the master of the ship to report the problem to the port State authority as soon as possible and, where appropriate, before entering waters under the jurisdiction of the port State.[199] Again, when ballasting or de-ballasting of ballast water is conducted, certain information regarding the operation must be recorded and made available to the port State authority. The information include the date of loading and up-loading, ballast water

194 Resolution A.868(20), *ibid*, guideline 6, par.3.
195 Resolution A.868(20), *ibid*, guideline 7, par.1(1).
196 Resolution A.868(20), *ibid*, guideline 7, par.1(2) and 8, par.1(4).
197 Resolution A.868(20), *ibid*, guideline 8, par.1(4).
198 Resolution A.868(20), *ibid*, guideline 5, par.4.
199 Resolution A.868(20), *ibid*, guideline 8, par.1.

temperature and salinity, the amount of ballast water loaded or discharged, the location where it was conducted, the ship's tanks and cargo holds, etc. The Guidelines mandate that a responsible officer should be appointed to maintain the records (Ballast Water Record Book) and ensure that ballast water management procedures are adhered to and recorded.[200] During the process of sampling for research or compliance monitoring, the master of a ship must assist by providing the ship's plans, the officers or crew, records regarding ballast arrangements, and details of the location of sampling points.[201]

Practical implementation of precaution to avoid the uptake of HAOP could be achieved by the ship using various methods. They include minimizing the uptake of organisms during ballasting by ensuring avoidance of areas in ports where populations of organisms are known to occur.[202] The ship master must also prevent ballasting in shallow water or in darkness or when bottom-dwelling organisms may rise in the water column. Second, he must ensure the cleaning of ballast tanks and their removal on a regular basis, including sediments which accumulate in the tanks and may harbour harmful aquatic organisms.[203] Third, where it is not necessary to de-ballast, he must make sure that ballast water should not be discharged and thus, must be kept on board.[204] The ship must also ensure compliance with its ballast water management procedure,[205] such as ballast water exchange in the open sea, retention of ballast on board, minimal discharge of ballast water, or discharge to onshore reception facilities and treatment facilities.[206]

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200 Resolution A.868(20), *ibid*, see *generally,* guideline 8.
201 Resolution A.868(20), *ibid*, guideline 11, par. 11.
202 For example, all instances mentioned in IMO Resolution A.868(20), *ibid*, guideline 9, par.1(1).
203 Resolution A.868(20), *ibid*, guideline 9, par.1(2).
204 Resolution A.868(20), *ibid*, guideline 9, par.1(3).
205 Resolution A.868(20), *ibid*, guideline 9, par.2.
206 *Ibid*. See also GloBallast Partnerships, "The International Response", *supra* note 105.

To aid the safety of ships for ballast water exchange at sea, shipbuilders, owners and classification societies must consider the provisions of the Guidelines regarding ballast water exchange when designing new ships or modifying existing ships.[207] This is to ensure that in the new or repaired ships, ballasting and de-ballasting in the open sea will be safely conducted and in ways that might be more effective for combating the threat of HAOP transfer. Other provisions of the Guidelines deal with the safe conduct of ballast water exchange at sea. These are set out next.

3.3.5.3 Ballast Water Exchange

The Guidelines note that ballast water exchange at sea, is "appropriate in the short term",[208] and still provides the effective means for combating the transfer of HAOP in the absence of more scientifically based means of controlling the problem.[209] Ballast water exchange at sea may be conducted either by the sequential method in which ballast tanks are pumped out and refilled with clean water, or by the flow through method in which ballast tanks are simultaneously filled and discharged by pumping in clean water.

Because different kinds of ships are required to conduct ballast water exchange at sea, it is impracticable to provide specific Guidelines for each type. However, ship-owners are given some variables to consider in order to determine the safety of the ship's specific ballast water exchange operation. Some of these variables are: the type and size of ship, weather conditions, environmental protection, acceptability, port State

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207 Resolution A.868(20), *ibid*, guideline 13.

208 Resolution A.868(20), *ibid*, guideline 12, par. 1.

209 Resolution A.868(20), ibid, appendix 2, guideline 1, par.3. Since then, various equipment and systems have been developed to address the problem. See Chapter 4.

requirements, manning, ballast tank configurations and pumping systems.[210] A BWMP must include a list of situations when ballast water exchange at sea will not be conducted. Such circumstances include *force majeure* due to weather conditions and any other condition in which human life or safety of ship or crew members are threatened.[211]

Given the short term solution that ballast water exchange at sea offers for combating HAOP transfer, the Guidelines recognize the future needs to revise and adjust the Guidelines in the light of results requiring new ballast water management options.[212] The Resolution also recognises the need for long-term evaluation of safety aspects in relation to ballast water exchange at sea in light of detailed studies and information provided by interested parties based on experience gained from carrying out ballast water exchange at sea, operational precautions and methods adopted to avoid potential hazards and consequences which may arise during ballast water exchange at sea, or in light of any hazards which may arise due to human intervention relative to the responsible execution of ballast water exchange at sea and operational procedures carried out before initiating the ballast water exchange.

In any case, the BWMP must incorporate any unique procedure to combat an emergency that may affect the exchange of ballast water at sea. It must also set out the extent of necessary training and management given to the responsible officers to ensure that the process of ballast water exchange is effectively monitored and controlled on board. It is also required that the decision making process be studied and reported on,[213]

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210 Resolution A.868(20), *ibid*, appendix 2, guideline 1, par. 1.
211 Resolution A.868(20), *ibid*, appendix 2, guideline 2, par.6.
212 Resolution A.868(20), *ibid*, guideline 12, par. 1.
213 Resolution A.868(20), *ibid*, see *generally*, guideline 12.

and that in practice, it must take into account relevant safety matters like weather conditions, ballast water inspection and maintenance, ship's position, machinery performance, crew safety and availability.[214]

All the above information was to be evaluated and included in the work-plan of the Marine Safety Committee (MSC) to help it "to determine the hazards and potential consequences for various existing ship types and operations."[215] In addition, the Resolution requested the MSC to consider any other relevant issues concerning ballast water management and design objectives for new ships to help minimize the introduction of HAOP through ships' ballast water and sediments.[216]

Resolution A.868(20) with its annexed Guidelines are voluntary and do not set detailed standards. For this reason, different States implementing them have different approaches to combat HAOP introduced through ships' ballast water and sediments. The effect is lack of a uniform international approach to addressing this problem within the shipping industry. Even so, the Resolution laid the foundation for the BWMC and its subsequent Technical Guidelines. Also, the Resolution constitutes the existing standard according to which measures to combat the transfer of HAOP in ballast water and sediments may be formulated and applied.

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214 Resolution A.868(20), *ibid*, see generally, guideline 12.
215 Resolution A.868(20), *ibid,* at preamble 4.
216 Resolution A.868(20), *ibid,* at preamble 4.

3.4 CONCLUSION

The international instruments addressed in this chapter, set both general and specific responsibilities of States towards the protection of their marine environment and biodiversity against any form of threat, including threats posed by the introduction of HAOP through ships' ballast water and sediments. Until the BWMC comes into force, the LOSC and the CBD will remain the only international legal regime regulating the protection of the marine environment and biodiversity against the threats of HAOP.

These instruments however have some weaknesses. The LOSC contains general provisions on the prevention of pollution in the marine environment, and includes specific obligations regarding alien species, which allows for an inference to the control of HAOP transferred through ships' ballast water and sediments. The CBD, a MEA, is more specific on preventing the introduction of alien species to environments, but it does not provide specific enforcement rules, measures, or technical guidance. Besides, it is concerned generally with conservation of biological biodiversity in all media. Other international instruments, especially the IMO Resolution A.868(20), contain elaborate provisions on the specific issue of controlling the transfer of HAOP through ships' ballast water and sediments, however, these are non-binding instruments and only constitute guidance for adopting national control legislation and procedures. Similarly, the WHO's *International Health Regulations* establish potential regulatory approach based on health concern. But, it also does not contain specific operational guidance. In essence, before the adoption of BWMC, there is no international uniform standard applicable across the board to the shipping industry on this matter.

As such, these instruments resulted in divergent national policies regarding the control and management of ships' ballast water and sediments. This trend necessitated the adoption of BWMC as a binding treaty. Hence,

> [s]tates already have an international obligation to address the problem of alien species transfer, to the extent that it occurs within their territory or because of an activity under their control….The emergence of rules dealing with ballast water are, therefore, simply the rules designed to deal with one specific pathway or vector amongst others to be addressed by each State.[217]
>
> The rules referred to are mainly contained in the provisions of the BWMC [218]

which deals with "ships' ballast water" as "pathway/vector" to HAOP and any supplementary national measures to address issues not covered by the BWMC. This BWMC was adopted for the purpose of controlling ships, as pathways through which HAOP are introduced. It imposes obligations on both coastal/port and flag States to manage ships' ballast water and sediments in accordance with its provisions in order to avoid the transfer of the HAOP. The provisions of the Convention and its accompanying Regulations are analysed in the next chapter.

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217 McConnell, *GloBallast Legislative Review*, *supra* note 9 at 31-32.

218 BWMC, *supra* note 1.

CHAPTER 4: INTERNATIONAL LEGAL REGIME FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS

4.1 INTRODUCTION

Chapter 3 outlined the pre-2004 international instruments adopted to combat harmful aquatic organisms and pathogens (HAOP) transferred through ships' ballast water and sediments. As discussed in Chapter 3, while there were general obligations to take actions in the *United Nations Convention on the Law of the Sea,* 1982 (LOSC),[1] and the *Convention on Biological Diversity,* 1992 (CBD)[2] other than *International Health Regulations,* 1969 (IHR),[3] there were no binding instruments that specifically targeted ships' ballast water and sediments as a vector for the transfer of HAOP. The Guidelines that were adopted by the IMO were implemented in various ways in different countries.[4] Consequently, there was a need "[t]o have a standardized, international regime to control ballast water … [by way of] a treaty."[5]

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1 *United Nations Convention on the Law of the Sea*, 10 December, 1982, 1833 U.N.T.S. 3,[hereinafter LOSC].

2 *Convention on Biological Diversity of the United Nations Conference on the Environment and Development*, 5 June 1992, 31 I.L.M.818, [hereinafter CBD].

3 *International Health Regulations*, 1969 as amended by *International Health Regulations*, 2005, 2nd ed., (Switzerland, World Health Organization 2008), online: http://whqlibdoc.who.int/publications/2008/9789241580410_eng.pdf accessed on April 16, 2011.

4 See *International Convention for the Control and Management of Ship's Ballast Water and Sediments*, IMO Doc. BMW/CONF/36, 16 February 2004, [hereinafter BWMC] at preamble.

5 *IMO Mulling Treaty to Control Ballast Water in Cargo Ships,* Kyodo News International, quoted in Sarah McGee, "Proposals for Ballast Water Regulation: Biosecurity in an Insecure World" (2002) 13 Colo J Int'l Envtl L & Pol'y 141 at 153.

In 1999, the Ballast Water Working Group of the Marine Environment Protection Committee (MEPC) began to draft a new treaty for this purpose.[6] The impacts of the problem and the need for a mandatory legal framework under which the transfer of HAOP through ships' ballast water must be handled is a concern, even after the commencement of the draft. In this regard, MEPC observed that: "the effects [of invasive species] in the waters of Australia, Canada and United States as well as the Black Sea have been devastating."[7] IMO's alarm is reflected also in its admission that "the rate of bio-invasions is continuing to increase at an alarming rate, in many cases exponentially, and new areas are being invaded all the time."[8]

Prior to the adoption of the *International Convention for the Control and Management of Ships' Ballast Water and Sediments*, 2004 (BWMC),[9] the questions had been whether the obligations envisaged should be promulgated as a new annex to the *International Convention for the Prevention of Pollution from Ships*, 1973/78 (MARPOL 73/78)[10] as a complement to existing international standards on shipping regulation. It

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6 Tony George Puthucherril, "Ballast Waters and Aquatic Invasive Species: A Model for India" (2008) 19 Colo J Int'l Envtl L & Pol'y 381 at 394.

7 Marine Environment Protection Committee (MEPC), 49th session: 14-18 July 2003, online: http://www5.imo.org/SharePoint/mainframe.asp?topic_id=109&doc_id=2798 accessed on April 10, 2011.

8 IMO GloBallast Programme, "Ballast Water Management", online: http://www5.imo.org/SharePoint/mainframe.asp?topic_id=548 accessed on April 10, 2011. See also David Ciesla, "Developments in Vessel-Based Pollution: The International Organization's Ballast Water Convention and the European Union's Regulation to Phase Out Single-Hull Oil Tankers", (2004) 15 Colo J Int'l Envtl L & Pol'y 107 at 109. Recent studies indicate that this trend continues. See IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, 15 July 2011 at 11. See also IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/15, 6 May 2011at 1. Online: http://www.amtcc.com/imosite/meetings/IMOMeeting2011/MEPC62/MEPC%2062-2-15.pdf accessed on August 6, 2011.

9 BWMC, *supra* note 4.

10 *International Convention for the Prevention of Pollution from Ships,* 2 November 1973, 1340 U.N.T.S. 184 [MARPOL 1973], *Protocol of 1978 Relating to the International Convention for*

was thought that including ballast water and sediments discharge duties in an annex to MARPOL would make national implementation of the legislative and institutional frameworks easier for domestic initiatives to absorb. This was why the preamble to Resolution A.868(20) asked MEPC "to work towards the completion of legally binding provisions on ballast water management in the form of a new Annex to MARPOL 73/78, together with guidelines for their uniform and effective implementation with a view to their consideration and adoption in the year 2000."[11]

However, the extent to which an annex to MARPOL 73/78 would facilitate the implementation of the obligations to address the problem of HAOP was debated. Prior to the adoption of BWMC, McConnell, for instance, thought that "[i]f it was an annex to MARPOL then national level legislative implementation would be simplified, at least with respect to administrative placement and adoption of regulations."[12] However, Rolim, post facto, held the view that a new regime to regulate ships' ballast water was the right strategy, rather than include it under MARPOL. Her justification is that "the impact of alien invasive species on the oceans differs substantially from oil pollution and special methods are required to prevent biopollution of the marine environment."[13] In any case, the regulations regarding minimizing the risk of HAOP transfer by ballast water and

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the Prevention of Pollution from Ships of 1973, 17 February 1978, 1340 U.N.T.S. 61 [MARPOL 73/78].

11 IMO Resolution A.868(20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*, 27 November 1997, online: http://globallast.imo.org/resolution.htm par. 4, accessed on April 21, 2011.

12 Moira McConnell, *GloBallast Legislative Review: Final Report* GloBallast Monograph, Series No. 1 (London: IMO, 2002) at 32.

13 Helen Fonseca de Souza Rolim, *The International Law on Ballast Water: Preventing Biopollution* (Leiden, Boston: Martinus Nijhoff Publishers, 2008) at 53.

sediments were adopted, not as an annex to MARPOL, but in the form of a new Convention, the BWMC.

As at August 2011, the Convention has not come into force.[14] As at July 31, 2011, 28 States have ratified the Convention. This represents 25.43% world merchant shipping tonnage.[15] However, the provisions of the BWMC and the Regulations annexed to it represent the current international legislation regarding the control, prevention and eradication of HAOP introduced through ships' ballast water and sediments. The analysis of BWMC consider, among others, the role of States in achieving its objectives, and the potential effectiveness of the mechanisms it provides for combating the threat and spread of HAOP through ballast water and sediments.

4.2 INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

4.2.1 OVERVIEW

The BWMC builds upon the various instruments adopted by IMO to combat the menace of HAOP. In particular, majority of the provisions of the Resolution A.868(20) serve as the foundation of its provisions. It also constitutes implementation of the general obligations in the LOSC and CBD. The objectives of the BWMC are:

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[14] IMO, "Status of Conventions" online: http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx accessed on August 8, 2011. Its present status is against the required number of not less than 30 states, representing 35% or more of the world merchant shipping tonnage to bring it into force.

[15] IMO, "Status of Conventions", *ibid.*

> to prevent, minimize, and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of Ships' Ballast Water and Sediments as well as to avoid unwanted side-effects from that control and to encourage developments in related knowledge and technology.[16]

Divided into three parts, the Convention contains twenty-two Articles comprising of definitions and overarching general obligations to flag and coastal/port States. Its Annex sets out the more detailed technical Regulations for the control and management of ships' ballast water and sediments. The Annex is divided into five Sections. Section A contains the general provisions under which various terms are defined. Section B regulates management and control requirements for ships, while Section C makes provisions for special requirements in certain areas. Section D establishes standards for ballast water management and Section E makes provisions for survey and certification requirements for ballast water management. The last part of the Convention is the Appendices which contain specimens of an International Ballast Water Certificate, and a Ballast Water Record Book. The Annex and the appendices are "an integral part of [the] Convention."[17]

In addition to the three segments of the Convention is seventeen Guidelines which are foreseen.[18] The Guidelines are not mandatory, but provide technical guidance to aid implementation of the Convention. Fifteen of these Guidelines have been adopted thus far.[19] The adopted Guidelines deal with the following matters: Guidelines for Sediment

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16 BWMC, *supra* note 4, at preamble.

17 BWMC, *ibid,* art. 2(2).

18 The Guidelines are not an Annex to the Convention.

19 GloBallast Partnerships, "The IMO Technical Guidelines" online: http://globallast.imo.org/index.asp?page=resolution.htm. See also IMO, "BWM FAQ" online: http://www.imo.org/OurWork/Environment/BallastWaterManagement/Pages/BWMFAQ.aspx#2 accessed on July 2, 2011.

Reception Facilities (G1);[20] Guidelines for Ballast Water Sampling (G2);[21] Guidelines for Ballast Water Management Equivalent Compliance (G3);[22] Guidelines for Ballast Water Management and Development of Ballast Water Management Plans (G4);[23] Guidelines for Ballast Water Reception Facilities (G5);[24] Guidelines for Ballast Water Exchange (G6);[25] and Guidelines for Risk Assessment under Regulation A-4 of the BWM Convention (G7).[26]

Other matters of which Guidelines have been adopted are: Guidelines for Approval of Ballast Water Management Systems (G8);[27] Procedure for Approval of Ballast Water Management Systems that make Use of Active Substances (G9);[28] Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes (G10);[29] Guidelines for Ballast Water Exchange Design and Construction Standards (G11);[30] Guidelines on Design and Construction to Facilitate Sediment Control

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20 *Guidelines for Sediment Reception Facilities* (G1) adopted by Resolution MEPC. 152(55) on 13 October 2006.

21 *Guidelines for Ballast Water Sampling* (G2) adopted by Resolution MEPC.173(58) on 10 October 2008.

22 *Guidelines for Ballast Water Management Equivalent Compliance* (G3) adopted by Resolution MEPC 123(53) on 22 July 2005.

23 *Guidelines for Ballast Water Management and Development of Ballast Water Management Plans* (G4) adopted by Resolution MEPC.127(53) on 22 July 2005.

24 *Guidelines for Ballast Water Reception Facilities* (G5) adopted by Resolution MEPC. 153(55) on 13 October 2006.

25 *Guidelines for Ballast Water Exchange* (G6) adopted by Resolution MEPC.124(53) on 22 July 2005.

26 *Guidelines for Risk Assessment under Regulation A-4 of the BWM Convention* (G7) adopted by Resolution MEPC. 162(56) on 13 July 2007.

27 *Guidelines for Approval of Ballast Water Management Systems* (G8) adopted by Resolution MEPC. 125(53) on 22 July 2005.

28 *Procedure for Approval of Ballast Water Management Systems that make Use of Active Substances* (G9) adopted by Resolution MEPC.126(53) on 22 July 2005.

29 *Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes* (G10) adopted by Resolution MEPC.140(54) on 24 March 2006.

30 *Guidelines for Ballast Water Exchange Design and Construction Standards* (G11) adopted by Resolution MEPC.149(55) on 13 October 2006.

on Ships (G12);[31] Guidelines for Additional Measures Regarding Ballast Water Management Including Emergency Situations (G13);[32] Guidelines on Designation of Areas for Ballast Water Exchange (G14);[33] and Guidelines for Ballast Water Exchange in the Antarctic Treaty Area.[34] Two more Guidelines are in development.[35] These are: Survey Guidelines for the Purpose of BWM Convention, and Guidelines on PSC under the BWM Convention.

The BWMC will enter into force twelve months after the date on which not less than thirty (30) States representing thirty-five percent of the gross tonnage of the world's merchant shipping" have unreservedly become party to it.[36] As at July 31, 2011, 28 States have ratified the Convention. This represents 25.43% world merchant shipping tonnage.[37] This means in essence, that the Convention is yet to come into force. As noted in Chapter 3, while many States have taken steps to implement the Guidelines in the Resolutions, the specific approach and standards of the BWMC requires that 30 States, as noted above, ratify in order to bring it into force and to achieve the objective to combat HAOP transferred through ships' ballast water. The non-coming into force of the Convention, stemming out of failure of States to ratify, despite all efforts geared towards its

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31 *Guidelines on Design and Construction to Facilitate Sediment Control on Ships* (G12) adopted by Resolution MEPC.150(55) on 13 October 2006.

32 *Guidelines for Additional Measures Regarding Ballast Water Management Including Emergency Situations* (G13) adopted by Resolution MEPC.161(56) on 13 July 2007.

33 *Guidelines on Designation of Areas for Ballast Water Exchange* (G14) adopted by Resolution MEPC. 151(55) on 13 October 2006.

34 *Guidelines for Ballast Water Exchange in the Antarctic Treaty Area* adopted by Resolution MEPC. 163(56) on 13 July 2007.

35 GloBallast Partnerships, "The IMO Technical Guidelines", *supra* note 19

36 BWMC, *supra* note 4, art. 18.

37 IMO, "Status of Conventions" online: http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx accessed on August 6, 2011. Its present status is against the required number of not less than 30 States, representing 35% or more of the world merchant shipping tonnage to bring it into force.

ratification, such as the establishment of GloBallast Partnerships and numerous Guidelines developed by them[38] to assist States "in their efforts to ratify and implement the Convention in a timely manner"[39] is of great concern, even to the IMO. In this regard, it calls on States that have not ratified it "to do so at their earliest convenience,"[40] as prompt ratification and implementation of the Convention is needed to prevent the further spread of HAOP transferred through ships' ballast water and sediments.[41]

At present, parties to the BWMC are: Albania, Antigua &Barbuda, Barbados, Brazil, Canada, Cook Islands, Croatia, Egypt, France, Islamic Republic of Iran, Kenya, Kiribati, and Lesotho Others are: Malaysia, Maldives, Marshall Island, Mexico, Netherlands, Nigeria, Norway, Republic of Korea, Saint Kitts and Nevis, Sierra Leone, South Africa, Spain, Sweden, Syrian Arab Republic and Tuvalu.[42] The non-ratification by States may be connected *inter alia*, to the complexity of the Guidelines.

4.2.2 THE ARTICLES OF THE CONVENTION

As noted earlier, the Convention is divided into the Article, Annex and Appendices. The Article contains twenty-two Articles setting out overarching obligations of the flag and port/coastal States. The articles also stipulate the ships to which the

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38 Such as GloBallast Publications, Monographs etc., published by GloBallast Programme and GloBallast Partnerships.

39 GloBallast Partnerships, *Economic Assessments for Ballast Water Management: A Guideline* GloBallast Monographs No.19 (London, UK and IUCN, Gland, Switzerland: GEF-UNDP-IMO GloBallast Partnerships and IUCN, 2010) at 1. Online: http://globallast.imo.org/Monograph_19_Economic_Assesment_web.pdf.

40 See IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/15, 6 May 2011, *supra* note 8 at par. 3.See also IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session", *supra* note 8 at item 2.23

41 *ibid.*

42 IMO, "Status of Conventions", *supra* note 37.

Convention applies, the mechanisms for the settlement of disputes between parties and the procedures for the amendment of the Convention. These are discussed next.

4.2.2.1 Application of the Convention

When the Convention comes into force, it will not regulate all types of ships. Generally, the Convention will apply to flag ships of a State party and ships that are not entitled to fly the flag of a Party, but operate under the authority of a party.[43] According to the Convention, a ship means "a vessel of any type whatsoever operating in the aquatic environment and includes submersibles, floating platforms, FSUs and FPSOs."[44] The provisions of the Convention also apply to ships of non-parties to the Convention as "no more favourable treatment is given to such ships"[45] while at the ports of State parties. Thus, where the ship of a non-party State voyages to the port of a party to the Convention, it shall be subject to examination in accordance with the Convention. When it does not comply with the requirements, sanction may be applied.

Some ships are exempt from the application of the Convention.[46] First are those that are not designed or constructed to carry ballast water. These ships are known as "No Ballast On Board (NOBOB) ships."[47] Second are ships with permanent ballast water in sealed tanks which are not subject to discharge, The third category of exempted ships are warships, naval auxiliaries or other ships owned or operated by a State and used, for the

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43 BWMC, *supra* note 4, art. 3(1)
44 BWMC, *ibid*, art. 1(12).
45 BWMC, *ibid*, art. 3(3)
46 BWMC, *ibid*, see *generally*, art. 3(2)
47 Hereinafter referred to as "NOBOB Ships"

time being only on government non-commercial service. The fourth category of exempt ships are those that "do not cross borders between different countries."[48]

There are three types of ships under the fourth category. First, ships which only operate in waters under coastal/port State jurisdiction. These ships are known as coastal trading ships. They would be regulated under national law and standards since they may be in the same ecosystem. Although they may be regulated under national law, the issue however, relates to the problem of movement of organisms, which may be harmful within such State. Second, ships of State party which only operate in waters under the jurisdiction of another State party but subject to the authorization of the latter for exemption. Where the exemption is not granted, the flag State of the ship concerned must be notified. Third are ships which only operate in waters under the jurisdiction of a State party and on the high seas, except a ship that has been denied authorization by another party. However, where a State exercises the option to exempt any of the three types of ships, the environment, property, and human health of the State party or those of adjacent or other States must be taken into consideration in order to avoid damage or injury.[49]

Apart from the above exceptions, each party has authority in waters under its jurisdiction to grant any exemption under the Convention in respect of any additional measures and standards it applies regarding the application of ballast water management requirements. This exemption is however subject to certain conditions. First, it applies to a ship or ships which operate exclusively or on (a) voyage (s) between specified ports or

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48 Michael Tsimplis, "Alien Species Stay Home: The International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004" (2004) 19:4 Int'l J Mar & Coast L 411 at 419.

49 BWMC, *supra* note 4, art. 2(7).

locations. Second, exemptions are granted to ships that do not mix ballast water or sediments other than between these specified ports and locations. Third, the exemptions will be effective for a period of five years or less but subject to review.[50] Aside from the application of the Convention to the categories of ships mentioned above and its exemption of some ships, there are obligations that are imposed on States to actualize the prevention and ultimate eradication of HAOP and its transfer from region to region.

4.2.2.2 General Obligations of Parties

The Convention imposes various obligations on States in their capacity as both flag States and coastal/port States. These range from the provision of reception facilities in ports, to surveying and certification of ships by flag States "to prevent, minimize and ultimately eliminate"[51] the danger posed by HAOP transported through ships' ballast water from one State to another State.[52] These obligations are specified for States in terms of their status as coastal/port and flag States and/or in all these roles. There are some that are directed to States, flag and port /coastal States, while there are also some obligations separately directed to either flag States or port/coastal States.

(i) Obligations of Parties as Flag and Coastal/Port States

To combat the transfer of HAOP through ships' ballast water and sediments, the Convention stipulates the ballast water management (BWM) to be adopted by States.

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50 *Regulation for the Control and Management of Ships' Ballast Water and Sediments 2004 made under* BWMC, *supra* note 4, reg. A-4.1 to 4. [Hereinafter referred to as Regulations].

51 BWMC, *supra* note 4, the preamble.

52 See, Jeremy Firestone & James J. Corbett, "Coastal and Port Environments: International Legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species" (Fall 2006) 7:1 Sustainable Developmental Law and Policy 45 at 46. See also Cory Hebert, "Ballast Water Management: Federal, States, and International Regulations" (2009-2010) 37:2 SUL Rev 315 at 346.

Ballast water management is defined as "mechanical, physical, chemical, and biological processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of Harmful Aquatic Organisms and Pathogens within Ballast Water and Sediments".[53] To avoid adverse impact from the management techniques, both port and flag State parties must ensure that BWM do not impair, damage or cause greater harm than they prevent to the environment, property and human health to themselves or other States.[54] They must also continually develop ballast water and sediment management practices and standards for the purpose of combating the transfer of HAOP through them.[55]

Co-operation is mandated among parties to ensure effective implementation, compliance and enforcement of the Convention.[56] This means also that they must collaborate under the auspices of IMO to address the threats and risks from HAOP as they affect the marine ecosystem and biodiversity within and beyond the limits of their national jurisdictions.[57] When exercising their rights and obligations to enforce the Convention, including survey and certification, port and the flag States must endeavour "to avoid a ship being unduly detained or delayed."[58] Where there is any delay, compensation must be paid for any loss or damage occasioned.[59]

The Convention requires that assistance in terms of technical and technological support be given to less capable States to facilitate implementation. Thus, States must

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53 BWMC, *supra* note 4, art. 1(3).
54 BWMC, *ibid*, art. 2(6) and (7).
55 BWMC, *ibid*, art. 2(5).
56 BWMC, *ibid*, art. 2(4).
57 BWMC, *ibid*, art. 2(9).
58 BWMC, *ibid*, art. 12(1).
59 BWMC, *ibid*, art. 12(2).

provide support to parties that request technical assistance to train personnel. They must be willing to initiate joint research and development programmes with them and make available to them relevant technology, equipment and infrastructures with the aim to enhance effective implementation of the Convention.[60] Technical assistance may either be rendered directly or through IMO and other international bodies. Parties are also required to promote scientific and technical research, individually or jointly, on ballast water management, and also to monitor the effectiveness and adverse impacts of the adopted ballast water management technology and impacts caused by the organisms and pathogens identified as having being transported through ships' ballast water.[61] The results of the research and monitoring should be made available to other parties upon request.[62]

Though technology transfer via co-operation to control and manage ships' ballast water and sediments must have regard to each party's national laws, policies and regulations on the subject,[63] it is required, in particular, of parties bordering enclosed and semi-enclosed seas, to co-operate regionally through agreements to develop harmonized procedures to combat the transport of HAOP through ships' ballast water.[64] With provisions for technical assistance, regional co-operation, research and monitoring among parties, new invasion of HAOP may be prevented and the established ones may be eliminated in due time.

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60 BWMC, *ibid*, art. 13.
61 BWMC, *ibid*, art. 6(1).
62 BWMC, *ibid*, art. 6(2).
63 BWMC, *ibid*, art. 13(2).
64 BWMC, *ibid*, art. 13(3).

(ii) Obligations of Port State

A port State party is obliged to make provision for adequate facilities for the reception of sediments in the ports and terminals it designates for the cleaning or repair of ballast tanks. In this instance, it must take into account the *Guidelines for Sediment Reception Facilities*[65] adopted by IMO, and it must not cause undue delay to ships in this matter.[66] The reception facilities must facilitate safe disposal of sediments to prevent negative impacts on the environment, human health, property or resources of the port State and other States.[67] Where the facilities are inadequate, this must be notified to IMO for onward transmission to other parties concerned.[68] It must be noted however that the obligation is for port State to establish reception facilities where cleaning or repair of ballast tanks occurs, and not full sediment reception facilities.[69] In developing national policies and strategies for ballast water management, a port State is required to have due regard to its particular conditions and capabilities without loosing sight of ensuring attainment of the objectives of the Convention.[70]

The port State has the right to inspect ships, entering its port, to which the Convention, applies, to determine whether ships are in compliance with the requirements of the Convention.[71] The rights are exercised by the port State control officer (PSCO). Inspections of a ship are limited to verifying that the ship has on board a valid BWM certificate. The PSCO can also inspect the ship's ballast water record book, and sample

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65 Resolution MEPC.152(55), *Guidelines for Sediments Reception Facilities (G1)*, *supra* note 20.
66 BWMC, *supra* note 4, art. 5(1).
67 BWMC, *ibid*, art. 5(1).
68 BWMC, *ibid*, art. 5(2).
69 See also GloBallast Partnerships, *Economic Assessments for Ballast Water Management: A Guideline*, *supra* note 39 at 16.
70 BWMC, *supra* note 4, art. 4(2).
71 BWMC, *ibid*, art. 9(1).

its ballast water in accordance with Resolution MEPC.173(58)[72] developed by IMO.[73] Where a ship does not possess a valid certificate or where there are "clear grounds" for believing that the condition of the ship or its equipment do not conform to the particulars of the certificate, or that the master or the crew of the ship do not conform with essential shipboard procedures regarding ballast water management, or where such procedures have not been implemented, then a detailed inspection may be carried out by the PSCO. These are all well-established practices under other IMO Conventions dealing with ship safety security and protection of marine environment. In this instance, the PSCO must take all steps to avoid the ship discharging ballast water until it can do so without presenting a threat of harm to human health and the biosphere.[74]

As is the usual practice regarding PSC, there is no compulsion on the inspecting party to carry out a PSC on ships. The discretion so allowed under the BWMC reiterates the relevant provision of LOSC which says that:

> [a]ny physical inspection of a foreign vessel shall be limited to an examination of such certificates, records or other documents as the vessel is required to carry by generally accepted international rules and standards … further physical inspection of the vessel may be undertaken after such an examination and only when:
>
> (i) There are clear grounds for believing that the condition of the vessel or its equipment does not correspond substantially with the particulars of those documents;
> (ii) The contents of such documents are not sufficient to confirm or verify a suspected violation; or
> (iii) The vessel is not carrying valid certificates and records.[75]

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72 Resolution MEPC.173(58), *Guidelines for Ballast Water Sampling (G2)*, *supra* note 21
73 BWMC, *supra* note 4, art. 9(1).
74 BWMC, *ibid*, art. 9(2) and (3).
75 LOSC, *supra* note 1, art. 226(1).

Under both the BWMC and LOSC, the physical inspection procedure undertaken by the port State must not cause undue delay for the movement or departure of the ship.[76]

The PSCO may also inspect a ship at the request of another State that has sufficient evidence that a ship is operating or has operated in violation of a provision of the Convention. If a sampling of the ship's ballast water leads to a result or supports the information received from the requesting State party to the effect that the ship poses a threat, the port State within which the ship is operating shall prohibit the ship from discharging ballast water until the threat is removed.[77] The report of the investigation shall be sent to both the party requesting it and the flag State of the ship for proper action to be taken.[78] But, generally when an inspection is conducted which indicates a violation of the Convention, it is mandatory that the ship be notified of the violation and a report forwarded to the flag State's administration with evidence regarding the violation. [79]

Aside from inspecting ships, the Convention also authorizes the port State to sanction for violation of the requirements of the Convention within the jurisdiction of a coastal State party. The requirements established under its national law. Thus, violations of ballast water management and standards may be sanctioned and penalized by the port State. When violation occurs, the port State may either institute proceedings in accordance with its national law or furnish the flag State of the ship information and evidence indicating that violation has occurred.[80]

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[76] See, BWMC, *supra* note 4, art. 9(1)(c). See also the LOSC, *ibid* , art. 226(1)(a).
[77] BWMC, *ibid*, art. 10(3).
[78] BWMC, *ibid*, art. 10(4).
[79] BWMC, *ibid*, art. 11(1).
[80] BWMC, *ibid*, art. 8(2).

Notwithstanding the provisions of the Convention regarding the two options opened up for coastal/port State to adopt against a ship that violates its laws, one basic fact is that when the ship in question belongs to a non-party to the Convention, the port/coastal State party has the right to institute proceedings in accordance with its national law. Also, it is more appropriate to hold that where a port State applies additional measures,[81]any violations of such measures by a ship must be sanctioned by the port/coastal State. Otherwise, the essence of adopting the additional measures by the port State will be undermined.[82]

Beyond the foregoing, a port State may also warn, detain or exclude a ship for violating any of the provisions of the Convention. It may also permit a ship to leave its port or offshore terminal to discharge its ballast water or proceed to a reception facility or nearest repair yard, provided doing so will not endanger human health, property, resources or the biosphere.[83]

Where any action is taken by an authorized PSCO carrying out inspection on a ship, the officer must inform the flag State administration in writing about the action. When this is impossible, the consul or diplomatic representative of the ship shall be informed of all the circumstances in which the action taken was deemed necessary. The organization responsible for the issue of certificates shall also be notified.[84] Where the port State concerned is unable to take action or the ship has been allowed to proceed to

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81 The additional measures is provided for under the BWMC, *ibid*, art. 2(3) and BWMC Regulations, *supra* note 50, sec. C

82 Tsimplis, "Alien Species Stay Home: The International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004", *supra* note 48 at 420.

83 BWMC, *supra* note 4, art. 10(2).

84 BWMC, *ibid*, art. 11(2).

the next port of call, the port State shall notify the next port of call, in addition to the flag State Administration of the ship concerned, or the consul or diplomatic representatives, as well as the body authorised to issue certificate, of all relevant information about the violation.[85]

As pointed out by Tsimplis, it is unclear from the Convention whether the notification to the next port of call should be made whether or not the next port of call is a State party to the Convention.[86] Notification should however be made to the first port of call which is a State party to the Convention since the Convention binds only State parties to it, although as a result of the no more favourable treatment provision,[87] the ships of both parties and non-parties are subject to ballast water management and control requirements when at ports belonging to State parties.[88]

(iii) Obligations of Flag State

Flag States must, first, encourage ships to which the Convention applies, to avoid, as far as practicable, the uptake of ballast water and sediments with potential HAOP.[89] They must require that those ships comply with the requirements of the Convention, including applicable standards and requirements under the Annex to the Convention.[90] The Convention also requires that flag State must "take effective measures to ensure that

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85 BWMC, *ibid*, art. 11(3).

86 Tsimplis, "Alien Species Stay Home: The International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004", *supra,* note 48 at 422.

87 See BWMC, *supra* note 4, art. 3(3).

88 If notification is given to the next port of call that is not a party to the Convention, it may or may not enforce the requirements. It may not even pass on the information regarding its inability to enforce the requirements of the Convention to the next port State which may be a party to the Convention. On the other hand, when notification is given to the first port of call which is a State party to the Convention, it is likely to enforce the Convention, and this will enhance the prospect of achieving its goals against the spread of HAOP through ships' ballast water and sediments.

89 BWMC, *supra* note 4, art. 2(8).

90 BWMC, *ibid*, art. 4(1).

those ships comply with those requirements."[91] It is their duty to make sure that ships flying their flags or operating under their authority and are subject to survey and certification are so surveyed and certified.[92]

The flag State must prohibit and respond to any violation of the Convention wherever the violation occurs.[93] The sanctions provided under its laws must be adequate in severity to discourage violations.[94] When a violation is reported by a port State, the flag State is required to investigate the matter and request the port State to furnish additional evidence of alleged violation. If the administration is satisfied that there exists sufficient evidence to warrant proceedings in respect of the alleged violation, "*it shall cause such proceedings to be taken as soon possible*, *in accordance with its law*"[95] It must also inform the port State upon whose evidence it may have instituted proceedings, and IMO, of the action it took.

In the event that a flag State fails to take any action within one year of receiving the information from the port State, it must notify the port State that reported the violation.[96] One year grace period to allow flag State to take action before notifying the port State of its failure to respond is an element which may reduce the tendency of actualizing the aim of the Convention. Although the port State may choose to cause proceedings to be taken under its law,[97] where it fails to exercise this option and decides

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91 *Ibid.*
92 BWMC, *ibid*, art. 7(1).
93 BWMC, *ibid*, art. 8(1).
94 BWMC, *ibid*, art. 8(3).
95 Emphasis supplied. See, BWMC, *ibid*, art. 8(1).
96 BWMC, *ibid*, *art*. 8(1).
97 BWMC, *ibid*, art. 8(2)(a).

to report the violation to the flag State,[98] failure of the flag State to take action will adversely impact action to be taken by the port State. For example, circumstantial evidence which may aid the port State to institute proceedings against the erring ship may have been lost. Likewise, the ship may have ceased to operate again. When a flag State chooses to enforce the obligations imposed on it under Article 8 to sanction an erring ship, like a port State, the flag State may warn, detain, or exclude any ship detected to have violated any of the provisions of the Convention.[99] As in the case of PSC, all possible efforts should be made to avoid undue delay.[100]

4.2.2.3 Dispute Settlement

The BWMC stipulates various ways in which disputes among its parties may be settled. Hence, when there is any dispute regarding the interpretation or application of the Convention, the dispute is to be settled by "negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, or by resort to regional agencies or arrangements or other peaceful means of parties' choice."[101] Disputes may also arise on issues of international law, and in particular between the flag and port/coastal States regarding the enforcement of the Convention.

4.2.2.4 Amendment of the Convention

The BWMC also contains standard IMO provisions in relation to amendment procedures. There will be a need to amend the Convention, in particular, the Annex to take account of technological and methodological advances. The provisions of the

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98 BWMC, *ibid*, art. 8(2)(b).
99 BWMC, *ibid*, see *generally*, *art*. 10(2).
100 BWMC, *ibid*, art. 12(1).
101 BWMC, *ibid*, art. 15.

Convention for continual research on technological and methodological methods of improving the present techniques laid down by the Convention as well as suggestions from scholars to combat the transport of HAOP through ships' ballast water may in future predicate the necessity for the amendment of the Convention, more technical provisions in the Annex (the Regulations). The procedures for the amendment, as many other IMO Conventions draw a distinction between amendment of the Articles and the Regulations in the Annex.[102] The provisions relating to amendment procedures stipulate two processes. One process is by the Committee.[103] The other process is by conference of parties.[104]

4.2.2.5 Conclusion on the Articles

The rights and obligations of flag and port/coastal State as set out under the Articles of the Convention are encompassing provisions towards achieving the objective of combating the threat posed by HAOP and its transportation through ships' ballast water and sediments. This objective can however be realized when all States perform their duties accordingly. The flag States must regulate ships flying their flags and ensure their compliance with the provisions of the Convention. Also, the port/coastal States must exercise their PSC positively to enhance the protection of their marine ecosystems, environments and biodiversity. By this, the transfer of HAOP into coastal waters and adverse impact of HAOP within marine environment may be avoided. The objectives "to prevent, minimize and ultimately eliminate"[105] the danger posed by HAOP requires that

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102 BWMC, *ibid*,, art. 19(2)(e)and (f).
103 BWMC, *ibid*, see *generally*, art. 19(2).
104 BWMC, *ibid*, see *generally*, art. 19(3).
105 BWMC, *ibid* 4, at preamble.

flag States prohibit the violation and ensure implementation of the Convention. Similarly, coastal/port States need to take steps to identify discharge areas as having HAOP in the water that may pose risks if taken up by ships. Establishing efficient and reliable inspection system in PSC are also key elements.

The first part of the Convention, the Articles deal with the application and obligations of State parties. The Annex, containing the Regulations made under the Convention set out the key requirements and mechanisms by which to apply and implement the Convention. Its requirements, which are imposed on both flag and port States, include the need to have a ballast water management plan, surveying and certification of ships, sediments management, ballast water management, additional measures for certain areas for the purpose of combating the transfer of HAOP transported through ships' ballast water and sediments from one coastal State to another coastal State.[106] The provisions of the Regulations are analyzed next.

[106] See, Firestone and Corbett, "Coastal and Port Environments: International Legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species", *supra* note 52 at 46. See also Cory Hebert, "Ballast Water Management: Federal, States, and International Regulations", *supra* note 52 at 346.

4.3 THE ANNEX TO THE BWMC: THE REGULATIONS FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS

4.3.1 INTRODUCTION

As set out in the overview, the Regulations set out in the Annex to the Convention are meant to ensure the successful implementation of the Convention. As noted earlier, the Regulations are contained under five Sections, A to E. Section A deals with general provisions regarding the definition of terms and applicability. Section B is on management and control requirements for ships, while section C addresses special requirements in certain areas. Section D is on standards for ballast water management and Section E deals with survey and certification requirements for ballast water management. The five Sections are herein discussed.

4.3.2 SECTION A: GENERAL PROVISIONS

For the purpose of construing the provisions under the Regulations, Regulation A-1 defines some terms. These include anniversary date, which it defines as "the day and month of each year corresponding to the date of expiry of the certificate."[107] Under Article 1 of the Convention, certificate means "the International Ballast Water Management Certificate."[108] Ballast water capacity means "the total volumetric capacity of any tanks, spaces or compartments on a ship used for carrying, loading or discharging

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107 Regulations, *supra* note 50, reg. A-1.1.

108 BWMC, *supra* note 4, art. 1(4).

ballast water, including any multi-use tank, space or compartment designed to allow carriage of ballast water."[109] The same Regulation defines a company as "the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operating of the ship from the owner of the ship and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Safety Management Code."[110] "From the nearest land" in the Regulations means "the baseline from which the territorial sea of the territory in question is established in accordance with international law …."[111] Also, under the Regulations, active substance means "a substance or organism, including a virus or a fungus, that has a general or specific action on or against Harmful Aquatic Organisms and Pathogens."[112]

Regulation A-2 makes provision for the general applicability of the conduct of ballast water discharge, which must be "conducted through ballast water management in accordance with the provisions of [the Regulations, the] Annex."[113] However, Regulation A-3 stipulates the exceptions to the general application of requirements for ballast water management in accordance with the Annex, as well as exceptions for any additional standards adopted by a State under five situations.[114] First, where the uptake or discharge of ballast water and sediments is necessary for the purpose of saving the ship or saving life at sea. Second, where there is accidental discharge or ingress of ballast water and sediments as a result of damage to a ship or its equipment, provided that all reasonable

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109 Regulations, *supra* note 50, reg. A-1.2.
110 Regulations, *ibid*, reg. A-1.3.
111 Regulations, *ibid*, reg. A-1.6.
112 Regulations, *ibid*, reg. A-1.7.
113 Regulations, *ibid*, reg. A-2.
114 Regulations, *ibid*, reg. A-3.1 to A-3.5.

precautions are taken before and after the occurrence or discovery of the damage, so as to prevent or minimize the damage, and provided also that the owner, company or officer in charge have not wilfully or recklessly caused the damage.

Third, additional measures will not apply when the uptake and discharge of ballast water and sediments is being used to avoid or minimize pollution incidents from the ship. Fourth, the measures are inapplicable when high sea water is used to ballast a ship and such ballast is subsequently discharged back into the high sea. Finally, the measures are also inapplicable where discharge of ballast water and sediments from a ship occurs at the same location where the whole originated, provided that no mixing with unmanaged ones from other areas has occurred. Where mixing has occurred, the ballast water taken from the other area is subject to ballast water management in accordance with the Regulations.[115]

In the same vein, Regulation A-4 provides that a State, in waters under its jurisdiction, may grant exemptions to any requirements regarding its adopted additional measures and/or exempt ships from conducting ballast water management in accordance with the requirements of the Annex.[116] But, the exemptions are subject to some conditions.[117] First, exemptions may only be granted to ships which operate exclusively or on (a) voyage (s) between specified ports or locations. Second, they are granted to ships that do not mix ballast water or sediments other than between these ports and locations. Third, the exemptions will be effective for a period of five years or less but subject to review. The exemptions must be granted in accordance with the Guidelines on

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115 Regulations, *ibid*, see *generally*, reg. A-3.
116 Regulations, *ibid*, reg. A-4.1.
117 Regulations, *ibid*, see *generally,* reg. A-4.

risk assessment developed by IMO.[118] More so, the exemptions must be communicated to IMO and relevant information circulated to State parties. These exemptions must however not impair or cause damage to the "environment, human health, property or resources of adjacent other States."[119]

Regulation A-5 makes provision for "equivalent compliance with [the] Annex for pleasure craft that are used solely for recreation or competition or craft used primarily for search and rescue, less than 50 metres in length overall, and with a maximum ballast water capacity of 8 cubic metres."[120] The equivalent compliance of these crafts is to be determined by the flag State in accordance with the Guidelines developed by the IMO.[121]

4.3.3 SECTION B: MANAGEMENT AND CONTROL REQUIREMENTS FOR SHIPS

Section B of the Regulations establishes the basic management and control requirements for ships. The section makes provision for ballast water management plan and record book, ballast water exchange, ballast water and sediments management for ships.[122]

4.3.3.1 Ballast Water Management Plan and Record Book

Regulation B-1 mandates each ship to which the Convention applies to have on board and implement a ballast water management plan that must be approved by the flag

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118 *Guidelines for Risk Assessment under Regulation A-4 of the BWM Convention* (G7), *supra* note 26.

119 *Regulation*, *supra* note 50*,* reg. A-4.3.

120 Regulations, *ibid*, reg. A-5.

121 Guidelines for Ballast Water Management Equivalent Compliance (G3), *supra* note 22.

122 Regulations, *ibid*, see *generally,* section B.

States.[123] The plan must take into account guidelines developed by IMO.[124] There is no standardized ballast water management plan for all ships. Each ballast water management plan is specific to each ship and should minimally contain detailed safety procedures for the ship and crew, a detailed description of actions to be taken to implement ballast water management requirements, and detailed procedures for the disposal of sediments at sea and on shore. The management plan must also contain procedures for coordinating onboard ship ballast water management which involves discharge to the sea with the authorities of the State into whose waters such discharge will take place, the designated officers for proper implementation of the plan etc.[125] All officers and crew must, nevertheless, be familiar with their duties with the ballast water management plan particular to the ship on which they serve.[126]

Regulation B-2 requires that the ship must have on board a ballast water record book which may be an electronic record system, or integrated into another record book or system.[127] The entries in the record book are to be maintained on board the ship for a minimum of two years after the last entry was made. Thereafter, it must remain in the company's control[128] for a minimum period of three years or more[129]. It must be available for inspection by an officer duly authorized by a State party to inspect the book.[130] Although the form of the record book is flexible, the minimum content is set out in Appendix II which also contains a sample ballast water record book page. Mandatory

123 Regulations, *ibid*, reg. B-1.
124 *Guidelines for Ballast Water Management and Development of Ballast Water Management Plans* (G4)*, supra* note 23.
125 Regulations, *supra* note 50, see *generally*, reg. B-1.
126 Regulations, *ibid*, reg. B-6.
127 Regulations, *ibid*, reg. B-2.1.
128 See 4.3.2 above *Section A: General Provisions* for the definition of "Company".
129 Regulations, *ibid*, reg. B-2.2.
130 Regulations, *ibid*, reg. B-2.6.

information in a ballast water record book includes, name of the ship, its flag, IMO number, ballast water capacity and tonnage. It must also contain information on each operation concerning ballast water. When ballast water is discharged by ships that are exempted from the application of the Convention, or where the discharge is made into a reception facility,[131] or it is an accidental or exceptional discharge unauthorised by the Convention, the circumstances and reason for such discharge must be entered into the record book.[132] Each entry in the ballast water record book must be signed by the officer in charge of the operation and each completed page must be signed by the master of the ship.

The entries must be in the working language of the ship and where the language is not English, French or Spanish, the entries must contain a translation into one of those languages. But where there is dispute or discrepancy between the entries in ship's working language and the translated language, the former shall prevail.[133] Authorized officer in a port may either inspect the ballast water record book on board a ship or not and may make a copy of any entry. When the officers choose to make copy of the entry, the master of the ship must certify the copy as a true copy.[134]

4.3.3.2 Sediments Management for Ships

As part of the efforts to safeguard the ecosystem, all ships to which the Convention applies are also required to remove and dispose of sediments from spaces designed to carry ballast water. This must also be done in accordance with the approved

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131 Regulations, *ibid,* see *generally*, *reg*. A-3, A-4 and B-3.6 .
132 Regulations, *ibid*, see *generally*, reg. B-2.3.
133 Regulations, *ibid*, reg. B-2.5.
134 Regulations, *ibid*, reg. B-2.6.

ship's BWMP.[135] Also, all ships constructed in or after 2009 with ballast water capacity of less than 5,000 cubic metres or more should be designed and constructed to achieve three objectives. The first objective is to minimize the amount of sediments taken in and entrapped; second, to facilitate removal of sediments; and third, to provide safe access to allow for removal and sampling of sediments. These three objectives must be achieved without compromising operational efficiency and safety. The Convention also requires all ships constructed before 2009 to comply with these actions, if practicable.[136]

4.3.3.3 Ballast Water Management for Ships

Ballast water management comprises the techniques of preventing the introduction of HAOP. As discussed earlier under Article 1, ballast water management is defined as "mechanical, physical, chemical, and biological processes, either singularly or in combination, to remove, or render harmless, or avoid the uptake or discharge of Harmful Aquatic Organisms and Pathogens within Ballast Water and Sediments."[137] In essence, preventing the introduction of HAOP through ballast water management is more easily achieved than eradicating those organisms that have already established themselves within a marine ecosystem.[138] In the words of a commentator, "[w]e'll have to restructure our strategies to fight invaders that won't surrender and can't be defeated. That probably

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135 Regulations, *ibid*, reg. B-5.1.
136 Regulations, *ibid*, reg. B-5.2.
137 BWMC, *supra* note 4, art. 1(3).
138 GloBallast Partnerships, *Economic Assessment for Ballast Water Management: A Guideline, supra* note 39 at 1.

means keeping other potentially destructive exotics from entering the country in the first place. To the barricades!"[139]

To prevent introductions of HAOP, therefore, the discharge of ballast water has to be conducted through ballast water management in accordance with the requirements of the BWM Regulations, except where it is expressly provided otherwise.[140] The Convention does not mandate a particular technique and system, but, instead, establishes standards for management by either ballast water exchange standard or ballast water performance standard.[141] The former is based on IMO earlier Resolution A.868(20).[142] For this reason, conditions are set in place to guide the compliance of ships with ballast water management. In addition, the Convention contains provisions relating to phasing based on year of construction and also its ballast water capacity.[143] The ballast water performance standard is stricter than the ballast water exchange standard and the former is designed to gradually phase out the latter.[144]

When a ship is constructed before 2009, and having ballast water capacity between 1,500 and 5,000 cubic metres, it must conduct ballast water management in accordance with any of the two standards until 2014.Thereafter, it shall be left with only the ballast water performance standard to comply with. For ships constructed before

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139 John Ross, "An Aquatic Invader is Running Amok in U.S. Waterways" quoted in Jason R. Hamilton, "All Together Now: Legal Responses to the Introduction of Aquatic Nuisance Species in Washington Through Ballast Water" (2000) 75:1 Wash L Rev 251 at 258.

140 Regulations, *supra* note 50, reg. A-2.

141 Regulations, *ibid*, see *generally*, reg. D-1and D-2 .

142 IMO Resolution A.868(20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Organisms and Pathogens*, 27 November 1997, *supra* note 11.

143 Regulations, *supra* note 50, see *generally*, reg. B-3.

144 Norwegian submission BWM/CONF/21 referred to by Tsimplis, "Alien Species Stay Home", *supra* note 48 at 428.

2009, but with a ballast water capacity of less than 1,500 or greater than 5,000 cubic metres, they shall conduct ballast water management in accordance with any of the standards until 2016, after which time they must meet the ballast water performance standard. Also, ships constructed in or after 2009, but before 2012, with a ballast water capacity of 5,000 cubic metres or more, are allowed to conduct ballast water management in accordance with any of the standards until 2016, after which time they must meet the ballast water performance standard. [145] When a ship is constructed in or after 2009 with a ballast water capacity of less than 5,000 cubic metres, it must meet the ballast water performance standard. A ship constructed in or after 2012, having ballast water capacity of 5,000 cubic metres or more, is obliged to adopt the ballast water performance standard set out under Regulation D-2.[146]

4.3.3.4 Ballast Water Exchange

Many approaches were considered for the prevention of the transfer of HAOP. These include alternative "ballast water performance standard" (treatment methods), ballast water exchange, preventive and retention of ballast water on board the ship. Ballast water exchange approach is established under Regulations B-4 and must be implemented in accordance with the Guidelines adopted by the IMO for ballast water exchange.[147] This approach entails the exchange of coastal or fresh water ballast with open or high seas water before a ship arrives at its next port. The rationale behind this method is that "[b]allast water exchange removes organisms from a ship's ballast tanks by dilution and exposes freshwater organisms in the tanks to salt water, thereby killing

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145 Regulations, *supra* note 50, reg. B-3.1 and B-3.4 .

146 Regulations, *ibid*, reg. B-3.3 and 3.5 *respectively*.

147 *Guidelines for Ballast Water Exchange* (G6), *supra* note 25.

many of them."[148] In essence, once the ballast water in the ship's tank is exchanged with the open water,[149] the fresh water organisms in the ballast tanks are unlikely to survive. Likewise, once the ocean water is discharged into the coastal waters of the port State, the organisms that are taken in the ocean water will likely find the coastal water inhabitable.

The merit of this method of ballast water management is that freshwater organisms may be killed during the process, thus reducing their transfer into another marine ecosystem. This is because at least 95 percent of water in the ballast tank is replaced with an equal amount of open sea water. This removes any equal amount of onboard organisms by the dilution effect.[150] In addition, this is the most cost effective method for the ship administration or flag State. According to Hamilton, "[f]or some vessels the overall cost of at-sea ballast-water exchange, including equipment wear, fuel costs, crew time, crew fatigue, and transit delays, does not exceed acceptable expenses."[151]

Presently, ballast water exchange, in the absence of established scientific system is considered as an acceptable method of ballast water management. In fact, research conducted in the USA on introduction of aquatic species in Chesapeake Bay and St. Lawrence Seaway reveals that the number of aquatic species transferred through ballast

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148 National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species* (Washington, D.C. Transportation Research Board, 2008) at preface, 78.

149 Conducting ballast water exchange in an open water means "to conduct such ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth …." See Regulations, *ibid*, reg. B-4.1.

150 National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 148 at.78.

151 Hamilton, "All Together Now: Legal Responses to the Introduction of Aquatic Nuisance Species in Washington Through Ballast Water", *supra* note 139 at 259.

water reduced sharply because of ballast water exchange. The exchanges reduced residual coastal organisms to roughly 10% of the expected concentration.[152]

An instance of two bulkers that operated during the summer was given. One of them that did not conduct ballast water exchange had a record of 72,311,228 zooplankton per discharge of ballast water, while the other bulker that conducted ballast water exchange had the discharge of harmful aquatic organisms reduced to 7,231,122.8 zooplankton per discharge.[153] In situ studies have shown that ballast water exchange reduced both "diversity and abundance of freshwater invertebrates in ballast tanks" of ships traveling between the Great Lakes and Europe.[154] These examples would confirm that at present the viability of ballast water exchange as a mechanism for ballast water management under the BWMC cannot be easily discounted.

Recently, a proposal was made by the Department of Transport for the repeal of the current Canada *Ballast Water Control and Management Regulations*[155]and to adopt new rules to regulate the control and management of ships' ballast water and sediments. Even so, it is noteworthy that there will be "no substantive policy changes to the regulatory provisions" and ballast water exchange will still be identified "as the most

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152 Gregory M. Ruiz & David F. Reid, "Current State of Understanding About the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introduction to the Great Lake Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information" in Emily G. O'Sullivan, ed, *Ballast Water Management: Combating Aquatic Invaders*, (New York: Nova Science Publishers Inc. 2010) 25 at 126.

153 Ruiz & Reid, "Current State of Understanding About the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introduction to the Great Lake Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information", *ibid*, at 126.

154 D. K. Gray et al., referenced in National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, (Washington, D.C. Transportation Research Board, 2008) at 78 and 138. See also Sandra Ellis & Hugh J. MacIsaac, "Salinity Tolerance of Great Lakes Invader" (2009) 54 Freshwater Biology 77 at 77.

155 The Canada *Ballast Water Control and Management Regulations,* SOR/2006-129, June 28 2006, online: http://laws.justice.gc.ca/PDF/SOR-2006-129.pdf accessed on May 15, 2011.

effective method of controlling the potential of invasive species and pathogens from entering waters under Canadian jurisdiction."[156] Essentially, therefore, when the Convention comes into force, the mechanisms it puts in place for the control and management of ships' ballast water will remain useful to realizing its objective of combating the threat of the transfer of HAOP.

However, as explained earlier, this method is not perfect. First, it is unsafe for larger ships to exchange enough water on the high sea, except under calm sea conditions. As well, it is unsafe for ships in general to do so during stormy or rough seas. This is why the Convention provides that:

> "[a] ship conducting Ballast Water exchange shall not be required to comply … if the master reasonably decides that such exchange would threaten the safety or stability of the ship, its crew or its passengers because of adverse weather, ship design or stress, equipment failure or any other extraordinary condition.[157]

Other problems associated with ballast water exchange as a form of ballast water management is that organisms that tolerate different salinities may survive in the lower salinity of the ship's next port. This is because it is generally believed that when fresh port or coastal water is exchanged for saline ocean water, there is a tendency that HAOP will not be able to survive the exchanged ocean water in the ballast tank or sediments. But there are organisms with broad salinity tolerance that are likely to survive the ballast water exchange. Where these organisms are eventually discharged into the next port of call with lower salinity, on the belief by the port State that the ship conducted ballast

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156 See *generally,* Government of Canada, *Canada Gazette: Ballast Water Control and Management Regulations,* online: http://www.gazette.gc.ca/rp-pr/p1/2010/2010-12-18/html/reg4-eng.html#tphp accessed on March 30, 2011.

157 Regulations, *supra* note 50, reg. B-4.4.

water exchange in the open sea water, the salinity tolerant HAOP may survive and constitute a threat to the port State's marine ecosystems and biodiversity.[158]

The third problem associated with ballast water exchange is that flushing may be conducted ineffectively as a result of ship designs. This protects a sufficient number of surviving harmful organisms in sediments remaining in the ships' tanks which will invariably be discharged into the next port of call. Fourth, the system is only available for international shipping on a long voyage and at sufficient distance from the shore. Thus, this method is not applicable to coastal vessels that operate within domestic ports.

To sum up the efficacy of ballast water exchange, the research conducted by the Smithsonian Environmental Research Center holds that "[t]he available experimental data demonstrate a strong effect of BWE [ballast water exchange] on reducing abundance of coastal organisms. Despite the relatively high efficacy in removing initial plankton assemblages (average of 80-90%), it is also evident that some coastal organisms remain in ballast tanks following exchange…."[159]

It must be borne in mind that the use of ballast water is for the safety of life and property. Therefore, any method that must be used as ballast water management must also ensure that ship safety is not jeopardized. Thus, the requirements of the *International*

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158 See *generally,* Sandra Ellis & Hugh J. MacIsaac, "Salinity Tolerance of Great Lakes Invader" (2009) 54 Freshwater Biology 77 at 77, *supra* note 154.

159 Gregory M. Ruiz & David F. Reid, "Current State of Understanding About the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introduction to the Great Lake Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information" in O'Sullivan, eds, *Ballast Water Management: Combating Aquatic Invaders supra* note 152 at 38.

Convention for Safety of Life at Sea, 1974[160] and the *International Safety Management Code* (ISM Code)[161] must strictly be adhered to. These two Conventions provide for standards for safety and stability of ships.

To meet the standard set for ballast water exchange, certain conditions must be adhered to because there are restricted areas where ballast water exchange could take place. The ship must, whenever possible, conduct the exchange, at least, 200 nautical miles from the nearest land and in water, at least, 200 metres in depth taking into account the Guidelines[162] developed by the IMO.[163] This is the basic norm,[164] but where the ship is unable to discharge the ballast water in this mode, it shall do so, in all cases, at least 50 nautical miles from the nearest land and in water at least 200 metres in depth.[165] A ship should not be required to deviate from its intended voyage, or to delay its voyage, in order to comply with the discharge requirements.[166] In essence, a ship needs only to comply where it passes and stays at the specified distances/depths as part of its voyage. This has been the subject of criticism by Tsimplis who said that, "the purpose of this regulation is to improve on existing ballast water exchange practices and minimise the risks involved rather than establish a thorough and protective regime for the coastal waters."[167]

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

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

162 *Guidelines for Ballast Water Exchange (G6)*, *supra* note 25.

163 Regulations, *supra* note 50, sec. B, reg. B-4.1.1

164 Tsimplis, "Alien Species Stay Home", *supra* note 48 at 436.

165 Regulations, *supra* note 50, sec. B, reg. B-4.1.2.

166 Regulations, *ibid*, sec. B, reg. B-4.3.

167 Tsimplis, "Alien Species Stay Home", *supra* note 48 at 435.

In the performance of the ballast water exchange, there are some sea areas where the distance requirements might not be met. In such cases, the port State may designate, in consultation with adjacent or other States, areas where such ballast shall be discharged taking into account Guidelines[168] developed by the IMO.[169] The obligation to designate areas in consultation with adjacent or other States is premised on one of the key rules of customary international law, which is the "no harm principle" or prohibition of trans-boundary pollution. It is an obligation not to impair or damage the port State's environment, human health, property or resources or that of other States as provided for Article 2(6) of the Convention[170] and other international instruments on marine protection and biodiversity.

Bearing in mind that the Convention aims to secure the safety of marine resources and ecosystems, its flexibility facilitates the process by ensuring avoidance of more harm in the process of implementing the Regulations. For instance, a ship conducting ballast water exchange can be excused for non-compliance when the master of the ship reasonably decides that the exchange of ballast water in accordance with the Regulations would threaten the safety or stability of the ship, its crew, or passengers because of adverse weather, ship design or stress, equipment failure or any other extra-ordinary condition.[171] But where a ship that is required to conduct ballast water exchange failed to do so, the reasons must be entered in the ship's ballast water record book.[172] All officers

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168 *Guidelines for Ballast Water Exchange (G6)*, *supra* note 25.
169 Regulations, *supra* note 50, sec. B reg. B-4.2
170 BWMC, *supra* note 4, art. 2(6).
171 Regulations, *supra* note 50, sec. B reg. B-4.4
172 Regulations, *ibid*, sec. B reg. B-4, par.5

and crew must be familiar with their duties in the implementation of ballast water management particular to the ship on which they serve.[173]

4.3.4 SECTION C: SPECIAL REQUIREMENTS IN CERTAIN AREAS

This section set out preventive methods that may be adopted by States to prevent the introduction of HAOP. It also allows States to adopt additional measures above the provisions of the Convention in order to control the introduction of HAOP.

4.3.4.1 Other Methods of Ballast Water Management

Aside from the ballast water exchange and treatment approach methods for ballast water management, there are other methods that may be adopted by States to combat the transfer of HAOP. To this end, Regulation C-2 establishes an obligation on port/coastal States to warn mariners regarding ballast water uptake in certain areas and related measures to be taken by flag States to combat the uptake and consequent transfer of HAOP into the marine environment. The approaches adopted by States to effect these obligations may be termed, the Preventive approach and retention of ballast water on board, and are herein discussed.

(i) Preventive approach

The objective of this method is to minimize the uptake of organisms from a locality, thereby reducing the quantity that will be discharged into another locality. This approach is very important for the reduction of HAOP, although it is not an alternative to

[173] Regulations, *ibid*, reg. B-6.

ballast water exchange. For this approach cannot, on its own, solve the problem. The method includes the cleaning of ballast tanks, discharge of a percentage of ballast water to give room for cargo to be loaded, uptake of ballast water in safe places, not taking ballast water where sewage is being discharged, avoid uptake of ballast water at night, etc.[174]

As discussed earlier, Article 2(8) obligates a flag State to "encourage ships entitled to fly [its] flag, to avoid, as far as practicable, the uptake of ballast water with potentially Harmful Aquatic Organisms and Pathogens, as well as Sediments that may contain such organisms."[175] Similarly, the Regulations obligate a port State to notify mariners of those areas within its "[j]urisdiction where ships should not uptake ballast water"[176] because of adverse conditions, such as where the area(s) is/are known to contain outbreaks, infestations, or populations of HAOP, areas near sewage outfalls, or where tidal flushing is poor, or times in which tidal stream is known to be more turbid.[177] Where there is any alternative location for the uptake of ballast water without posing risk(s), such an area must be included in the notice.[178] In addition to notifying mariners, the IMO and any potentially affected coastal States must be notified. When a given warning is no longer applicable, all these parties must also be notified.[179] The shortcoming of this method for many States is their lack of technology to determine the

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174 See *generally*, Geoff R. Rigby & Allan H. Taylor, "Progress in the Management and Treatment of Ship's Ballast Water to Minimize the Risks of Translocating Harmful Nonindigenous Aquatic Organisms" in Judith Pederson, ed, *Marine Bioinvasions: Proceedings of the First National Conference, January 24-27, 1999* (Cambridge, USA: Massachusetts Institute of Technology, 1999) at 344-356.

175 BWMC, *supra* note 4, art. 2(8).

176 Regulations, *supra* note 50, reg. C-2.1.

177 Regulations, *ibid*, reg. C-2.1.1 to C-2.1.3.

178 Regulations, *ibid*, reg. C-2.1.

179 Regulations, *ibid*, reg. C-2.2.

organisms that pose threats to their environments for the purpose of determining areas having high densities of HAOP.

(ii) Retention of ballast water on board

By this method, the ballast water in the ship's tank is not discharged upon reaching destination ports. But this is possible where the ship has no cargo to load on. Where there is cargo to be loaded, it is operationally necessary to discharge a proportional amount of ballast water in order to load cargo. Thus, this method will not be effective to control the transfer of HAOP. There are also some instances where the ship will not be allowed to discharge the water, but would be required to return to the open sea for an exchange. For instance, in the harbour operations manual of the Vancouver Ports Authority, from March 1997, all vessels arriving at the port in ballast condition are required to conduct mid-ocean ballast water exchange prior their arrival at the port. This is to limit the possibility of transferring HAOP into the coastal marine environment.[180] On entering the port, the harbour master's representatives will board the vessel to conduct ballast checks. In the event that the master of the ship is unable to supply information regarding the sea exchange, the ship will not be allowed to discharge the onboard ballast water until a sample is analyzed. Where the analyzed ballast water is found not to meet Vancouver Port Control test standards, the ship will be required to depart the port and exchange ballast water in the sea.[181]

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[180] Port of Vancouver's Harbour Operations Manual, online: http://www.ecy.wa.gov/programs/spills/prevention/ballastwater/Port%20Vancouver%20BC%20Ops%20Manual.pdf accessed on May 04, 2011.

[181] Vancouver Port Corp., *Harbour Master Department Standing Order*, *ibid*.

4.3.4.2 Additional Measures By States

In addition to the measures set out under the Convention regarding ballast water management, the Convention under Regulation C-1 also allows for additional measures that are more stringent than IMO standards, to be imposed on ships by a port/coastal State, individually or jointly with other parties with a goal to prevent, reduce or eliminate the transfer of HAOP resulting from ships' ballast water and sediments in ways that do not have any negative effect on biodiversity and biological security.[182] This provision is similar to the provision under Article 2(3) which specifically provides that "[n]othing in this Convention shall be interpreted as preventing a Party from taking, 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…."[183]

During the conference to adopt the BWMC, the need for the flexibility was emphasized by the delegate of the USA when he said:

> Recognizing that the Convention's purpose is to prevent, minimize, and ultimately eliminate aquatic invasions, it is fully consistent and appropriate for the Convention to respect the sovereign right of a Party to establish more stringent measures, consistent with international law, should such measures be necessary. The right of a Contracting Government to take more stringent measures is a long-standing and fundamental concept ….[184]

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182 Regulations, *supra* note 50, reg. C.1.1

183 BWMC, *supra* note 4, art. 2(3).

184 IMO, International Conference on Ballast Water Management for Ships, Agenda item 6, *Consideration of the Draft International Convention for the Control and Management of Ships' Ballast Water and Sediments, outstanding issues, Submitted by the United States,* BWM/CONF/12, 5 January 2004, 1, quoted in Gaetano Librando, "IMO and Codification of the International Law on Ballast Water Management" in Rolim, *The International Law on Ballast Water, Preventing Biopollution*, *supra* note 13 at 123-124.

Thus, Article 2(3) gives State parties the freedom to adopt additional measures nationally and regionally to meet the objectives of the Convention. By this, the port State may require ships coming into its port to meet certain additional measures for the purpose of combating the transfer of HAOP into its region. However, Regulation C-1 also sets out specific parameters regarding the adoption of these specific additional measures, including foreseeing the adoption of Guidelines by the IMO.[185] Accordingly, the additional measures must be done after prior consultation with adjacent or other States that are likely to be affected by them.[186] Impliedly, all neighbouring States and States with ships trading in the region must be consulted.[187] The State must take into account the Guidelines developed by IMO,[188] and the additional measures must be consistent with international law. Moreover, the security and safety of ships must not be compromised. Also, the State must justify the need for the additional measures and the intention to introduce additional measures must be communicated to the IMO six months before the date of their implementation, except in emergency or epidemic situations.[189]

A State party may however grant exemption to ships from complying with the requirements of ballast water management and adopted additional standards, in water under its jurisdiction, as it deems necessary, but subject to parameters set out under Regulation A-4.[190] For instance, Australia adopts the IMO ballast water exchange at open sea as its management technique. However, Australia, in implementing Resolution

185 *Guidelines for Additional Measures Regarding Ballast Water Management Including Emergency Situations* (G13), *supra* note 32.

186 Regulations, *supra* note 50, reg. C.1.2.

187 See, Tsimplis, "Alien Species Stay Home: The International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004", *supra* note 48 at 437.

188 *Guidelines for Additional Measures Regarding Ballast Water Management Including Emergency Situations* (G13), *supra* note 32.

189 Regulations, *supra* note 50, see *generally,* reg. C.1.

190 Regulations, *ibid*, see, reg. A-4 already discussed above.

A.868(20),[191] has an arrangement between the ship-owners and Australian Quarantine and Inspection Service (AQIS) which allows ships from low risk regions to enter any of the ports of Australia without being subjected to ballast water management. But, the arrangement is subject to some conditions.[192] The conditions are such that will prevent the invasion of HAOP into Australian marine ecosystems if utilized accordingly. Although Australia is yet to ratify the Convention, it has signed it subject to ratification in May 2005. Hence, whenever Australia becomes party to the Convention, it is likely that it will retain this arrangement.

4.3.5 SECTION D: STANDARDS FOR BALLAST WATER MANAGEMENT

Section D makes provisions for ballast water exchange standard, ballast water performance standard and approval requirements for other ballast water management systems, the treatment methods.

4.3.5.2 Ballast Water Exchange Standard and Alternative Performance Standard

Regulation D-1 envisages various approaches to carry out the ballast water exchange. It focuses on the extent to which water is actually exchanged. Ballast water exchange under the process can be conducted in an efficiency of at least 95 percent volumetric exchange of ballast water.[193] If a ship uses a pump through method, it must

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191 IMO Resolution A.868(20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*, 27 November 1997, *supra* note 11.

192 Hamilton, "All Together Now: Legal Responses to the Introduction of Aquatic Nuisance Species in Washington Through Ballast Water", *supra* note 139 at 275-276.

193 Regulations, *supra* note 50, reg. D-1.1.

pump through or flush three times the volume of its ballast water tank.[194] Where the ship pumped through less than three times the volume of its tank, it may be accepted, provided the ship can "demonstrate that at least 95 percent volumetric exchange is met".[195] Regulation D-1 sampling is not too costly or complicated because the sampling is mainly required to confirm entries in the ballast water record book.[196]

As explained earlier, the Regulations also provide in addition to ballast water exchange, alternative "ballast water performance standard" which is to replace the exchange based approach, as technology is developed. It provides that the requirements of ballast water exchange standards do not apply to ships that discharge ballast water in a reception facility[197] and that other methods of ballast water management may also be accepted as alternatives.[198] The basic standard that must be adopted is set out under Regulation D-2 which requires that ballast water performance standard must be conducted in such a way as to discharge less than ten viable organisms per cubic metre greater than or equal to fifty micrometres in minimum dimension and less than ten viable organisms per millilitre less than fifty micrometres in minimum dimension and greater than or equal to ten micrometres in minimum dimension.[199]

4.3.5.3 Ballast Water Management (Treatment) Systems and Approval

As noted above, any ballast water treatment system must meet the performance standards set out under Regulation d-2 and must be type-approved in accordance with

194 Regulations, *ibid*, reg. D-1.2.
195 *Ibid.*
196 GloBallast Partnerships, *Economic Assessments for Ballast Water Management: A Guideline, supra* note 39 at 14.
197 Regulations, *supra* note 50, reg. B-3.6.
198 Regulations, *ibid*, reg. B-3.7.
199 Regulations, *ibid*, reg.D-2.

Regulation D-3.[200] Thus, any treatment approach adopted by a ship must be approved by the ship's flag State taking cognizance of the Guidelines developed by IMO.[201] Ballast water management systems that however make use of active substances[202] or preparation containing one or more active substances to comply with the Convention must be approved by the IMO, based on procedure developed by it (IMO).[203] To determine the effectiveness of any treatment method, where a State intends to carry out "any programme to test and evaluate promising ballast water technologies,"[204] such State must take into cognizance the Guidelines developed by IMO[205] and must allow participation only by minimum number of ships that are necessary to effectively test the technologies.[206] A Committee of the IMO is required to undertake periodic review in order to determine the availability of appropriate technologies to achieve standards, taking into account the safety of ship and crews, practicability of the technology, cost effectiveness, biological effectiveness, and environmental acceptability.[207]

Currently, ballast water treatment is undergoing extensive research and development, and several systems are being proposed.[208] As at May 2011, thirty-nine (39) different ballast water management treatment systems that make use of active substances

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200 See on IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/17 (ICS), 6 May 2011, online: http://www.amtcc.com/imosite/meetings/IMOMeeting2011/MEPC62/MEPC%2062-2-17.pdf accessed on August 12, 2011.

201 *Guidelines for Approval of Ballast Water Management Systems* (G8), *supra* note 27. See Regulations, *supra* note 50, reg. D-3.1.

202 See 4.3.2 above *Section A: General Provisions* for the definition of "active substances".

203 *Procedure for Approval of Ballast Water Management Systems that make Use of Active Substances* (G9), *supra* note28. See also Regulations, *supra* note 50, reg. D-3.2.

204 Regulations, *ibid*, reg. D-4.3.

205 *Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes* (G10), *supra* note 29. See Regulations, *supra* note 50, reg. D-4.3.1.

206 Regulations, *ibid*, reg. D-4.3.2.

207 Regulations, *ibid*, reg. D-5.1 and D-5.2.

208 Eugene H. Buck, "Ballast Water Management to Combat Invasive Species" in O'Sullivan, ed, *Ballast Water Management: Combating Aquatic Invaders*, *supra* note 152 at 3.

have been submitted for the approval of the IMO, thirteen (13) of which have received final approval from MEPC.[209] There are two types of ballast water treatment methods: the in-transit or on-board treatment, and the shore-side treatment. Whichever treatment method is adopted in any case is dictated by certain factors. These are the season and year of the voyage, the type of ships, and the geographical region.[210] In addition, whatever system is used, the obligations under Article 2(7) must be considered.

The in-transit or on-board treatment includes the use of chemical, physical, and biological treatments and mechanical operations to combat HAOP. Mechanical operations entail filtration and separation. In this instance, ballast water will be filtered before it is discharged into the coastal water, or before it is taken onboard the ship into the ballast tank. Physical treatment includes the use of ultraviolet radiation, heat, electric currents, etc. The most popular of these treatments is heat treatment by which ballast water is heated to temperature between 35 and 45 degrees C. The heating system is effective on larger organisms but not on microorganisms.[211]

Chemical treatment operates by adding biocides to the ballast water in order to kill the organisms. The biocides are capable of mixing into ballast water evenly. Biocides may either be oxidizing or non-oxidizing and both can be effective against

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209 IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/17, *supra* note 8 at 2. See also IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, *supra* note 8, item 2.30.

210 A. Whitman Miller et al, "Measuring Ballast Water Delivery and Management Patterns in the United States: The National Ballast Water Information Clearinghouse and National Ballast Survey" in Pederson, ed, *Marine Bioinvasions: Proceedings of the First National Conference, supra* note 174 at 310-311.

211 T. Satir, "Ship's Ballast Water and Marine Pollution" in H.Gonca Coskun,H. Kerem Cigizoglu & M. Derya Maktav, eds, *Integration of Information for Environmental Security*, (Turkey: Springer Publisher, 2006) 453 at 458.

microorganisms.[212] Examples of biocides include chlorine, bromine, hydrogen peroxide and chlorine dioxide. On-board application is favoured by ship operators because of its simplicity and low cost of its application. But one of its demerits is that heat treatment, for instance, may be cost effective on ships that are engaged in long and tropical journeys. This method may be ineffective for ships on other types of journeys.[213] Also, for new ships that have been constructed in accordance with the Convention, incorporation of ballast water treatment systems will be cost effective. However, retrofitting such systems on existing ships is technically challenging and financially ineffective.[214]

Shore-side treatment, involves discharging ballast water on board into a treatment facility on land or on the vessel to be later discharged on shore. Treatment involves the use of filters to remove large numbers of organisms, and the use of ultraviolet irradiation to kill adamant species like *dinoflagellates* which cannot be killed or disarmed by biocides. Others are magnetic treatment, high power ultrasound, cyclonic separation etc. The shore-side treatment produces no residual effects.[215] But this ballast water management system will not be effectively established in large port cities having large

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212 Fred C. Dobbs & Andrew Rogerson, "Ridding Ships' Ballast Water of Microorganisms" (2005) 39 Environmental Science and Technology 259 at 260.

213 Allegra Cangelosi, "Ballast Water Management: Developments in Policy and Technology" in Pederson, ed, *Marine Bioinvasions: Proceedings of the First National Conference, supra* note 174, 273 at 276.

214 J. Kazumi, "Ballast Water Treatment Technologies and Their Application for Vessels Entering the Great Lakes via the St. Lawrence Seaway" (2007), referred to in National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 154 at 105-106. GloBallast Partnerships, *Economic Assessment for Ballast Water Management: A Guideline, supra* note 39 at12 and 17.

215 Darren J. Oemcke, "Future Research on Ballast Water Treatment: A Technologist's View" in Pederson, ed, *Marine Bioinvasions: Proceedings of the First National Conference supra* note 174 at 328-329.

numbers of daily entrant of ships.[216] Moreover, "[c]urrent shoreside wastewater treatment plants are not equipped to treat saline water, ports and ships would need to retrofit their facilities to allow shore-side discharges, and, while technically feasible, shore-side facilities or vessels would be costly."[217]

Generally speaking, the use of bio-chemical substance is considered unsafe for both the ship's crews and the marine environment as a whole. Because of this, the Convention obliges parties to ensure that ballast water management systems must be safe in relation to the ship, the crew and the ship's equipment.[218] This is the basic reason why the approval of IMO must be sought prior to the use of any treatment substance, containing one or more active substances, as earlier on discussed .[219]

The shortcomings and problems associated with the above methods of treating ballast water to avoid the transfer of HAOP have caused authors, such as Cangelosi to suggest that good ballast water management practices should contain some or all the following options.[220] First, the adopted method must protect the safety of ship, its equipment, and crew.[221] The method must not create undue delay for ships and must minimize maintenance and operational difficulties. Second, the system should be more effective than ballast water exchange, environmental friendly, and must not substitute the

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216 McGee, "Proposals for Ballast Water Regulation: Biosecurity in an Insecure World", *supra* note 5 at 157.

217 N. Dobroski et al., "2009 Assessment of the Efficacy, Availability and Environmental Impacts of Ballast Water Treatment Systems for Use in California Waters" quoted by Suzanne Bostrom, "Halting the Hitchhikers: Challenges and Opportunities for Controlling Ballast Water Discharges and Aquatic Invasive Species" (Summer 2009) 39:3 Envtl L 19 at 875. See also Christopher J. Patrick, "Ballast Water Law: Invasive Species and Twenty-Five Years of Ineffective Legislation" (2009) 27 Va Envtl LJ 67-89 at 74.

218 Regulations, *supra* note 50, reg. D-3.3. See also BWMC, *supra,* note 4, art. 2(7).

219 Regulations, *ibid*, reg. D-3.2.

220 Cangelosi, "Ballast Water Management: Developments in Policy and Technology", *supra* note 213 at 276.

221 See also Regulations, *supra* note 50, reg. D-3.3 and D-5.2.1.

solved problem with an emerging one.[222] It must also incorporate a back up in the event that the principal system fails, is unavailable, or it is not possible to effect it, probably to avoid any damage to safety of life and property.[223] For instance, during stormy conditions, it would not be possible for transoceanic ships to conduct ballast water exchange on open sea water. Likewise, it is impossible for coasting ships to conduct ballast water exchange on the high sea. Cangelosi notes that, "[A]dding the back-up requirements will help improve the comprehensiveness and effectiveness of the system and create an incentive for the industry to move from ballast exchange to more reliable technological alternatives."[224]

Third, it should be cost effective[225] and capable of being monitored and enforced. Above all, the system must be globally applicable. It must be compatible with the needs of both developed and developing nations.[226] Global applicability is very important because a regional-based water management system will not contain the aquatic invasion of that regional water only. As shipping is a global activity, aquatic invasive species will be transferred from ships coming from abroad to that regional world.

Although various ballast water management systems have been adopted and tested as discussed above, none of them has proved sufficient to combat the transfer of HAOP without one defect or another. Presently, several treatment methods have been approved and their effectiveness, environmental acceptability and cost effectiveness

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222 Regulations, *ibid*, reg. D-5.2.2.

223 See the provision regarding practicability under Regulations, *ibid*, reg. D-5.2.3.

224 Cangelosi, "Ballast Water Management: Developments in Policy and Technology", *supra* note 213 at 277.

225 See also Regulations, *supra* note 50, reg. D-5.2.4.

226 Cangelosi, "Ballast Water Management: Developments in Policy and Technology", *ibid* at 276. See also Regulations, *ibid*, reg. D-5.1.

determined.[227] However, there appears, at present, to be no single universally acceptable ballast water treatment method for combating HAOP resulting from ships' ballast water and sediments.

The adoption of a combination of treatment methods appears to be the best option against the problem. For instance, South Africa recently approved ballast water management system consists of combination of cavitation, ozone and sodium hypo chlorite treatment.[228] Also, one study found that over half of the combined treatment technologies were said to meet the US State of California's performance standards for ballast water discharge "[i]n a recent evaluation by California of the current State of shipboard treatment systems, the results for these technologies appeared promising. For a wide range of tested organism sizes, the results indicated that over half of the technologies meet California's performance standards for ballast water discharges- the most stringent in the world."[229]

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227 See *inter alia* MEPC Doc. 62/INF.18, 6 May 2011 (South Africa) on the Type Approval of the Resource Ballast Water Technologies System (Cavitation combined with ozone and sodium hypochlorite treatment, online: http://www.amtcc.com/imosite/meetings/IMOMeeting2011/MEPC62/MEPC%2062-INF.18.pdf; MEPC Doc. 62/INF.28, 6 May 2011 (China) on Type Approval of the Blue Ocean Shield Ballast Water Management System, online: http://www.amtcc.com/imosite/meetings/IMOMeeting2011/MEPC62/MEPC%2062-INF.28.pdf and MEPC Doc. 62/INF.14, 8 April 2011 (Norway) on Type Approval of the Pure-Ballast 2.0 and Pure-Ballast 2.0 Ex Ballast Water Management System. Online: http://origin.pmcdn.net/p/ss/library/docs/public/mepc62_norway_ballast_water_treatment_system.pdf. All accessed on August 8, 2011. See *generally* IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, 15 July 2011, *supra* note 8.

228 See MEPC Doc.62/INF.18 6 May 2011 (South Africa) on the Type Approval of the Resource Ballast Water Technologies System (Cavitation combined with ozone and sodium hypochlorite treatment, *ibid.*

229 Bostrom, "Halting the Hitchhikers: Challenges and Opportunities for Controlling Ballast Water Discharges and Aquatic Invasive Species", *supra* note 217 at 875. She also made reference to Dobroski et al, "2009 Assessment of the Efficacy, Availability and Environmental Impacts of Ballast Water Treatment Systems for Use in California Waters", *supra* note 217. In the same order, the California State Lands Commission also thinks that "multiple treatment systems have

However, combining more than one management system may either be too costly, or pose threats to marine ecosystems and environment. It may also be pointed out that where new technologies are built into vessels at the time of their construction, it is easier to adopt any of the methods that may fit the requirements of ballast water management in keeping with their navigational exigencies. Thus, it is for older vessels that the adoption of combined ballast water management may either be expensive or pose threats to life and property in their operations. Also, the IMO, worried about the "problems currently being experienced in obtaining suitable ballast water treatment systems for the larger ships,"[230] agrees to "urge the ballast water management systems manufacturers to provide solutions for suitable type-approved systems to be installed on larger ships."[231]

4.3.6 SECTION E: SURVEY AND CERTIFICATION REQUIREMENTS FOR BALLAST WATER MANAGEMENT

The BWMC requires flag States to survey and certify ships flying their flags, or ships that are subject to their authority. Ships that are subject to survey are those of 400 gross tonnage (GT) above to which the BWMC applies, excluding floating platforms, FSUs and FDSOs.[232] The model documents are found in the Appendix Ito the Annex. Regulation E sets out requirements for five surveys. When the applicable ships fulfill all

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demonstrated the potential to meet California's performance standards. See California State Lands Commission, "2010 Assessment of the Efficacy, Availability and Environmental Impacts of Ballast Water Treatment Systems for Use in California Waters" at iv, online: http://www.slc.ca.gov/spec_pub/mfd/ballast_water/Documents/2010TechReportFinal_23Aug2010.pdf August 2010 accessed on May 05, 2011.

230 IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/17 (ICS), *supra* note 200 at 1

231 See IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, *supra* note 8 at item 2.28. The report relied on IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/17 (ICS), *supra* note 200.

232 Regulations, *supra* note 50*,* sec. E reg. E-4.1.

the survey requirements, a BWM certificate will be issued.[233] Certificates are issued or endorsed either by the flag State or by recognized organization (RO) but the flag State assumes full responsibility for the validity of the certificates. The certificate must be drawn in the official language of the issuing country, in the form set out in Appendix I to the Annex. Where the language used is neither English, French nor Spanish, the text must include a translation into one of those languages.[234] The Regulation sets out requirements for surveys. These are: initial survey, renewal survey, intermediate survey, annual survey and additional survey.

4.3.6.1 Initial Survey

Before a ship is put into service, or before it is issued with a certificate for the first time, there must be an initial survey verifying that its ballast water management plan and any associated structure, equipment, fittings, material or processes comply fully with the requirements of the Convention. Upon compliance with the necessary requirements, a certificate will be issued to the ship for a period specified by the administration, but not exceeding five years.[235]

4.3.6.2 Renewal Survey

After the initial survey, the concerned ships are subject to renewal surveys which are conducted at intervals specified by the administration, though this must be done within five years of the issue of the certificate. Again, this survey must testify to compliance by the ship with the ballast water management plan, its general structure and

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233 Regulations, *ibid*, sec. E, reg. E-1.1 and E-2.1.
234 Regulations, *ibid,* sec. E reg. E-4.
235 Regulations, *ibid*, reg. E-1.1.1 and E-5.1.

appliances in accordance to the requirements of the Convention. How long the certificate issued upon this survey remains valid depends on specified criteria.[236] When the renewal survey is completed within three months before the expiration of the existing certificate, the new certificate will be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate.[237]

However, when the renewal survey is completed more than three months before the expiration of the existing certificate, the new certificate will be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of completion of the renewal survey.[238] When the renewal survey is completed after the expiration of the existing certificate, the new certificate will be valid from the date of the completion of the survey to a date that does not exceed five years from the date of expiration of the existing certificate.[239]

Where at the time a certificate expires, the ship is not in the port to be surveyed, the validity period of the certificate may be extended by the flag State administration for a period of not more than three months, only for the purpose of allowing the ship to complete its voyage to the port and be surveyed in cases where it is proper and reasonable to do so. In this instance, the new certificate shall be valid from the date of the completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing certificate before the extension was granted.[240] Also, where a ship on short voyages has not had its certificate extended in any circumstances, its certificate

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236 Regulations, *ibid,* reg. E-1.1.2 and E-5.2.
237 Regulations, *ibid* , reg. E-5.2.1.
238 Regulations, *ibid*, reg. E-5.2.3.
239 Regulations, *ibid*, reg. E-5.2.2.
240 Regulations, *ibid*, reg. E-5.5.

may be extended for a period of grace of up to one month from the date of expiry.[241] Once the renewal survey is completed, the new certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.[242]

Aside from the general provision of the Regulations regarding the commencement of a new BWM certificate from the date of the expiry of the old one, there are some special occasions when the flag State administration may deviate from the general rule. Those special circumstances might be determined by the administration, a new certificate does not need to be dated from the date of the expiry of the existing one, but shall be valid to a date not exceeding five years from the date of the completion of the renewal survey.

4.3.6.3 Intermediate Survey

Apart from the initial and renewal surveys, ships are also subject to intermediate surveys. This occurs within three months before or after the second or third anniversary date of the certificate. Alternatively, ships must subject themselves to annual surveys before or after each anniversary date. A general inspection of the structure, fittings and processes for ballast water management shall be examined in all cases to ensure compliance with the requirements of the Convention. Intermediate or annual surveys shall be endorsed on the certificates.[243]

After a survey of the ship has been completed, no change shall be made in the structure, equipment, fittings or any material associated with the ballast water

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241 Regulations, *ibid*, reg. E-5.7.

242 *ibid.*

243 Regulations, *ibid*, reg. E-1.1.3 and 4.

management plan covered by the survey without the sanction of the administration except the direct replacement of such equipment or fittings.[244] However, where a change occurs, an additional survey will be required.

4.3.6.4 Additional Partial or General Survey

Where there is a change, replacement or significant repair of the structure, equipment or materials needed to achieve full compliance with the Convention, an additional partial or general survey will be required to ensure that such alterations have been effectively made to make the ship compliant with the requirements of the Convention.[245] But a port State implementing additional measures to the provisions of the Convention is not entitled to require additional survey and certification of a ship by the flag State.[246]

The officers of the flag State must ensure compliance with requirements regarding the surveys. Alternatively, the administration may entrust the surveys to surveyors nominated by it or a recognized organizations (ROs). The administration must afterward notify IMO of the delegated authority for onward circulation to parties for the information of their officers.[247] When the administration, nominated surveyor or RO determines that a ship's ballast water management is inconsistent with particulars of its certificate or the ship is unable to proceed to sea without posing a threat of harm to the marine environment and human health, the surveyor or RO shall ensure corrective action

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244 Regulations, *ibid* ,reg. E-1.10.

245 Regulations, *ibid*, reg. E-1.1.5.

246 BWMC, *supra* note 4, art. 7(2). Also, the flag State cannot be obliged to survey and certify additional measures imposed by another Party

247 Regulations, *supra,* note 50, reg. E-1.3, 4 and 5.

is taken to bring the ship into compliance.[248] For example, where a certificate has not been issued to the ship, it shall not be issued and where it has been issued, the certificate will be withdrawn. Where the ship is the port of another State party, the authorities of the port State will be notified immediately and the government of the port State must give necessary assistance to the administration, RO or a nominated surveyor towards discharging their obligations under the Regulations and any of the port State's action under Article 9 of the Convention.[249]

Certificates are issued or endorsed either by the administration or by the RO, but the administration assumes full responsibility for the validity of the certificates.[250] As noted above, the certificate must be drawn in the form set out as Appendix I in official language of the issuing country, and where the language used is neither English, French nor Spanish, the text shall include a translation into one of those languages.[251]Where a certificate is issued by another (State) party, it must contain a Statement to the effect that it has been issued at the request of the flag State, and such certificate shall have the same force and receive the same recognition as that issued by the administration.[252] The Regulations protect issuance of a certificate to ship of non-party State.[253]

The issuance of a certificate of compliance does not mean that it cannot be invalidated. In fact, a certificate will cease to be valid where it is not endorsed in accordance with the Regulations or where the relevant surveys are not completed within

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248 Regulations, *ibid*, reg. E-1.6.

249 Regulations, *ibid*, reg. E-1.6. As discussed above, Article 9 relates to port state's obligation on inspection of ships.

250 Regulations, *ibid*, reg. E-2.

251 Regulations, *ibid*, reg. E-4.

252 Regulation*s*, *ibid* , reg. E-2 and E-3.

253 Regulations, *ibid*, reg. E-3.4.

the specified periods, or where the structure, equipment, arrangements or processes of a ballast water management plan are altered and the certificate is not endorsed accordingly, and when the ship is transferred to the flag of another State.[254] The approach to ship survey and certification essentially follow the approach found in most other IMO Conventions. This is in accordance with the PSC as enshrined under Article 9.[255]

4.4 CONCLUSION

The BWMC was adopted to help ensure a global uniform approach by coastal, port and flag States to combat the threat posed by HAOP transferred through ships' ballast water and sediments. According to Librando, "[t]he preventive and precautionary regulatory regime provided in the BWM Convention is primarily addressed to flag States….Nevertheless, the BWM Convention can also be considered a protective port State Convention from the perspective of anti-biopollution practices…."[256] The Convention with its Annex, the Regulations set out a comprehensive approach for flag States as well as coastal/port States. In many respects, it follows the approach in other IMO Conventions, with ship surveys, certification and port State control. It contains technical standards for ballast water systems. However, it also contains some precautionary actions for coastal/port States. The intent is that when parties mount conscientious and effective implementation arrangements, they will enable a uniform

254 Regulations, *ibid*, see *generally,* sec. E-5.9
255 See BWMC, *supra* note 4, art. 9. See also *Obligations of Port State, supra.*
256 Librando, *supra* note 184 at 142

global regime against the transfer of HAOP through ship's ballast water and sediments to emerge.

The challenge left to consider is what may hinder the successful realization of the Convention's objectives? How sufficient are the provisions of the Convention that when implemented by States, they would lead to control, prevention and ultimately elimination of HAOP transferred through ships' ballast water and sediments? This challenge is the subject of the next chapter. Similarly in the next chapter, suggestions to correct the anomalies in the Convention are proposed and directed to IMO and its member States to adopt national laws and policies to address the weaknesses of the Convention. It also recommends that IMO may adopt Guidelines to address the weaknesses as well as considering the incorporation of the suggestions in the Annex or Protocol to be adopted in future.

CHAPTER 5: EVALUATION, RECOMMENDATIONS AND CONCLUSION

5.1 INTRODUCTION

In Chapter 4, the provisions of the *International Convention for the Control and Management of Ships' Ballast Water and Sediments,* 2004 (BWMC)[1] including its annex were outlined in terms of the obligations imposed on coastal/port State and flag State to realizing the objective of combating the threat posed by harmful aquatic organisms and pathogens (HAOP) transferred through ships' ballast water and sediments. It also considers the particular problems faced by developing countries in implementing the Convention. In this respect, it is notable that it is almost eight years now since the adoption of the Convention and it is still not yet in force. However, as Chapter 4 has indicated, its provisions follow the typical IMO approach to ship source marine pollution, found in *inter alia,* the *International Convention for the Prevention of Pollution from Ships*, 1973/78 (MARPOL 73/78),[2] and other IMO conventions.

The question then is whether there are some specific weaknesses in the Convention that do not attract ratification, even with extensive resources devoted to its promotion by IMO.[3] This chapter assesses the provisions of the Convention and focuses

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1 *International Convention for the Control and Management of Ship's Ballast Water and Sediments*, IMO Doc. BMW/CONF/36, 16 February 2004, [hereinafter BWMC].

2 *International Convention for the Prevention of Pollution from Ships*, 2 November 1973, as amended by *Protocol* of 17 February 1978, reprinted in *MARPOL 73/78 consolidated edition* 1997 (London: IMO, 1997), [hereinafter MARPOL 73/78].

3 The establishment of the joint initiative Global Ballast Water Management programme in 2000 to assist, train and educate the developing world on implementing the requirements of the Convention. See GloBallast Partnerships, "The GloBallast Programme" online: http://globallast.imo.org/index.asp?page=gef_interw_project.htm. Similarly, the establishment of GloBallast Partnerships established to assist less industrialized countries to tackle the problem of

on the strength and weaknesses of the Convention and the challenges these pose to the realization of its overriding objective. This chapter also recommends how its regulatory effectiveness can be improved once it comes into force by suggesting that matters not covered by the Convention be addressed under national laws of States and that Guidelines be adopted at the international level to address the issues as well, though the Guidelines may in the future be adopted as a Protocol or Annex to the Convention.

5.2 EVALUATION OF THE CONVENTION

This part examines the strengths, weaknesses and challenges of the Convention in light of its objectives.

5.2.1 THE STRENGTHS OF THE CONVENTION

As noted before, the BWMC is the first comprehensive and international mandatory legal regime that specifically addresses and attempts to find a comprehensive solution to the problem of HAOP transferred through ships' ballast water. In this regard, it is distinguishable from the Regulations and Guidelines that preceded it.[4] The Convention is considered "a pioneering treaty in breaking new technical and legal grounds towards the development of a new order for the oceans."[5] Because of its

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HAOP, expand and build on the completed GloBallast Programme. See Globallast Partnerships, "GloBallast Partnerships" online: http://globallast.imo.org/index.asp?page=GBPintro.html&menu=true both accessed on May 6, 2011.

4 See Chapter 3 above, *Other International Instruments Pre-Dating the Ballast Water Management Convention, 2004.*

5 Gaetano Librando, "IMO and Codification of the International Law on Ballast Water Management" in Rolim, *The International Law on Ballast Water: Preventing Biopollution* (Leiden, Boston: Martinus Nijhoff Publishers, 2008) at 144.

mandatory nature, contracting parties will have to comply, with its minimum ballast water management standards. This will promote stability and uniform development of the legal regime on controlling the transfer of HAOP through ships' ballast water and sediments. Consequently, it will bridge "the gaps that exist in piecemeal domestic legislation, and [would ensure] that there is not a conflict between the respective requirements of the States."[6] For example in 2002, Japanese officials were reported to have said that "[i]t is good to have a standardized, international regime to control ballast water. That is why we need a treaty."[7] Thus, having a unified international legal regime for the management of ship's ballast water will strengthen and secure international shipping, and allow the Convention to be a means to promote the global effort to combat the threats posed by HAOP.[8]

Another potential of the Convention that may aid the realization of its objectives is the application of its provisions to all ships at any of the ports of State parties, irrespective of whether the ship's flag State is a party to the Convention. Specifically, the Convention provides that "[w]ith respect to ships of non-Parties to this Convention, Parties shall apply the requirements of this Convention as may be necessary to ensure that *no more favourable treatment is given to such ships."*[9] In essence, ships of a non- party States, "in an attempt to avoid being subject to international Regulations,"[10] will also

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6 Briony MacPhee, "Hitchhikers' Guide to the Ballast Water Management Convention: An Analysis of Legal Mechanisms to Address the Issue of Alien Invasive Species" (2007) 10 J Int'l Wildlife L & Pol'y 29 at 51.

7 *IMO Mulling Treaty to Control Ballast Water in Cargo Ships*, Kyodo News International, quoted in Sarah McGee, "Proposals for Ballast Water Regulation: Biosecurity in an Insecure World" (2002) 13 Colo J Int'l Envtl L & Pol'y 141 at 153.

8 BWMC, *supra* note 1at preamble.

9 BWMC, *ibid*, art. 3(3). See also Chapter 4, *Application of the Convention, supra.*

10 Cory Hebert, "Ballast Water Management: Federal, States, and International Regulations" (Spring 2009-2010) 37 SUL Rev 315 at 349.

need to comply with the requirements of the Convention once it enters into force. Enforcing the provisions on all ships, particularly with its prevention oriented approach combined with sanctions for non-conformity will reduce the transportation of HAOP and may eventually eradicate the menace to promote safer and cleaner global oceans.

As noted earlier, the BWMC, in its broader context and regulatory strategy, follows the MARPOL 73/78.[11] It outlines a framework that gives opportunity to flag and port States to exercise enforcement rights. Article 8 obliges a port or coastal State party to cause proceedings to be taken against an erring ship, or alternatively, to furnish to the administration of the ship sufficient information regarding the violation for proper sanction.[12] But as discussed earlier,[13] there are two instances where a port State party will need to sanction a ship in accordance with its national law without referring the violation to the flag State of the ship for sanction. These are where the ship belongs to a non-party State, and it comes within the jurisdiction of a State party and when the ship[14] violates the additional measures the port State put in place. Also, under Article 10(2), a port State may "take steps to warn, detain, or exclude" a ship detected to have violated the Convention.[15]

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11 Moira L. McConnell, "Responsive Ocean Governance: The Problem of Invasive Species and Ships' Ballast Water: A Canadian Study" in T.Koivurova, eds, *Understanding and Strengthening European Union — Canada Relations in Law of the Sea and Ocean Governance* (2009) 35 Juridica Lapponica 433-471 at 452-453.

12 BWMC, *supra* note 1, art.8.

13 See, Chapter 4.2.2.2 above, *General Obligations of Parties*.

14 Notwithstanding the flag it flies, whether belonging to State party or not.

15 See *generally,* Chapter 4.2.2.2, *ibid.* See also BWMC, *supra* note 1, art. 8 and 10(2).

The right of port States to enforce sanctions against foreign flagged vessels departs "from the idea of exclusive flag State jurisdiction and enforcement"[16] as enshrined in earlier international conventions regarding the protection of the marine environment. The international community has now reckoned with the fact that flag State control of ships be complemented by port and coastal State control. This is a useful modification, especially with respect to the effort to control the spread of HAOP.

Beyond the foregoing, a port State may also undertake ballast water sampling where it has clear grounds to believe that either the ship or its equipment do not conform to the requirements of the Convention. This decision here is not to be based on information on the ship's certificate or what is referred to by Firestone and Corbett as "mere paper examination."[17] This step will aid the combat of HAOP transferred through ships' ballast water. This is because the Convention states that "[a] ship to which this Convention applies *may* in any port…be subject to inspection by officers duly authorized…for the purpose of determining whether the ship is in compliance with this Convention."[18] When this right is affirmatively utilized, the goal of promoting the control of HAOP will be upheld.

The Convention recognizes that States possess differing abilities when it comes to implementing its provisions. It allows them to take cognizance of their social and economic situations when doing so. It specifically provides that States must have regard

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16 Cory Hebert, "Ballast Water Management: Federal, States, and International Regulations", *supra*, note 10 at 350.

17 Jeremy Firestone & James J. Corbett, "Coastal and Port Environments: International Legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species" (2005) 36 Ocean Dev & Int'l L 291 at 297

18 See BWMC, *supra* note 1, art. 9(1).

to its specific conditions and capabilities when developing "national policies, strategies and programmes for ballast water management in its Ports and waters under its jurisdiction." [19] The minimum standards the Convention provides for seem to cater particularly to the implementation ability differences between the developed and the developing State parties. Article 2(3) also allows States generally, to adopt more stringent standards than the Convention prescribes, subject to conditions provided under Regulation C-1.[20] This allows each State to adopt standards suitable to its socio-economic, and environmental situations, with focus on combating the introduction and spread of HAOP within its waters.

It must be pointed out that some contend that the standard adopted under the Convention is "too high and that current treatment methods that are deemed "efficient" still require further research and testing".[21] Others think the standards are too low in view of environment protection needs.[22] In the end, it may be said that the minimum standards and the liberty States have to adopt more stringent measures strikes an acceptable balance which will allow both developed and developing countries to implement obligations under the Convention. Even so, there are countries that lack infrastructure, or have dilapidated infrastructure, and also lack finances, so that they cannot even meet the minimum standards. But the provisions of minimum standards may encourage more States to ratify the Convention, as opposed to having very stringent standards which most

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19 BWMC, *ibid*, art. 4(2).

20 See above, Chapter 4.3.4, *Section: C Special Requirements in Certain Area.* See also *Guidelines for Additional Measures Regarding Ballast Water Management Including Emergency Situations* (G13) adopted by Resolution MEPC.161(56) on 13 July 2007.

21 Christopher J. Patrick, "Ballast Water Law: Invasive Species and Twenty-Five Years of Ineffective Legislation" (2009) 27 Va Envtl LJ 67 at 87.

22 USA is an example of state holding the view that the standards are too low and will thereby not protect its marine ecosystems. This is basically one of the reasons why USA has not ratified the Convention despite its efforts in the coming into being of the Convention.

States cannot live up to or enforce and which might impose excessive cost on the shipping world, at the same time jeopardizing the essence of uniformity in standards envisaged by the Convention.[23]

As discussed in Chapter 4, the Convention makes provision for the measures by which the introduction of HAOP through ballast water and sediments may be controlled, prevented, reduced and ultimately eliminated. These methods include ballast water exchange in the open sea, ballast water treatment to remove or kill inherent HAOP, and adjusting where, when and how ballast water may be uploaded or discharged.[24] Presently, ballast water exchange on the open sea, in the absence of other established systems is considered an established method of ballast water management.

The Convention also provides for continued technological research and development on ballast water management treatments and methodological approaches[25] until a reliable, human and environmentally friendly method is found. Thus, where other management methods[26] are developed and are cost effective and environmentally friendly, the Convention welcomes such innovation. Indeed, since its adoption, the IMO Committee has developed an extensive number of implementation Guidelines and

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23 The United States National Research Council recommends the standards prescribed by the Convention. To this end, it advises that: "[t]he United States should follow Canada's lead and take immediate action to adopt and implement BWE and performance standards for the Great Lakes that are identical to those specified in IMO's *Convention for the Control and Management of Ships' Ballast Water and Sediments*." See National Research Council of the National Academies, *Great Lakes Shipping, Trade, and Aquatic Invasive Species* (Washington, D.C. Transportation Research Board, 2008) at 151.

24 Andrew N. Cohen & Brent Foster, "The Regulation of Biological Pollution: Preventing Exotic Species Invasions From Ballast Water Discharged into California Coastal Waters" (2000) 30 Golden Gate UL Rev 787 at 801-802.

25 See, BWMC, *supra* note 1, arts. 2(5) & 6(1) .

26 Such methods as treatment substances.

approved ballast water management systems.[27]This development is important because, as noted in Chapter 4, presently, there is no single method that can be used to adequately combat the threat posed by the transfer of HAOP without leaving any negative aftermaths. In fact, even ballast water exchange at sea has its negative effects, and should be viewed as an interim measure.

The requirements under the Convention for partnering and regional co-operation[28] are meant to aid the protection of "shared ecosystems" [29] from invasions through ships' ballast water and sediments. Such co-operation regarding the protection of shared ecosystems would "allow law and policy responses to be tailored to the unique circumstances of each region. It also allows States within a region to co-operate in the absence of global consensus …. It can be an important component to ensure the effectiveness of international regimes…may be better able to tailor responses according to ecological boundaries as opposed to political ones…."[30]

Provisions relating to provisions of sediment reception facilities for the cleaning or repair of ballast tanks,[31] survey and certification,[32] technical assistance,[33] as well as

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27 *Guidelines for Approval of Ballast Water Management Systems* (G8) adopted by Resolution MEPC. 125(53) on 22 July 2005; *Procedure for Approval of Ballast Water Management Systems that make Use of Active Substances* (G9) adopted by Resolution MEPC.126(53) on 22 July 2005; and *Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes* (G10) adopted by Resolution MEPC. 140(54) on 24 March 2006.

28 See, BWMC, *supra* note 1, art. 13, in particular art. 13(3).

29 Meinhard Doelle, Moira L. McConnell & David VanderZwaag, "Invasive Seaweeds: Global and Regional Law and Policy Responses" (2007) 50 Botanica Marina 438 at 444.
See also Christopher J. Wiley & Renata Claudi, "Alien Species Transported in Ships' Ballast Water: From Known Impact to Regulation" in Renata Claudi, Patrick Nantel & Elizabeth Muckle-Jeffs, eds, *Alien Invaders in Canada's Waters, Wetlands, and Forests* (Ottawa, Canada: Canadian Forest Service, Natural Resources, 2002) 233at 236.

30 See *generally,* Doelle, McConnell and VanderZwaag, "Invasive Seaweeds: Global and Regional Law and Policy Responses", *supra* note 29, at 443-446, *especially* 443-444.

31 BWMC, *supra* note 1, art. 5. See above, Chapter 4.2.2.2, *General Obligations of Parties*.

ballast water management timetable setting out how and when ballast water standards must be met by old and new ships[34] all point to the strength of the Convention. In sum, the strengths of the Convention come through in the provisions discussed thus far. But, this is not to say that the Convention is without problematic weaknesses. To the latter, the discussion now turns.

5.2.2 WEAKNESSES OF THE CONVENTION

Notwithstanding its potential, the Convention has some inherent flaws which may adversely undermine the prospect of realizing its objective, which is to promote a uniform approach to prevention, control and elimination of ongoing transfer of HAOP through ships' ballast water and sediments. Perhaps, most telling is the length of time it is taking the Convention to come into force. This suggested some difficulties for States. The adoption of fifteen (15) technical Guidelines also suggests that there are some difficulties for implementation of the Convention.

The first weakness is the Convention's lack of provision for maximum standards that a State may adopt in addition to the minimum standards provided. Of course, as Article 2(3) provides, State parties could adopt additional or more stringent measures that would demand that ships meet a specified standard or requirement.[35] In other words, a port State may adopt stringent measures for the discharge of ballast water in any of its

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32 See above, Chapter 4.3.6, *Section E: Survey and Certification Requirements for Ballast Water Management.*

33 See above, *General Obligations of Parties*. See also BWMC, *supra* note 1, art. 13(1).

34 See above, Chapter 4.3.3.3, *Ballast Water Management for Ships*, *supra.*

35 *Regulation for the Control and Management of Ships' Ballast Water and Sediments*, [hereinafter referred to as Regulations], reg. C-1.1.

designated areas or apply additional measures in the implementation of the Convention. But, there is no specification as to the maximum measures that a State may adopt. What this means is that each State would likely adopt standards that differ from those that others may adopt. Thus, some States may adopt rules of ballast water management that are too stringent. Despite the parameters set out by the Convention, within which a State may adopt additional measures,[36] the provision of additional measures undermine the objective of uniformity and standardized approach agitated for by international community for the adoption of BWMC. Invariably, this may have a negative effect on global trading. According to Buck, the adoption of standards that are too stringent would have the effect of making the BWMC irrelevant.[37]

For instance, in New York, the legal regime for the control of ships' ballast water is the *Clean Water Act.*[38] The ballast water management standard set by the Act is much stricter than the IMO standard.[39] It requires, *inter alia,* that ocean going ships travelling through New York must undergo ballast water treatment. The Act which supposed to come into force on 1 January 2012 has been postponed to 1 August 2013.[40] Many people regard this rule as too stringent arguing that it may cause economic set-backs. This is because "seaway traffic will stop" holding up fifty million tons of shipping that depends

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36 See Chapter 4.3.4, *Section C: Special Requirements in Certain Areas, supra.* See also Regulations, *ibid,* reg. C-1.

37 Eugene H. Buck, "Ballast Water Management to Combat Invasive Species" in Emily G. O'Sullivan, ed, *Ballast Water Management: Combating Aquatic Invaders*, (New York: Nova Science Publishers Inc. 2010) at 9.

38 *Clean Water Act*, s.401 amend, (2008). States within United States of America have different ballast water management schemes because each state has power to legislate on matters affecting them.

39 National Research Council of the National Academies, *Great Lakes Shipping, Trade, and Aquatic Invasive Species, supra* note 23 at 150.

40 As per Eric Machums, lecture given at the Marine Affairs Programme, Dalhousie University, 14 February, 2011.

on the seaway.[41] While commenting on the effects of stringent measures adopted by the USA for Great Lakes shipping in the face of Canada's adherence to IMO standards, the National Research Council noted:

> [t]he implementation of more stringent standards by either nation would reduce the overall risk of AIS introduction into the Great Lakes …. However, disparities between Canadian and U.S. standards would raise the possibility of a diversion of maritime trade away from the nation with more stringent standards, with vessels choosing to use ports with less demanding constraints on ballast water discharge.[42]

Presently, the USA has not ratified the Convention, but all the above comments illustrate what may happen where there is no uniform or maximum ballast water management standard. In essence, where there is no uniform or maximum ballast water management standard and port/coastal States are allowed to adopt any standard they consider fit, and if those standards are too stringent, sea-borne trade will be affected. This is because ship-owners who cannot afford to comply with the stringent rules will be prohibited from trading in particular areas, and, thus withdraw their ships from those routes. The effect on society would be that ships that comply with the stringent standards at great cost would pass on the costs through the prices of the products they ship, and consumers will unavoidably bear them.

More so, the provisions for additional measures and standards to protect coastal interest may be an incentive for a State to delay ratification of the Convention. In essence, the provisions for additional measures means different standards from different States as earlier stated. If standards are not going to be uniform, then there will be no need to ratify

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41 John Ibbitson, "Environmental Standoff threatens traffic on Seaway" *The Globe and Mail* (7 February 2011), A4.

42 National Research Council of the National Academies, *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 23 at 150.

the Convention, for at least, they are States parties to the *United Nations Convention on the Law of the Sea*, 1982 (LOSC)[43] and the *Convention on Biological Diversity*.1992 (CBD)[44] and have existing obligations under the two Conventions to protect their marine environment and biodiversity. With this notion by some States, ratification of BWMC will be delayed, and the actualization of its objectives rendered imaginary.

At the same time, the argument is not that standards required in ballast water management should be lower than those established under the Convention. Indeed, where the standards are too low, the objective of the Convention will not be achieved as many ship owners will opt to apply the low standards. The better option that would serve the interest of international shipping would be uniform or peak ballast water management standards, that States may adopt and implement, having regard to their respective national circumstances, such as economic and environmental challenges. In practice, "[I]MO standards , which represent a broad international consensus based on scientific input, expert judgment, and practical and political considerations, form a robust and pragmatic starting point."[45] When all States adopt the Convention's basic rules, then compliance with "additional measures" should be on a voluntary basis, and ships that choose to comply with them should be given incentives, such as reduction in port charges or any other administrative charges. By this, the voluntary rule may become mandatory in later years.

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43 *United Nations Convention on the Law of the Sea*, 10 December, 1982, 1833 U.N.T.S. 3.

44 *Convention on Biological Diversity of the United Nations Conference on the Environment and Development*, 5 June 1992, 31 I.L.M.818.

45 National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 23 at 150.

Second, the exemption of "no ballast on board" (NOBOB) ships from the application of the Convention is a set-back for realizing the objectives of the Convention. A NOBOB ship is a ship "fully laden with cargo and with only unpumpable residual water and sediments in its ballast tanks [and thus have] no ballast on board."[46] These NOBOB ships were initially presumed not to transfer HAOP. But the fact is that both "ballast on board" (BOB) and NOBOB ships can transfer HAOP from one region to another. There is no reason why ships carrying no ballast on board should be exempted from the application of the convention. Ruiz & Reid, analyzing the several approaches adopted to evaluate the effects of ballast water exchange regarding the Great Lakes and Chesapeake Bay, reported as follows:[47]

> [T]he majority of the vessels that enter the Great Lakes from overseas are in NOBOB condition, containing small residual amounts of ballast water, sediments and organisms, some of which are from low salinity sources. Such NOBOB ships can load and discharge additional ballast …and thereby release residual organisms, creating opportunity for invasions to occur. It is noteworthy that some of the new non-native species reported in the Great Lakes since 1993 are consistent with the type of organisms reported in NOBOB residuals and may have resulted from NOBOB discharges.[48]

Buttressing this point further, Ruiz & Reid refer to Duggan et al.[49] and Bailey et al.[50] to say that:

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46 National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *ibid* at 69.

47 Gregory M. Ruiz & David F. Reid, "Current State of Understanding About the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introduction to the Great Lake Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information" in O'Sullivan, ed, *Ballast Water Management: Combating Aquatic Invaders*, *supra* note 37, 25 at 32.

48 Emphasis supplied.

49 IC Duggan et al., "Invertebrates Associated with Residual Ballast Water and Sediments of Cargo Carrying Ships Entering the Great Lakes" (2005) 62 Can. J. Fish. Aquat. Sci., 2463.

50 Bailey, SA et al., "Invertebrate Resting Stages in Residual Ballast Sediment of Transoceanic Ships" (2005) 62 Can. J. Fish. Aquat. Sci., 1090.

> Duggan et.al reported an average concentration of ~1.3 million live invertebrates per t (range 24,000 - 19,900,000 per t) of residual sediments from NOBOB ballast tanks sampled in the Great Lakes between 2001 and December 2003, Bailey et. al reported an average concentration of invertebrates resting eggs (dormant stages) of ~3.5 million per t (range 40,000 – 91.000,000 per t) from the same samples.[51]

Also commenting on the capability of NOBOB ships to spread harmful organisms, McConnell reported that the International Joint Commission which was established to address the issue of harmful aquatic organisms regarding the shared Great Lakes between Canada and United States, notes that:

> NOBOBs represent over 70% ... of incoming ships to the Great Lakes-St. Lawrence River system. These NOBOB ships are fully loaded with cargo and as a result ballast tanks contain minimal (generally less than 3 percent) residual untreated ballast water and sediment. Yet even these small residues can be contaminated with alien invasive species. Both a Transport Canada study and a more recent study … reported finding live organisms in virtually all ships that reported as NOBOB ….[52]

Clearly, even ships with no ballast on board can hold HAOP in their residual water, thereby possessing the potential to threaten marine ecosystems. As pointed out, the unpumpable portions of ballast water "can represent great ecological risk."[53] The exemption of these of ships from the operation of the BWMC leaves a gap which would frustrate "continued prevention, minimization and ultimate elimination of the transfer of Harmful Aquatic Organisms and Pathogens."[54] NOBOB ships must be subjected to pumping-through or treatment methods of ballast water management, as they are not

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51 Ruiz & Reid, "Current State of Understanding About the Effectiveness of Ballast Water Exchange (BWE) in Reducing Aquatic Nonindigenous Species (ANS) Introduction to the Great Lake Basin and Chesapeake Bay, USA: Synthesis and Analysis of Existing Information", *supra* note 47 at 96.

52 Moira L. McConnell, "Responsive Ocean Governance: The Problem of Invasive Species and Ships' Ballast Water- A Canadian Study", *supra* note11 at 455 and 467.

53 LA Drake, PT Jenkins & FC Dobbs, "Domestic and International arrivals of NOBOB (No Ballast on Board) Vessels to Lower Chesapeake Bay" (2005) 50:5 Marine Pollution Bulletin 560.

54 BWMC, *supra* note 1 at preamble.

likely to conduct ballast water management in accordance with the 95 percent volumetric exchange of water. This is because they possess only residual ballast water and sediments and their ballast water tanks must be free of sediments at all times.

Another measure to assure the realization of the objectives of the Convention is to apply its provisions to coastal trading ships**.** Though these ships operate within the jurisdiction of a State, and are regulated under national law, they should be regulated to aid the objectives of the Convention as they are capable of transporting HAOP because coastal trading ships use ballast water, which is a vector for "interoceanic and transoceanic"[55] transfer of HAOP. They constitute challenge because HAOP unintentionally carried through ballast water by them and discharged back into the territorial water of the coastal State can eventually swim off to other region(s) and cause harm to the local biodiversity of that other region(s). Moreover, HAOP that has been introduced into a port by a foreign ship may be taken up by a coastal trading ship when taking up ballast water at the port. Wiley & Claudi observe that "[s]hould these ships take on freshwater in the Great Lakes, it would mix with the residue that could be released in another part of the Great Lakes…and could also contribute to interbasin transfer of species that are present in one of the Great Lakes but not yet in another."[56]

The incidence of HAOP invasion differs from port to port. When ships operating within the national jurisdiction of a State are excluded from the application of the Convention, the result is that a port which is less invaded may be polluted by the invasion

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55 Simkanin, C. et al., "Intra-coastal Ballast Water Flux and the Potential for Secondary Spread of Non-Native Species on the U.S. West Coast" (August 2 009) 58:3 Marine Pollution Bulletin 366 at 366, online: http://www.ncbi.nlm.nih.gov/pubmed accessed on May 03, 2011.

56 Wiley & Claudi, "Alien Species Transported in Ships' Ballast Water: From Known Impact to Regulation", *supra* note 29 at 236.

of HAOP transported by ships from different ports. For instance, San Francisco Bay is known to be highly invaded, while Puget Sound is considered as a port less invaded by harmful aquatic organisms.[57] If the United States ratifies the Convention and decides to exempt coastal trading ships from the application of the Convention rules, whenever a ship sails from San Francisco to Puget Sound, such a ship will not be subject to ballast water management requirements. This may, invariably constitute a greater threat to the marine environment of Puget Sound. Thus, for the cleaner and safer environment that IMO seeks, and to attain the objective of the Convention, States should regulate coastal trading ships in accordance with the requirements of the Convention, bearing in mind their existing obligations under the LOSC[58] and CBD[59] to protect marine environment and biodiversity.

A fourth gap in the Convention relates to causation, liability and compensation**.** No provision covers the need to compensate affected party States for damages done to them as coastal/port States for the cost of remediation or combating of the menace caused by HAOP introduced through ships' ballast water into their jurisdictional waters. Under the Convention, the principle of "polluter pays" does not exist. It is said that the absence of a provision on liability and compensation may be connected with "difficulties in attributing causation, discovering an introduction of a species, the passage of time and the fact that remediation is unlikely…."[60] The passage of time between a discharge and the effect of the discharge on the marine ecosystem may also contribute to the difficulty of

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57 Buck, "Ballast Water Management to Combat Invasive Species", *supra* note 37 at 5.

58 LOSC, *supra* note 43.

59 CBD, *supra* note 44.

60 Moira L. McConnell, *GloBallast Legislative Review: Final Report* GloBallast Monograph, Series No. 1 (London: IMO, 2002) at 23 and 121.

identifying the particular ship that transported the HAOP through ballast water into the State. More so, where "the receiving port has not developed an ability to assess the level of risk or to determine where there has been an impact on its biodiversity."[61]

To establish a liability regime regarding the transfer of HAOP must confront the question whether the carriers (ships carrying goods), the shippers (those sending the goods), and the receivers (those receiving goods)[62] must provide the insurance policy on the menace. Even if any of these parties wishes to do so, there is likely not going to be an insurer that will be willing to provide coverage for damages done by HAOP transferred through ships' ballast water and sediments.[63]

As it is, recourse may be had to Article 235 of the LOSC[64] which provides on responsibility and liability as follows:

> 1. States are responsible for the fulfilment of their international obligations concerning the protection and preservation of the marine environment. They shall be liable in accordance with international law.
> 2. States shall ensure that recourse is available in accordance with their legal systems for prompt and adequate compensation or other relief in respect of damage caused by pollution of the marine environment by natural or juridical persons under their jurisdiction.
> 3. With the objective of assuring prompt and adequate compensation in respect of all damage caused by pollution of the marine environment, States shall co-operate in the implementation of existing international law and the further development of international law relating responsibility and liability for the assessment of and compensation for damage and the settlement of related disputes, as well as, where appropriate, development of criteria and procedures for payments of adequate compensation, such as compulsory insurance or compensation funds.[65]

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61 McConnell, *GloBallast Legislative Review, ibid*, at 83.

62 National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *supra* note 23 at 115.

63 See also Great Lakes Protection Fund 2006, referred to in National Research Council of the National Academies *Great Lakes Shipping, Trade, and Aquatic Invasive Species*, *ibid* at 114-115.

64 LOSC, *supra* note 43.

65 See LOSC, *ibid*, art. 235(1)-(3).

Given the difficulties of establishing causation, and the challenge of the passage of time with respect to finding evidence, compensation for damage may be found through a fund established along the line of the fund established under the *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage,* 1971 (FUND 1971),[66] or past industry funds, such as *Tanker Owners' Voluntary Agreement Concerning Liability for Oil Pollution (TOVALOP),*[67] or *Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution* (CRISTAL),[68] for the benefit of victim State parties.

In addition to the above weaknesses of the Convention is the lack of provision for biological baseline surveys stemming from the port/coastal States control. The baseline surveys allow a port/ coastal State to detect new HAOP introduced into its waters and variation in the population of established HAOP,[69] "through regular monitoring and quantification of possible impacts,"[70] and "provides the baseline against which success of ballast water management can be measured."[71] The measure requires the efforts of specialists to collect samples and perform detailed analysis of the samples to detect the introduction of new HAOP within the waters. This measure will aid the realization of the

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66 *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage,* 18 December 1971, 1110 U.N.T.S. 57.

67 *Tanker Owners' Voluntary Agreement Concerning Liability for Oil Pollution*, 7 January 1969, in Edgar Gold, Aldo Chircop & Hugh Kindred, *Essentials of Canadian Law: Maritime Law* (Toronto, Ontario: Irwin Law, 2003) at 662.

68 *Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution*, 14 January 1971., see, Edgar Gold, Aldo Chircop & Hugh Kindred, *Essentials of Canadian Law: Maritime Law* (Toronto, Ontario: Irwin Law, 2003) at 663.

69 GloBallast Partnerships, *Economic Assessments for Ballast Water Management: A Guideline* GloBallast Monographs No.19 (London, UK and IUCN, Gland, Switzerland: GEF-UNDP-IMO GloBallast Partnerships and IUCN, 2010) at 17. See also Clare Shine, Nattley Williams, and Francoise Burhenne-Guilmin, "Legal and Institutional Frameworks for Invasive Alien Species" in Harold A. Mooney, eds, *Invasive Alien Species: A New Synthesis* (Washington, Covelo, London: Island Press, 2005) 233 at 253.

70 GloBallast Partnerships, *Economic Assessments for Ballast Water Management, ibid* at 12.

71 *Ibid.*

objectives of the Convention, as new introduction of HAOP will be promptly detected and contained, but the Convention did not make provision for this measure. This marks a tangible lacuna in the provisions of the Convention.

There are other points of weakness in the provisions of the Convention. For instance, Regulation E-5.7 provides that: "[i]n special circumstances, as determined by the Administration, a new Certificate need not be dated from the date of expiry of the existing Certificates…."[72] What constitutes the "special circumstances" is left to be determined solely by the ship administration. Although it is vital that inherent powers be conferred on such an authority in some circumstances, these must be made in specific terms to avoid excessive discretion. The unspecified circumstances under which the flag State administration may exercise this power can lead to arbitrariness in doing so. It may even execute the task with favouritism and nepotism. It is advisable that for deviation from the general rules to be justified, those "special circumstances" should be specified, or alternatively, there must be legislative check on the exercise of the power granted.

Article 8(1) of the Convention gives the flag State administration power to sanction an erring ship in accordance with its law whenever and wherever there is any violation of the Convention. Even so, having gathered sufficient evidence satisfactory to justify proceedings, the administration may still not act for a year, in which case, "[i]t shall so inform the party which reported the alleged violation."[73] This situates the tremendous discretion the flag State has regarding enforcing the rules of the Convention against its erring ships. In essence, it leaves open how effective enforcement actions may

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[72] *Regulation for the Control and Management of Ships' Ballast Water and Sediments*, *supra* note 35, reg. E-5.7.

[73] BWMC, *supra* note 1, art. 8(1), the last sentence.

be. One can only hope that the coastal/port State would be more conscientious in exercising their enforcement powers to ensure that the Convention carries some influence for ship conduct regarding ballast water management as an aspect of the effort to combat the introduction and transfer of HAOP.

Also, Articles 5 and 12 provide that in the implementation of the Convention, the State parties shall not cause undue delay to ships and, where this is done, losses incurred by the ship must be compensated. It would seem that for fear of causing "undue delay", a State might not conduct thorough inspection, ballast water sampling, and surveys.

As noted in Chapter 1 and 2, apart from ballast water, other vectors through which HAOP may invade marine ecosystems include land-based source, such as sewage, hull fouling, aquaculture, canals and waterways, attachment of aquatic organisms to cargo, ships' chests, anchor, and other parts of the ships. All these vectors have the potentials to adversely impact the coastal and marine environment and also assist in the uptake and transportation of HAOP from one coastal region to another.[74] Article 5 of the Convention obligates the port State to ensure that adequate facilities are provided for the reception of sediments, in ports and terminals designated by that State for the cleaning or repair of ballast tanks.[75] Even so, it must be noted from the provision that the Convention excludes the establishment of sediment reception facilities, except where cleaning or repair of

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74 See *generally,* DW Alexander et al., *Gulf of St. Lawrence: Human Systems Overview Report* (Newfoundland and Labrador Region: Oceans, Habitat and Species at Risk Publication Series, 2010). See also GESAMP Reports and Studies, *Protecting the Oceans from Land-based Activities: Land-based Sources and Activities Affecting the Quality and Uses of the Marine, Coastal and Associated Freshwater Environment,* (New York, Nairobi, Paris, London, GESAMP, No. 71, 2001), 16-18. Online: http://www.jodc.go.jp/info/ioc_doc/GESAMP/report71.pdf accessed on February 22, 2011.

75 BWMC, *supra* note 1, art. 5(1).

ballast tanks occurs.[76] The fact that no provisions are made regarding the prevention and control of the transfer of HAOP by means of these other mechanisms means a large part of the sources of HAOP transfer remain outside the regulatory umbrella of the Convention.

Envisaging the weakness that may be associated with the implementation of the Convention, in particular its technical Guidelines, the joint initiative Global Ballast Water Management programme and the GloBallast Partnerships were established. The latter was established to expand and build on the completed project of the former. Their objectives include the provision of mechanism for technical assistance, training and educating the developing world on implementing the requirements of the Convention when it comes into force.[77] The programmes will aid the international community in its effort to reducing and eventually eradicate HAOP transferred by ships' ballast water. The GloBallast programme was established under the aegis of IMO, the Global Environmental Facility (GEF), and the United Nations Development Programme (UNDP) and parties to the Convention. The programme exemplifies the international co-operation prescribed under Article 13 of the Convention.[78] A specific instance, in 2010, was regional training and workshop organised by the GloBallast Partnerships of IMO in collaboration with the Nigerian Maritime Administration and Safety (NIMASA) and the

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[76] See also *GloBallast Partnerships, Economic Assessments for Ballast Water Management, supra* note 69 at 16.

[77] See GloBallast Partnerships, "The GloBallast Programme", *supra* note 3. Similarly, the establishment of GloBallast Partnerships in 2007 to assist less industrialized countries to tackle the problem of HAOP, expand and build on the completed GloBallast Programme. See Globallast Partnerships, "*ibid.*

[78] BWMC, *supra* note 1, art. 13(1).

Interim Guinea Current Commission (IGCC). [79] According to Omatseye, "[i]t is paramount that we participate actively to ensure an in depth understanding of the Convention and eventual drawing up of the national legislative parameters in readiness for its implementation both at the regional and national level."[80] Understanding the Convention will make implementation easier and would facilitate efforts to prevent and eradicate the threat posed by HAOP.

Balancing the strengths against the weaknesses of the Convention, it may be said that essentially, the instrument provides a useful framework within which necessary first steps can be taken to establish basic global ground rules, standards and practices by which to contain the introduction, transfer and spread of HAOP across the world's coastal and marine areas. But before this modest hope can begin to be realized, a number of challenges stand in the way, including the prospect of the coming into force of the Convention. These challenges are considered next.

5.2.3 CHALLENGES TO MAKING THE CONVENTION EFFECTIVE

The main challenge presently facing the Convention is achieving sufficient ratification to enter into force. As noted earlier, the Convention has not yet to come into force because the required number of States that must ratify it to bring it into force have

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79 Andrew Airahuobhor, "Nigeria: International Collaboration to Protect Marine Environment From Ballast Water", online: http://allafrica.com/stories/201006180445.html accessed on October 31, 2010.

80 Temisan Omatseye, Director General, Nigerian Maritime Administration and Safety Agency (NIMASA), quoted in Andrew Airahuobhor, "Nigeria: International Collaboration to Protect Marine Environment From Ballast Water", *ibid.*

not yet done so. Only twenty-eight (28) States have so far ratified it.[81] This means that the Convention has no binding effect on States that have already accepted it.[82] In practice, it means that until it comes into force, States will have different Regulations in relation to the protection of marine ecosystems and biodiversity in terms of combating HAOP transported through ships' ballast water and sediments. As earlier noted, this constitutes a great concern to the IMO, thereby inviting parties to ratify the Convention.[83]

As it were, therefore, the regulation of the international shipping industry as to combating the threats of HAOP remains under Resolution A.868 (20),[84] which has no binding status, as discussed in Chapter 3. Presently, many national laws on HAOP control are fashioned along the lines of this Resolution which many States have adopted voluntarily. So then, without the coming into force of the BWMC, the international legal regime for the control of the transfer of HAOP would remain discretionary and largely non-uniform. This outcome is not particularly helpful for dealing effectively with the menace of HAOP transfer and its ecological and environmental consequences.

The fact, however, seems to be that many countries want to see the Convention come into force. The Maritime Authority of Jamaica, for instance, believes that "it is vital

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81 See Chapter 4.2.1, *Overview, supra,* for the list of the 28 States that have ratified the Convention.

82 Other than the obligations under Article 18 of the Vienna Convention on the Law of Treaties, 1969, "to refrain from acts which would defeat the object and purpose of treaty" prior to its entry into force. See Vienna Convention on the Law of Treaties, 23 May 1969, U.N.T.S. 1155, 331. Online: http://untreaty.un.org/ilc/texts/instruments/english/conventions/1_1_1969.pdf accessed on August 12, 2011.

83 See IMO, "Harmful Aquatic Organisms in Ballast Water" MEPC Doc. 62/2/15, 6 May 2011 at par. 2, online: http://www.amtcc.com/imosite/meetings/IMOMeeting2011/MEPC62/MEPC%2062-2-15.pdf accessed on August 6, 2011.See also IMO, "Draft Report of the Marine Environment Protection Committee on its Sixty-Second Session" MEPC Doc. 62/WP.1, 15 July 2011 at item 2.23

84 IMO Resolution A.868(20), *Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens*, 27 November 1997, par. 4 online: http://globallast.imo.org/resolution.htm accessed on April 21, 2011.

for Jamaica and other Countries in the region to accede to the IMO's *Ballast Water Management Convention* due to [Jamaica's] strategic location as a maritime hub for maritime traffic, including the accommodation of one third of the world's oil traffic…."[85] Clearly, widespread ratification of the Convention is essential for protecting the global marine environment against the threat of invasion by HAOP, as the world is linked through its oceans from region to region, and from coastal State to coastal State.

In addition to the above challenge is that regarding the enforcement of biological baseline surveys and risk assessments. As noted above, the Convention did not make provision for port/coastal State biological baseline surveys. It however provides for risk assessment Regulation A-4[86] which states that States may grant to ships, exemptions to comply with the requirements of the Convention regarding additional measures or ballast water management, in waters under their jurisdiction, subject to some parameters, among which is that the exemptions must be granted in accordance with the Guidelines developed by the IMO.[87] Aside from the usefulness of risk assessment in this instance, it may also be a useful tool to minimize the number of ships requiring detailed inspection at the ports without compromising efficiency of inspection.[88]

Both biological baseline surveys and risk assessments are essential measures to combat the introduction of HAOP from one coastal region to another. These measures

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85 Jamaica Ship Registry, "Jamaica Aims to Ratify *Ballast Water Management Convention*", quoting Bertrand Smith, Director of Legal Affairs, Maritime Authority of Jamaica, online: http://www.jamaicaships.com/JSR/NewsArticles/BWMconference.html accessed on March 22, 2011.

86 See Chapter 4 above, *Section A: General Provisions.*

87 *Guidelines for Risk Assessment under Regulation A-4 of the BWM Convention* (G7) adopted by Resolution MEPC.162(56) on 13 July 2007.

88 GloBallast Partnerships, *Economic Assessments for Ballast Water Management*, *supra* note 69 at 12 and 14.

may only be enforced by experts who collect samples and perform detailed analysis of the samples to detect whether the ballast water or national waters contain HAOP. All these are cost related issues. But, aside from the cost implication of these measures, the majority of States have their shipping industry regulated under the auspices of Department of Transport or Maritime Authorities. This is a challenge because arguably, most of the personnel in these establishments lack the technical knowledge regarding biological baseline surveys and risk assessments, majority are trained for the purpose of "registry/administrative functions" only. Taking into account the cost related factor, a port/coastal State may disregard the use of these measures, more so, as it is not required under the Convention, and the one required is only for the purpose of granting exemptions under Regulation A-4.

In addition to the above challenge is the problem of determining the institution to enforce the provisions of the Convention at the national level. BWMC cuts across LOSC, CBD and IMO. Thus, for countries implementing the BWMC, it poses a challenge to determine the institution to implement and enforce it. This is because the implementation and enforcement of its provisions cuts across institutions regulating fisheries, environment, maritime, quarantine, health, transport, etc., with their relevant authorities like maritime authority, ports authority, Department of Transport, Ministry of Environment, etc. If adequate measures are not taken to set out the various functions to be performed by these institutions regarding the implemented and enforcement of BWMC, there may be conflict which may eventually hinder the successful implementation of the Convention, and eventual realization of its objectives.

Another challenge has to do with the ability of States to implement the obligations the Convention imposes upon them when it comes into force. There are two concerns here. First is the financial and technological capacity of States, especially developing State parties, to implement its requirements. As noted in Chapter 4, ballast water management methods are capital intensive, the implementation of which many States may not be able to afford. An example is the treatment methods either on shore in ports or on-board the ship, which is stipulated by the Convention as alternatives to ballast water exchange at mid-sea. A second example is the technological apparatus needed for inspection and sampling of ballast water on board a ship, and for determining the organisms that pose threats to the marine environment as part of verifying the density of HAOP in a port area.

For instance, Nigeria is one of the early twenty-eight ratifying States to the Convention,[89] but one grave challenge it presently faces relates to "the state of dilapidated infrastructure and poor monitoring equipment which hamper the effective monitoring of vessels coming into the country's water territory."[90] Although, the Convention requires that a port State without adequate facility must notify IMO, the notification is merely for onward transmission to other parties concerned.[91] In light of these financial and technological challenges, the fact that a ship unduly delayed during sampling of its ballast water, survey and certification, etc., "shall be entitled to

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89 IMO, "Status of Conventions" online: http://www.imo.org/About/Conventions/StatusOfConventions/Pages/Default.aspx accessed on August 8, 2011.

90 Andrew Airahuobhor " Nigeria: International Collaboration to Protect Marine Environment from Ballast Water" referencing Mrs Mabel Yarhere, Director, Nigerian Institute of Oceanography and Marine Research, in an interview during the Year 2010 World Ocean Day, in Nigeria, *supra* note79.

91 BWMC, *supra* note 1, art. 5.

compensation for any loss or damage suffered,"[92] may become an incentive for poor port States to barely carry out those obligations. They cannot afford to pay for the costs of such compensable delays. Also, aside from the complicated 15 Guidelines that may be reason for non-ratification, huge financial implication of implementation and enforcement of the Convention may also deter States.

Second to the problem of implementation relates to the divergent interests of flag and coastal/ port States. Port States may be interested in protecting their marine environments from invasion by HAOP. On the other hand, flag States may be interested in the economic returns from the activities of ships flying their flags. Firestone & Corbett succinctly put it thus:

> Frequently, a decision also poses trade-offs among desirable attributes or objectives. Moreover, because differently-situated actors often approach a question from their own unique perspectives, they in turn weigh decision criteria differently. While port States may place a priority on protecting sensitive ecosystems from species introductions, the major maritime nations may be more interested in meeting the economic goals of shippers that fly their flags.[93]

As discussed in Chapter 4, flag States have a responsibility under the Convention to enforce its provisions on the ships flying their flags regarding, *inter alia*, developing and implementing a ballast water management plan; maintaining a record book; and survey and certification procedures. If flag States fail to ensure that ships flying their flags comply with these requirements, it will compound the consequences arising from port States having inadequate human, financial and technological resources to inspect ships within their ports. Together, these challenges reduce heavily, the prospect of

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92 BWMC, *ibid*, art. 12.

93 Firestone & Corbett, "Coastal and Port Environments: International Legal and Policy Responses to Reduce Ballast Water Introductions of Potentially Invasive Species", *supra* note 17 at 47-48.

achieving the objective of the Convention to combat the transfer of HAOP through shipping.

5.2.4 CONCLUSION TO EVALUATION OF THE CONVENTION

That the Convention makes adequate provision for a minimum but potentially effective regime to combat the spread of HAOP through ships' ballast water and sediments is not in much doubt. However, the chances of this becoming reality is fairly compromised by its weaknesses. As discussed, these include the exemption of NOBOB and coastal trading ships from the application of the Convention, the absence of liability and compensation provisions to make transferors of HAOP compensate for the pollution damage this causes, and the Convention's failure to include such other vectors for the transfer of HAOP as sewage, hull fouling, aquaculture, and other parts of ships' bodies that may harbour HAOP.

The greatest challenge, however, is for the Convention to come into force. Once this happens, the duty for States to partner and co-operate to implement its provisions would have a chance of being carried out. In that case, developing State parties may benefit from financial and technical assistance to help them begin to meeting their obligations under the Convention. It must be emphasized that such co-operation and extension of assistance is necessary so that as many States as possible can ably join to work together to prevent the transfer of HAOP by controlling their pathways and vectors.

5.3 RECOMMENDATIONS

As discussed in Chapter 2, the effects of the transfer of harmful aquatic organisms and pathogens (HAOP) through ships' ballast water and sediments are devastating. These effects are ecological, economical, environmental and human health effects. To combat the problem, the international community under the auspices of various organizations (such as, the United Nations (UN) and in particular, the IMO) has adopted various international instruments. As discussed in Chapter 3, the majority of the binding instruments are not directed principally to combating the transfer of HAOP associated with ships' ballast water and sediments, but rather establish basic provisions to prevent the problem.

The only binding treaty directly concerned with the problem is the BWMC. This Convention's objective is "to prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of Ships' Ballast Water and Sediments…."[94] Its provisions are directed to the control and management of ships, as the pathways and ballast water and sediments, as vectors through which these harmful organisms are moved or transferred from coast to coast. Ultimately, rather than eradication, prevention of the problem is the goal of the Convention. This is why the prevention of the transportation of HAOP by controlling its pathway and vectors is considered realistic, viable and cost effective, [95] more so, not all States are financially and

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[94] BWMC, *supra* note 1at preamble.

[95] Briony MacPhee, "Hitchhikers' Guide to the Ballast Water Management Convention: An Analysis of Legal Mechanisms to Address the Issue of Alien Invasive Species", *supra* note 6 at 53.

technologically capable of creating the conditions and providing the resources that would enable the rules of the Convention to be brought to bear on the problem.

The Convention has an important feature that holds the potential to universalize the application of its provisions. Once it is in force, the ships of non-parties are subject to its requirements whenever they are in the ports of any State party. As well, nearly every State is a member of IMO and also parties to both LOSC and CBD. These two Conventions also require States to protect their marine ecosystems, environment and biodiversity. The ratification of the BWMC will implement these responsibilities to a large extent under both Conventions.

Even so, the prospect of the effectiveness of the BWMC is challenged by its weaknesses, as discussed above. With these in mind, the following recommendations are made. The purpose is to consider how its regulatory effectiveness can be improved once it comes into force to be applied by States. It is also important to consider matters not covered by the Convention that need to be addressed under national law.

The following recommendations are directed to the specific weaknesses of the Convention:

(i) *Application of the BWMC to Coastal and NOBOB Ships*: As noted earlier, BWMC do not apply to NOBOB and coastal trading ships. It is recommended that States should adopt national laws and policies to regulate these ships in accordance with the provisions regarding ships covered by the Convention. Thus, States should make the requirements of the Convention, in its entirety, applicable to all ships that are designed to carry ballast water though they do not have permanent ballast water in sealed tanks. They

must be mandated to comply with ballast water management technologies and standards as required by the Convention. As noted in Chapters 3 and 4, results have shown that both categories of ships can transfer HAOP. For instance, NOBOB ships can still have residual unpumpable water and sediments in their ballast tanks, while coastal trading ships are sometimes utilized for transoceanic voyage. As such, HAOP can be taken from a port and deposited into another port of the same or different regions by such ships.

Thus, under national laws, the definition of ships to which the requirements of the Convention apply should include NOBOB and coast trading ships. Bringing coastal and NOBOB ships under the national implementation of the Convention's ballast water management will aid in the eventual eradication of HAOP that are transported through ships' ballast water and sediments, and also help to better protect the marine environment as a whole.

(ii) *Regulation of other Vectors through which HAOP may be transferred*: To further reduce threats posed by HAOP, there is a need to regulate other pathways and vectors that do not come under the mechanisms of control established by the provisions of the BWMC regarding ships' ballast water and sediments. As discussed in previous chapters, other means through which HAOP can be transferred include hull fouling, aquaculture, canals and waterways, attachment of aquatic organisms to cargo, ships' chests, anchor, and other parts of ships. Proper mechanisms of controlling HAOP transfer by these vectors must be prescribed, quite properly, under national regulations and policies of States in order to actualize the objectives of the Convention. States must also make provisions for the establishment of full sediment reception facilities, in addition to the one set out under the Convention for the cleaning or repair of ballast tanks.

(iii). *National Legislation on Land-Based Sewage Control*: All States must adopt national laws to regulate land-based sewage which are introduced in various ways into coastal waters. When this is done, it will curb the high probability that HAOP would develop near the coast or enter into coastal/port waters and eventually find their ways into ballast water and sediments.[96] Although land-based pollution control does not come under the BWMC, it remains a source of the problem and "[i]t is necessary to have a combination approaches in order to implement a truly preventative approach that begins at the source of the problem."[97] So, in order to actualize the objective of the Convention, all sources of the problem must be regulated under States' national laws and policies to have global oceans free from HAOP.

(iv). *Stringent Ballast Water Management and Standards*: There must be strict enforcement of ballast water management standards. This does not mean, however, that States should adopt very stringent ballast water management practices that will affect international shipping. It means conscientious observance of the minimum standard of ballast water management that the Convention provides. This also requires that developing States must be helped to improve their infrastructure and other facilities to meet the standards, while developed States, more financially and technologically capable, may adopt more stringent measures to achieve the same purposes. As argued, these additional measures must be voluntary so as not to drive shipping to lower standard areas, with the greater risk of the transfer of HAOP, the very problem which the measures are expected to help control and eradicate. Likewise, ships complying with higher standards

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96 See McConnell, *GloBallast Legislative Review, supra*, note 60 at 21.

97 McConnell, *GloBallast Legislative Review, ibid,* at 7.

should be given incentives, such as reduction in port charges or any other administrative charges, while those that can only meet the IMO minimum standard should not be deprived entries into ports. By this, the additional measure may become mandatory in later years.

(v) *Liability and Compensation***:** As a result of the difficulty of tracing liability for the introduction of HAOP to a particular ship, partly because of the length of time that will pass before the problem becomes visible, a fund should be established under the Convention, or by the International Association of Independent Tanker Owners (INTERTANKO) or other ship-owner groups to be used to compensate State victims of HAOP whenever and wherever damage becomes known. This may be similar to what operated under the *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage,* 1971 (FUND 1971),[98] and the experience, proven in the past, of the *Tanker Owners' Voluntary Agreement Concerning Liability for Oil Pollution (TOVALOP)*[99] and *Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution* (CRISTAL).[100] INTERTANKO, the International Chamber of Shipping (ICS), and classification societies publish Model Ballast Water Management Plans which "give practical guidance for the implementation of the IMO Guidelines on-board ships."[101] This is helpful, but it is not a guarantee that HAOP would not be transferred by ships and to cause pollution damage. This is why a fund should be

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98 *International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, supra* note 66.

99 *Tanker Owners' Voluntary Agreement Concerning Liability for Oil Pollution*, 7 January 1969, in Edgar Gold, Aldo Chircop & Hugh Kindred, *Essentials of Canadian Law: Maritime Law*, *supra* note 67 at 662.

100 *Contract Regarding an Interim Supplement to Tanker Liability for Oil Pollution*, 14 January 1971. See Gold, Chircop & Kindred, *Essentials of Canadian Law: Maritime Law*, *ibid,* at 663.

101 GloBallast Partnerships, "The International Response", online: http://globallast.imo.org/index.asp?page=internat_response.htm accessed on April 14, 2011.

maintained for compensation purposes. No compensation would pay for the damage done, but, it will offer some economic assistance to the victims.

(vi) *Ratification of BWMC by States***:** As noted in Chapter 4, the coming into force of the Convention is presently its biggest challenge. As noted earlier, as at 31 July 2011, only two more ratifications are needed to bring the Convention into force.[102] Part of the challenge that remains even upon its entry into force is that States like the United States do not find its provisions sufficiently stringent. Again, as earlier discussed, its enforcement is necessary to initiate the emergence of a basic global standard for practices on the control of HAOP through ballast water and sediments. Once this is generally operational, the more stringent rules that other States may put in place would facilitate improving the regime in later years. The importance of its coming into force is that it would initiate the formal process of its objective to facilitate the control and elimination of HAOP transfer through shipping to be pursued and its progress to be assessed periodically. Likewise, there will be unified practices and standards to regulate ships source marine pollution resulting from ballast water and sediments.

Thus, States should ratify the Convention to bring it into force and all State parties sharing coastal regions with non- party should encourage the latter to ratify and implement accordingly, the requirements of the BWMC for uniformity. For instance, United States should ratify and follow Canada's example in the implementation of IMO requirements to control and manage ships' ballast water and sediments, in order to have standardized rules to manage and protect the shared heritage of the Great Lakes.

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[102] See Chapter 4.2.1, *Overview, supra.* See also IMO, "Status of Conventions", *supra* note 89.

On a general note, assuming there is wide spread ratification of the Convention, if obligations conferred on port/coastal States by the Convention are exercised accordingly without exercising their control negatively, the goal of the Convention to combat the transportation of HAOP from a region to another will be realized. However, the realization goes beyond the enforcement of the Convention provisions at the national level, but also connects with human intervention at that level. For instance, the conditions of service of many States, in particular, the developing States are so poor. This may open the door to bribery and corruption on the part of the enforcement officers, rather than subjecting ships to thorough inspection and sampling. To combat the introduction of HAOP, the port/coastal States should also consider the conditions of service of their authorized officers alongside the obligations conferred on them as discussed above, as when this is feasible, the attainment of the objectives of the Convention is better realized.

(vii) *Assistance to the Developing Nations*: It is very important for the success of the Convention that once it is in force, its developing State parties must be assisted technically and financially to implement its requirements. Many of the developing States are susceptible to HAOP because many of them are raw materials exporters, and this has made them recipients of HAOP transferred through ships' ballast water and sediments when these are discharged into their marine ecosystems. As already discussed, they lack the financial capacity and technical tools required to combat the threats posed by HAOP. The capable participation of the developing States is indispensable to ensuring effectiveness in the regime put in place by the BWMC.[103] In this regard, the joint

[103] For discussion of the importance of assuring sufficient compliance to underscore effectiveness in treaty regimes, see Ronald B. Mitchell, "Compliance Theory: An Overview" in James Cameron, Jacob Werksman & Peter Roderick, eds, *Improving Compliance With International Environmental*

initiative Global Ballast Water Management Programme and GloBallast Partnerships which have been mandated to assist and educate developing Countries regarding implementation of the provisions of the Convention should extend their assistance beyond the six developing countries[104] to reduce the transfer of HAOP through ships' ballast water and sediments. To determine assistance priority, the numbers of ships visiting a State should be considered, as this is a good indication of the volume of ballast water received by each State.

(viii) *Adoption of Biological Baseline Surveys*: As noted earlier, the Convention did not provide for port/coastal State baseline surveys, this is however a practical method that State should adopt as it will aid in detecting the variation in the population of the existing HAOP and ensure prompt action to be taken against the introduction of new ones. It will also allow port/coastal State to warn mariners of areas where uptake and discharge of ballast water may be conducted. By this, the coastal waters will be free from HAOP introduced through ships' ballast water and sediments. Thus, it is recommended that port/coastal States should fashion their national laws and policies towards implementing this system.

Law (London: Earthscan Publications Ltd., 1996) 3 at 12-13; and Philippe Sanda, "Compliance With International Environmental Obligations: Existing International Legal Arrangements" in James Cameron, Jacob Werksman & Peter Roderick, eds, *ibid*, 48 at 49.

104 The Countries are referred to as six initial pilot Countries. The six countries are: China, Brazil, India, Iran, South Africa and Ukraine. Each of the six countries represents each developing regions of the world. See, D.C. Pughiuc, foreword in McConnell, *GloBallast Legislative Review, supra* note 60 at ii. See also GloBallast Partnerships, "The GloBallast Programme", *supra* note 3.

(ix) *Relevant Government Agencies*: State parties should involve all relevant government departments and agencies directly connected with the issue, in the implementation of the Convention and enforcement of national laws. Crucial among the departments may be those responsible for shipping, fisheries, environment, health, aquaculture, port authorities, coast guards, etc. Alternatively, states may set up a new government agency that will enforce the provisions of the national laws with its power and duties adequately spelt out. Doing this will forestall any clash among different existing government departments in the administration of the national laws as well as prevent inadequate enforcement of BWMC as a result of conflicting duties.

(x) *Adoption of Voluntary Guidelines by IMO*: Although, immediate amendment of the Convention is not feasible, as the Convention itself has not come into force, after almost eight years of its adoption, and coupled with the complex nature of amending multilateral conventions. However, it is suggested that future committees of IMO that may likely work on amendments to the Convention, or adopt additional Guidelines to foster the implementation of the Convention, should consider the suggestions made in this study for implementation in the future. But, prior to the unforeseen time of amending the Convention, the IMO can adopt Guidelines, although non-binding, incorporating the suggestions for the improvement and achievement of the objectives of the Convention, later to be upgraded as a binding instrument in the future, by way of an Annex or a Protocol to the Convention.

5.4 CONCLUSION

The short conclusion, then, is that the adoption of the BWMC is an important global step in the journey to control and eradicate the transfer of HAOP through ships' ballast water and sediments. When the Convention eventually comes into force and efforts are made to implement its provisions and Regulations on as large a scale as the spread of its State parties, it would offer a viable legal approach for effective regulatory oversight of activities that promote the transfer of HAOP. Hopefully, under its auspices, the goal of preventing, minimizing and ultimately eliminating "the risks to the environment, human health, property and resources arising from the transfer of HAOP through the control and management of Ships' Ballast Water and Sediments"[105] which the Preamble to the BWMC sets out, shall progressively be realized. Thus, we will have an international community that is free from the menace posed by HAOP introduced into different coastal regions by ships' ballast water and sediments and safer marine ecosystems devoid of HAOP will be ensured for us all in due time.

[105] BWMC, *supra* note 1 at preamble.

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APPENDIX

INTERNATIONAL CONVENTION FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS, 2004

Note: This Appendix can be found on DalSpace at dalspace.library.dal.ca