The marine environment and ballast water management law

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Abstract

This article contains a study of international and national measures dealing with the potential threat of pollution and the introduction of alien species that may come from the discharge of improperly treated ballast water. Ballast water management policy, law and coastal biosecurity strategies are considered. There are challenges to achieving the ideals of ballast water laws, as correctly pointed out by President Denholm of the Baltic and International Maritime Council (BIMCO), such as the cost of achieving these measures in today’s economic climate; however, this article emphasizes the long-term effects of ignoring proper ballast water management. This article encourages a sustained commitment to strategies aimed at dealing with pollution and the harm that may be caused by marine invasive species that often find their way around the world as a result of ballast water discharges. With the imminent implementation of international law on ballast water and a federal court of appeals in the United States ordering the Environmental Protection Agency (EPA) to rewrite a portion of its ballast water dumping rules, ballast water policy justly deserves unrelenting global attention.

Keywords: Anti-fouling; Aquatic invasive species (AIS); Ballast; Environment; GloBallast; International Maritime Organization (IMO); Marine; Ocean Health Index (OHI); Policy; Water

1. Introduction

This article considers ballast water management law and policy in terms of international law and the laws of certain countries. Some of the countries discussed include those within the Asia-Pacific Economic Cooperation (APEC) region, with the United States being one of the primary countries to be considered. The countries discussed are so selected for two reasons, first, to explore how the APEC environmental vision (APEC’s Oceans and Fisheries Working Group (OFWG), 2011) is valued by one of its biggest trading economies, the United States, and second, to provide samples of ballast water activities and practices by various jurisdictions. This is done in order to create a global snapshot of the manner in which countries in both the developed and developing worlds are dealing with ballast water law and policy as international trade partners.


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The United States is of particular interest as a permanent member of the United Nations (UN) and has had, until recently, rules on ballast water management that were considered to be of a higher standard (Grasso et al., 2015) than those established by the International Maritime Organization (IMO) through the International Convention for The Control and Management of Ship’s Ballast Water and Sediments 2004, known as the BWM 2004 and also referred to herein as ‘the BWM Convention’.

The role of the IMO, as an important agency of the UN, is to bear the responsibility for the safety and security of shipping and the prevention of pollution from shipping. This means that the IMO is also responsible for the creation of many other international instruments that are to be applied in conjunction with the BWM Convention, for example, the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). MARPOL provides for clean water ballasting, either by cleaning the ballast tanks or exclusively carrying clean ballast water in segregated ballast tanks as shown in the definitions section Regulation 1(17) and (18) of MARPOL. In ballast water law and policy, the IMO, through its Marine Environmental Protection Committee (MEPC), is responsible for the creation of a universal regulatory framework that is to be universally adopted and implemented. This means that, concerning ballast water management, once the BWM Convention is in force, through ratification by the expressed amount of States, this international law will be implemented by the member States.

‘Parties are given the right to take, individually or jointly with other Parties, more stringent measures with respect to the prevention, reduction or elimination of the transfer of harmful aquatic organisms and pathogens through the control and management of ships’ ballast water and sediments, consistent with international law’ (Article 2).

BWM Convention member States, once the law is in force, must implement international law through their own national legal frameworks that comply with international standards. This is achieved through the cooperation between the appointed local authority of each port State, which must coordinate its activities through the interconnection of various government agencies that are responsible for the implementation of that law (Article 2). In the United States, for example, the Convention would have to pass through Congress and be enforced through government agencies such as the United States Coast Guard (USCG), the Environmental Protection Agency (EPA), together with other government agencies that are responsible for compliance with international law, such as the American Bureau of Shipping (ABS) (ABS Ballast Water Treatment Advisory, 2011), in terms of the United States Code of Federal Regulations and other applicable State laws, ordinances and by-laws (Code of Federal Regulations (CFR), 2015). Each country has its own unique system of institutional implementation of law.

With the mentioned law and policy on ballast water, this discussion of ballast water management, the legal response, proposed solutions for international trade, and the health and sustainability of the marine environment, forms the basis of this analysis. This incorporates an understanding of the issues pertaining to ballast water discharge from scientific, biological, engineering, design, environmental and legal perspectives. The legal perspectives in this paper are drawn mainly from the BWM Convention, which is not yet in force, as the Convention force status has not been reached yet (IMO, 2015a, 2015b, 2015c, 2015d, 2015e). The industry requested force moratorium on the Convention in order to better prepare the industry to deal with the implementation of this international law (Seatrade, 2014); however, it appears that the force status of the Convention is fast approaching as tonnage figures are being confirmed (IMO, 2015a, 2015b, 2015c, 2015d, 2015e).
2. Understanding the threat of aquatic invasive species

The BWM Convention sets out the threat of aquatic invasive species (AIS) and provides regulations dealing with that threat (Article 1, Preamble of the BWM Convention). The threat of AIS refers to invasive species and other organisms that are transported between trading partners through shipping transport as the main vector (Elkady et al., 2014). This occurs as a result of seawater being pumped in and out of ships in order to stabilize the vessels between empty and laden voyages into and out of various foreign ports. Ship transportation being the viable carriage method with the best economies of scale in international trade requires this practice as part of safe ship design.

The BWM Convention helps to educate those involved in the marine and maritime environment about their roles in continued endeavours to deal with invasive species and pollutant sediments that come from the discharge of ballast water. South African shores, for example, have been affected by at least 22 reported invasive species as a consequence of international trade (Robinson et al., 2005; Mead et al., 2011). The South African Draft Ballast Water Management Bill of 2013 (Government Gazette No. 363303, 3 April 2013, Notice 340 of 2013), which follows the BWM Convention, is an example of an active regulatory response to the concerns raised by ballast water discharges.

The traditional rule on preventing AIS was originally couched in the United Nations Convention of the Law of the Sea (1982) (UNCLOS) (Article 196(1)), which is customary law rather than ratified law to the United States. Prior to the UNCLOS and any other code, ballast water management fell into the recognized customary rule, commonly known as the ‘no harm rule’. This rule provides that a State is duty-bound to prevent, reduce and control the risk of environmental harm to other States (Fonseca de Souza et al., 2008).

It would seem, however, after several scientific studies such as those conducted by the IMO through GloBallast and in the United States, by the EPA and its Science Advisory Board, that the AIS threat needs more stringent regulation as non-endemic species seem to continue to compromise the biodiversity of national coasts around the world. In the United States some of the leading studies into ballast water management include, inter alia, the Assessment of Transoceanic NOBOB Vessels and Low-Salinity Ballast Water as Vectors for Non-indigenous Species Introductions to the Great Lakes, which focused on mid-ocean ballast water exchange (NOBOB Great Lakes Project, 2005), a system sought to be phased out, and the white paper created by the Terra Bowling Research Council dealing with Michigan’s New Ballast Water Regime (Showalter, 2006). These studies bring an emphasis to the challenges posed by AIS and record methods of dealing with these problems.

Is it possible to take commercial advantage of the over-abundance of AIS? This question is important because it brings possible solutions to the AIS threat. The answer to the question is that it is important to note that experts in the invasive species field have suggested that there are some limited benefits to exotic marine species. These benefits include:

‘the improvement of aesthetic values, the creation of new economic activities (fisheries and aquaculture for example) and increased employment in invasive alien marine species management projects and programs. Knowledge gained on ecosystem processes and resource dynamics and interactions may also be seen as a positive impact’ (Bax et al., 2003).

However, the benefits listed above are not sufficient to allow national coastal economies to be lax about AIS.
The main problem with invasive species is that when they are introduced into a non-indigenous environment, they tend to cause economic and environmental harm by creating self-sustaining, dominant populations that disrupt the indigenous environment (Invasive Species Advisory Committee (ISAC), 2006; Keller et al., 2009; Simberloff & Rejmánek, 2011; Water and Wastewater International, 2015).

It is important to have a scientific understanding of what makes invasive species robust outside their natural environment and why this is considered a threat that outweighs any benefits of the presence of invasive species. Invasive species in a non-indigenous ecosystem lack predators, pathogens and diseases that keep their population numbers under control. In an indigenous ecosystem, invasive species produce abundant high-quality seeds and reproduce at a high rate, they are opportunistic in nature, they thrive on disturbance, and they are fast growing. Some invasive species demonstrate allelopathy, a condition that allows invasive species to produce chemicals that inhibit the growth of other organisms, particularly in plants, and this is of particular importance in cases of seaweed invasions (Johnson, 2008). What is disconcerting about these facts is that the discharge of ballast water from shipping is recognized as a significant factor in the introduction of invasive species (Ruiz & Carlton, 2003; Leonard, 2009).

2.1. Recorded country-specific invasions

There are many country-specific invasions that have been recorded (IMO, 2015a) as a result of ballast water discharges and ship hull fouling. Several works can be consulted for scientific as well as legal policy research (Johnson, 2007; The Telegraph, 2009). It is appropriate here to mention a few examples of these recorded invasions in order to contextualize the threat of invasions in the maritime context. This brief look at the actual threat of invasions will also provide understanding of what is meant by threats to the marine environment by AIS.

More than half of the recognized alien marine species in the United Kingdom are associated with shipping (Bax et al., 2003). Invasions by unfamiliar species of the jellyfish population, such as those off the coasts of Japan (the Nomura jellyfish), New South Wales, Auckland and elsewhere in New Zealand, have cost the fishing economies billions in financial losses (Ruiz & Carlton, 2003). Ship fouling and unmanaged ballast water discharges may lead to the introduction of parasites, viral and bacterial pathogens and similar risks. The authors state that: ‘ballast water is also capable of transporting viral and bacterial pathogens, including the bacteria that cause cholera and the resistant cysts of toxic dinoflagellates that can lead to harmful algal blooms and shellfish poisoning’ (Bax et al., 2003).

For example, invasions may also lead to shrimp farming economic losses through the white spot syndrome, which has destroyed shrimp farming activities. White spot syndrome virus is a highly virulent scourge of prawns with a wide range of potential hosts (Bax et al., 2003). There are other invasions such as the lionfish in the South Pacific and Indian Oceans, and the presence of such fish in ballast water may spell disaster in increasing this unwanted and dangerous population of fish (Aquatic Nuisance Species (ANS) Taskforce, 2015). Other AIS have been used as food, an example of which would be the common carp; although it is invasive in nature and is destructive in its feeding habits it is safe for human consumption (Kuznetsov et al., 2011; Lugagu et al., 2011; Nico et al., 2012).

In the United States, it is reported that the introduction of species has been drastic. For example, The European Zebra Mussel (Dreissena polymorpha) has infested over 40 per cent of the internal waterways of the USA, and control measures since 1989 have cost in the region of US$5 × 10^5. Diving ducks have
been a suggested predator for the Zebra mussel (Hamilton et al., 1994), however the problem still persists. Similarly, the introduction of the filter-feeding North American comb jelly (Mnemiopsis leidyi) into the Black Sea has depleted native plankton stocks to such an extent that it has contributed to the collapse of the entire commercial fisheries (EnAct International Draft Policy, 2006). Furthermore, the transportation of cholera from Haiti and some of the Caribbean ports into the US Gulf, through ballast water, is still a serious concern (Cohen et al., 2012).

In South Africa one of the most noted invasive species is the European Green crab, which is resistant to predators, and consumes and depletes prey while displacing native crabs (Robinson et al., 2005; IMO, 2015a). Furthermore, there are reports that link harbours and ports with outbreaks of dangerous pathogens such as flesh-eating disease (vibrio vulnificus, a naturally occurring pathogen) as was reported to have affected some surfers in the South African port of Durban (Comins, 2012). If this pathogen was transported on ships through ballast water, the result would be devastating. Therefore, it is obvious that unmanaged ballast water intakes and discharges into waters that are prone to such viral eruptions will not only endanger human health, but will effectively put an end to aquamarine culture and sports, for example. The severity of environmental impacts clearly shows that measures to prevent harmful ballast water discharges must be swiftly implemented for marine protection with the purpose of reaching sustainable economic activities and human safety. Best practices in shipping certainly include effective ballast water management systems.

The South African container-handling commercial port of Durban (Transnet National Ports Authority, 2015) may accommodate as many as 4,000 commercial vessels every year and thus there is a significant concern for ballast water discharges into that marine environment.

‘The port of Durban handles the greatest volume of sea-going traffic of any port in southern Africa. For the 2008/09 financial year ending on 31 March 2009, the Port of Durban handled a total of 4,554 sea-going ships with a gross tonnage of 114,723,266 or about 38 per cent of the ships calling at all South African ports’ (Transnet Port Terminals, 2015).

The problem of invasive species reaching South African coasts is not new and has been escalating over the years. Leading authors on the science of South African invasive species state that: ‘Although we fully recognise that more work is needed to fully reveal all South African bioinvasions…South African bioinvasions appear to originate from historical shipping regions such as Europe’ (Mead et al., 2011).

In 2004, the year in which the BWM Convention was adopted, Cape Town harbour was reported to have been invaded by alien European killer shore crabs believed by scientific experts to have been introduced into the environment by ships’ ballast water. The threat to the harbour eventually showed that it was the new species of shore crabs that threatened the American oyster industry. This was the case while European mussels were becoming a material threat to oyster and mussel farms on the west coast of Africa and as far east as Port Elizabeth in South Africa (Mead et al., 2011).

This is important for South Africa and any port State that has a shipping industry mainly concerned with providing port services (National Ports Act 12 of 2005, Botha, 2006; Carstens, 2011) to many vessels rather than ship ownership and management. This means that South Africa will be able to increase national and international controls that will allow it to be proactive in protecting its marine environment as a receiver of ballast water discharges with potentially invasive species. Clearly, the battle to overcome AIS is a partnership between shipowners and the ports they call to. The United
States is similarly a very strong port services nation with a large consumer base and therefore it will, like all other international trade partners, have a large interest in dealing with the threat of AIS introduced by ships.

3. Ballast water law and the proposed standard for ocean health

It is proposed that all ballast water regulations can be helpful in achieving the high standards set by the comprehensive global benchmark for ocean health, as set out in the Ocean Health Index (‘the OHI’) study (Smith et al., 2015). The OHI is a progressive study that provides distinct measures for what is considered a healthy ocean. It was developed by various experts and represents the interaction between human beings and the oceans on the basis of the overall condition of the oceans in light of the economic, social and ecological well-being of the oceans (Smith et al., 2015).

It is submitted that the OHI must be used as the most accurate standard for measuring ocean health as it is the most integrated, balanced and universal scientific study of ocean health. The OHI takes into account ocean health on the basis of the oceans’ food provision abilities; local fishing opportunities; natural products; carbon storage; coastal protection; coastal livelihoods and economies (international trade and the ports), tourism and recreation; and a sense of place, clean waters and biodiversity (Smith et al., 2015). South Africa, for example, has a regional score ranking of 71 out of 221 Exclusive Economic Zones (EEZs) in terms of ocean health (OHI, 2015a, 2015b, 2015c, 2015d). The United States West Coast has a score of 71 out of 100 (OHI, 2015a, 2015b, 2015c, 2015d). China, a very big trade partner for the whole world and an influential member of the APEC community, which also holds a permanent seat in the UN, has an overall score of 64 out of 100 and has a ranking of 150 out of 221 EEZs (OHI 2015a, 2015b, 2015c, 2015d). China is also showing much improvement and progress according to the OHI study. These scores are not static as the condition of ocean health may continue to improve or decline depending on the management of resources in that region.

With regional scores ranging from 0 to 100 for ocean health, with 100 being the highest score for health, the significance of regional scores shows where countries and regions can improve in reaching for a higher ranking and achievement of a better ocean health. It must be kept in mind that ballast water laws that support the agenda of the OHI are meant to work in conjunction with other forward-thinking international marine environmental regulations expressed in international instruments and national law. This is because an ocean that is replete with viruses, diseases and exotic species destroying biodiversity, introduced by untreated ballast water, clearly shows signs of an unhealthy marine environment. Any laws to alleviate this will increase the overall health of regional oceans.

4. The mechanics of ‘ballasting’ and the proposal for ‘ballastless’ ships

The use of ballast water in modern shipping began with the introduction of steel-hulled vessels about 120 years ago (Walton, 1899; EPA, 1999; Elkady et al., 2014). This practice of ‘ballasting’ modern vessels is necessary to improve ship stability and manoeuvrability while compensating for weight loss resulting from fuel and water consumption. With steel-hulled vessels proving to be economical, safe and strong, it is clear that current ship designs will continue to be in use because of their proven structural stability benefits (Schuster, 2002). Most research studies have concentrated on
alternatives to harmful ballast water discharges rather than doing away with ballast water discharges altogether (Schuster, 2002). This is evident in the general rejection of the proposal to introduce ballastless vessels.

A proposal to do away with traditional water ballasting has been rejected by certain ship design experts because of its inability to stop invasive species from attaching to the body of the vessel in any case. The use of steel-hulled vessels and their traditional sea water ballasting is described by one author as a market revolution of the shipping industry as the use of steel-hulled vessels provided obvious advantages for commercial shipping, by expanding cargo holds thus increasing earning capacity, while higher speeds reduced operating costs (Schuster, 2002). Ballastless ship designs have not had a competitive record of success in commercial shipping.

Ship design experts have argued the following, for example: ballastless ship designs constitute a fundamental paradigm shift in surface vessel design. Rather than increasing the weight of vessels by adding water to ballast tanks, these new designs use reduced buoyancy to get the ship down to safe operating drafts in the no-cargo condition. For example, the Variable Buoyancy Ship design achieves this end by having structural trunks of sufficient volume that extend most of the length of the ship below the ‘ballast waterline’ and then opening these trunks to the sea in the no-cargo condition. When the ship is at speed, the natural pressure difference between the bow and the stern induces flow through the open trunks, resulting in only local water (and associated organisms) within trunks at any point during a voyage. While showing promise, and worthy of further considerations, ballastless ship designs appear feasible only for new vessels being built in the future and may result in an overall increase in vessel biofouling (another significant source of invasive species), if surfaces in open flow-through spaces are more accessible and hospitable than traditional ballast tank surfaces (which are rarely fouled by higher organisms). Similarly, a return to the historical approach of using solid ballast (commonly iron, cement, gravel or sand) has been discussed recently but may not be feasible or cost-effective for most vessels in the modern merchant fleet (EPA, 2011a, 2011b; Elkady et al., 2014).

In traditional ship ballasting, seawater is pumped into the ballast tanks of the ship and such seawater is then treated with approved chemicals and other processes in order to control fouling that may take place within the ballast tanks. This treatment is undertaken because the ballast water taken into the ship’s tanks may contain non-native or exotic living organisms of various kinds and sizes, some of which may not be visible to the naked eye. If these are not controlled, they have the potential to be detrimental to the marine environment (Bax et al., 2003).

The following description sums up the mechanics of ballasting:

‘Ballast is created when seawater is pumped into…tanks for the purpose of improving ship stability. Ballast is weight added to a vessel to move the centre of gravity to a position that increases the vessel’s stability. Ballast is normally placed low within a vessel’s hull to lower the centre of gravity. Permanent ballast is usually heavy solid material such as lead. Temporary ballast is normally seawater, which is pumped in and out of the tanks in the vessel’ (EPA, 1999).

The United States’ EPA also makes reference to ‘dirty ballast’ or ‘dirty ballasting’, which is described as seawater being pumped into fuel tanks to use the same to ballast the ship (Annex 1, regulation 30, MARPOL). This means that seawater can in some cases be pumped into and out of ballast tanks, and in some instances seawater can be pumped into subsequently emptied fuel tanks, which also act as ballast
tanks. The problem presented by dirty ballasting is the release of that oil sediment mixed with seawater back into the ocean or sea environment.

There are several companies and institutions that are active in the area of providing systems and technologies to treat ballast water. Some of them achieve this without the use of chemicals. One of the examples is the technology developed under the trademark of SiCURE™ ballast water treatment system. This system uses a combination of physical separation and a proprietary on-demand treatment with biocides, produced in situ from seawater, without the addition of chemicals. The system is said to be based on a proven 30-year record and over 2,500 shipboard installations of Siemens’ well-known Chloropac® biofouling control system (Complete Anode Protection System (CAPS), 2015). The main consideration, however, is to determine whether this technology is compliant with IMO regulations as contained in the BWM Convention.

The question for the fleet owner concerns the cost of the technology and the investment required to comply with all the treaty regulations. It is submitted that it is better to invest in the short term to gain greater advantages in the long run, particularly where environmental sustainability is a concern. In the United States, The United States Coastguard’s concern for biofouling and ballast water is shown in its effort to deal with the ballast water problem by enacting guidelines in compliance with the strategic vision of the US government agencies to protect the marine environment from invasive species. These guidelines will continue to operate without waiting for dependence on the coming into force of the BWM Convention (US Department of Homeland Security USCG, 2015).

4.1. Mid-ocean ballast water exchange

In California, the Marine Invasive Species Act, AB 433 of 2003 specifically sought for measures that include mid-ocean ballast water exchange for vessels entering California as one way to prevent fouling from becoming an issue on Californian coasts (California State Legislature, 2011). Mid-ocean ballast water exchange means that ships that have operated outside an EEZ (Article 55 of the United Nations Convention on the Law of the Sea (UNCLOS), 1982) of a country must either retain their ballast on board or undergo ballast water exchange without emptying ballast water into the seawaters. The EEZ is defined as:

‘...an area beyond and adjacent to the territorial sea, subject to the specific legal regime established in this Part, under which the rights and jurisdiction of the coastal State and the rights and freedoms of other States are governed by the relevant provisions of this Convention’.

The UNCLOS Convention is applied as a matter of custom in US territories. In mid-ocean, ballast water exchange ships tend to flush their ballast tanks in the open ocean, thereby replacing ballasted coastal water with ocean water (Smithsonian Environmental Research Center, 2015).

In terms of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (P.L. 101-646), it is required that all vessels entering Great Lakes Ports from beyond the EEZ undergo ballast exchange or some comparably effective ballast treatment that conforms to ballast water discharge requirements of the Federal Water Pollution Control Act (33 USC 1251) (‘the FWPCA’). The FWPCA requirements were extended to vessels arriving in ports of the upper Hudson River, north of the George Washington Bridge on 4 November 1992. The National Invasive Species Act (‘the NISA’) of 1996 (P.L. 104-332) reauthorized and amended the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.
The NISA issued mandatory ballast management reporting and voluntary ballast exchange guidelines to all vessels that enter US waters from outside the EEZ, with the exception of military vessels, crude oil tankers that carry out coastwise trade, and some passenger ships that are equipped with ballast treatment systems.

All of the above anti-fouling management systems are examples of how ballast water can be managed after it is received aboard. However, it has been stated that no method has been successful in completely removing all of the organisms or species. Instead, it is proposed that several methods should be used, taking into account factors such as cost and effectiveness, particularly where compliance with regulations may require ships to be retrofitted with expensive technologies (Chase et al., undated). There is also a proposal for the use of a combination of methods (Bax et al., 2003; EPA, 2011a, 2011b) to kill the organisms or species in the ballast water, in order to ensure that ballast water treatment systems are successful in managing the prevention of the introduction of alien species into an endemic environment to its detriment.

It is clear that an improvement in the understanding of the mechanics of ballasting in ships will improve the ability of policy makers to understand the need for creation of a better legal framework in dealing with ballast water discharges. This means that the legal expertise of law commissions must be combined with an accurate understanding of ballasting and the scientific research that goes into the mechanical and chemical practicalities of the ballast management systems. This is not something that can be achieved passively. Each nation must contribute to this effort. The development of laws around the US coast, reflected above, shows that greater care is taken now than historically to deal with ballast water discharges, and that this environmental stewardship is what the IMO seeks to achieve with the BWM Convention. The use of proper ballasting expertise will assist in creating legal frameworks that are sound and practical. Furthermore, such expertise will make an impact on the protection of the marine environment without being so onerous that it hinders the business efficacy, economics and exigencies of navigating the marine environment.

4.2. Compliance by ship owners: modern technologies and fittings for ballast water management

Ballast systems’ manufacturers (MAHLE, Ocean Protection System) (MAHLE, 2015) and ship owners are responsible for ensuring compliance with the regulations. As such, their concerns must also be addressed. As the enforcement deadline of the Convention standards approaches, one of the difficulties faced by ship owners in 2012, for example, was the reliability of the technologies proposed to allow them to comply with the BWM Convention (Eason, 2012).

Solutions for compliance with ballast water regulations must be realistic, economical and, most importantly, consistent. To deal with this issue, the USCG in the past has adopted the EPA testing procedures, passed through its Environmental Technology Verification Program. These procedures were said to be more robust than those proposed by the IMO G-8 guideliness (Annex 4 Resolution MEPC. 174 (58), adopted on 10 October 2008, Guidelines for Approval of Ballast Water Management Systems (G8)) guidelines (Metcalf, 2012). This meant that certification contained in the IMO G-8 guidelines would not be consistent with the certification of the United States. This was a serious technological challenge. It also was a challenge to the level of universal consistency that the BWM Convention sought and seeks to achieve (Howard, 2012) in ballast water management systems.

However, with the appeals court decision of New York in the Natural Resources Defence Council, Northwest Environmental Advocates, Center for Biological Diversity and National Wildlife Federation...
v United States Environmental Protection Agency with Lake Carriers’ Association and Canadian Shipowners Association, (Intervening) (13-1745 (L) NRDC v EPA, Docket Nos. 13-1475(L), 13-2393 (CON), 13-2757(CON)), methods of compliance with ballast water management created by the EPA through the Vessel General Permit (VGP) 2013 (page 6 of judgment) were partly vacated by the court in a 2015 decision because the EPA was found to have acted arbitrarily and capriciously in creating ballast water management rules (page 63 of judgment). This decision may be appealed; however, for the moment it would appear that there is a gap in the rules that must be addressed to help the EPA and other shipping stakeholders to determine scientifically which technologies comply with the expressed IMO standards, according to the BWM Convention, Regulation D-3, which deals with BWM technologies.

The court in Natural Resources Defence Council, Northwest Environmental Advocates, Center for Biological Diversity and National Wildlife Federation v United States EPA with Lake Carriers’ Association and Canadian Shipowners Association, (Intervening) supra, after looking at all the evidence, ordered that the EPA review a portion of its ballast water rules and consider the IMO standards. They were also ordered to review their rules on proper monitoring, reporting and other onshore ballast water treatment systems (page 64 of judgment). The court held that the current VGP would stand until a new VGP standard is issued by the EPA. For the United States, it has never been more important to invest in sound scientific methods to deal with ballast water discharges and technologies, and to create clear rules that will benefit the shipowners, the economy and the port State. The rules and methods of a port State authority must take into account all potential methods for dealing with AIS threats. Such methods have to be part of sound science and, best of all, such rules must be effective in dealing with the problem. This decision is helpful in that it allows for the United States authorities to not be completely isolated from the leading efforts of the IMO pertaining to ballast water management, which are clearly not a lowering of standards just because international consensus is required in creating such rules.

5. Legal issues pertaining to discharge of ballast water

To highlight characteristic legal issues that are relevant to the harmful discharge of ballast water, the case of Northwest Environmental Advocates, The Ocean Conservatory Inc., Water Keepers Northern California and The States of New York, Illinois, Michigan, Minnesota, Wisconsin and the Commonwealth of Pennsylvania (Intervening) v United States EPA (‘the Northwest Environmental Advocates’) is enlightening. The case was based on a petition for a review of an order by the EPA.

The matter concerned the administrative power of a government agency in making decisions to exempt certain vessels from discharging ballast water, among other pollutants, into navigable waters of the United States. The environmental groups were challenging regulation 40 CFR § 122.3(a). The regulation in question was promulgated by the EPA exempting certain marine discharges from the permitting scheme of sections 301(a) and 402 of the Clean Water Act (‘the CWA’), 33 U.S.C. The aforementioned CWA provisions operated to allow certain vessels to discharge effluent from properly functioning engines. It also allowed discharge of laundry, shower, and galley sink wastes, and any other discharge incidental to the normal operation of a vessel, including ballast water without permits.

The court found that the goal of the CWA legislation was to prevent marine pollution as it expressly provided that discharges of pollutants into the marine environment were unlawful, unless exempted by
the granting of a National Pollutant Discharge Elimination System. The court considered in great detail
the powers of the EPA and the impact of harmful ballast water discharges, finding that the EPA had
acted *ultra vires* (irrationally) in exempting certain vessels from discharging ballast water, among
other pollutants, into navigable waters of the United States. The court emphasized the unlawfulness
of the action of the EPA and ordered that the regulation be vacated in favour of a new regulation,
which would be more in line with the policy goals of marine environmental protection.

The *Northwest Environmental Advocates* and the new case *Natural Resources Defence Council,
Northwest Environmental Advocates, Center for Biological Diversity and National Wildlife Federation
v United States EPA with Lake Carriers’ Association and Canadian Shipowners Association, (Interven-
ing) (13-1745 (L) NRDC v EPA, Docket Nos. 13-1475(L), 13-2393(CON), 13-2757(CON)) echo
universal principles of just law pertaining to the protection of the marine environment from pollution
by highlighting the parameters and legal framework within which port States are required to act. These
are also important cases for the testing of marine environmental laws and marine environmental
protection, especially for the United States, particularly after the EPA’s initial rejection of the IMO
guidelines.

5.1. Policy considerations

The application of the BWM Convention and training on its application are provided by IMO and
GloBallast (*IMO MEPC 63rd Session, 2012*). The GloBallast Partnership Programme (2015) is a flag-
ship body that assists the IMO, to help developing countries to deal with the environmental threats
caused by AIS (*IMO, 2015a*). In the South African context, Gumede considered the intricacies of
the BWM Convention on its introduction in 2004 (*Gumede, 2004*). Twelve years later it is now
necessary to review the state of readiness of South Africa and the international community in imple-
menting the BWM Convention. Furthermore, a policy document proposed by EnAct, an international
consultancy on ecological sustainability, has a commendable step-by-step proposal on how the port
authorities and administrators can develop strategies to deal with ballast water (*EnAct, Draft
Policy, 2006*).

The South African EnAct document was instrumental in identifying the need for updated regulation
among other scientific aspects related to the protection of the marine environment. According to
GloBallast’s statistics, the BWM Convention is an important step towards the added protection of
developing country coasts that are traditionally at a higher risk of AIS. However, it is clear that
this is not a problem that affects only developing countries (*UN Conference on Sustainable Develop-
ment, 2012*).

According to the GloBallast initiative, from inception, developing countries have historically been the
most vulnerable to invasive species introduced by ballast water discharges (*Metcalf, 2012*). However,
GloBallast has also developed categorization and representation of shipping interests that can be used
to measure the shipping interest of countries. South Africa, for example, when compared with other
nations, does not fall under categories (a) or (b) of the largest States providing international shipping
services (*PMA Attorneys, 2012*).

According to GloBallast, category (a) States are the 10 States with the largest interest in providing
international shipping services, and these States are the economies of China, Greece, Italy, Japan,
Norway, Panama, Republic of Korea, Russian Federation, United Kingdom and the United States.
Category (b) States are the 10 States with the largest interest in international seaborne trade, which
6. International law: compliance with the BWM Convention

In 2002, GloBallast carried out a comprehensive legal review of countries’ domestic legislation on ballast water (McConnell, 2002). Six countries’ approaches to ballast water and marine environmental law were selected to be part of this review report and project, including that of South Africa. This review was important in the formulation of recommendations to address issues relevant to the success of the BWM Convention. More than a decade later, a further review is necessary so as to determine the future of the Convention in light of current efforts to manage ballast water discharge (BWM, preamble).

There are, in addition, a number of useful records and resources such as documents produced by State Legislature environmental bodies (Dobroski et al., 2007) that may also be consulted to assess the readiness of countries to implement the BWM Convention. These include the listing of ballast water law national profiles created, for example, by INTERTANKO (2006) and used as a reference work by GloBallast. In the US District Court Decision in Northwest Environmental Advocates et al., the EPA was called to take full responsibility for the regulation of ballast water discharges within a specific time frame without going over and above the powers it has in terms of the law (United States Court of Appeals for the Ninth Circuit 537 F. 3d 1006 (9th Circ. Cal., 2008)).

6.1. Certainty regarding compliance with the BWM Convention

The questions to be asked are as follows: As the BWM Convention is promoting a global approach to harmonize international law in dealing with ballast water measures, what steps are required of participants? Are those steps being achieved by participants for the sake of marine protection? Furthermore, are the laws and policies of the BWM Convention sufficiently clear and easy to comply with, or are they seen as cumbersome certification strategies that seem to make port-to-port entries even more difficult? To answer these questions, clarification regarding the expectations of the terms of the BWM Convention is necessary.

In terms of Article I of the BWM Convention, the legal objectives of the Convention are to support a sustainable marine environment (BWM Convention, 2004 art. I(1)–(12), Constitution of the Republic of South Africa (1996), Section 24). Most importantly, the Convention is clear about the threats that are presented by unsuccessfully managed ballast water discharges (BWM Convention, 2004 art. I(8)). Article II of the BWM Convention, read together with the Convention’s Annex (regulations A–E), deals with the general obligations of a State party in the implementation and enforcement of the Convention's standards. The methods employed are aimed at preventing harm to the environment (BWM Convention, 2004 art. II subsection (5)–(6)), using methods that are safe for the environment as well as human beings (BWM Convention, 2004 art. II(7)) and most importantly, seek the protection of
the marine environment by being sensitive to any harm that may be caused to it (BWM Convention, 2004 art. II(9)). Article III concerns the application of the Convention to State parties and gives them clear instructions on how to deal with non-party members, avoiding unduly favourable treatment to such ships (BWM Convention, 2004 art. III(3)).

The Annex to the BWM Convention, which includes Article IV of the Convention, clearly sets out the standards required for controlling the transfer of harmful aquatic organisms and pathogens through the ship’s ballast water and sediments (BWM Convention, Annex; 2004 art. IV(1), (2)), which must be read together with Article V, which deals with sediment reception facilities. Article VI of the Convention allows parties to participate in the contribution towards the research and technology that will allow those standards to be achieved (BWM Convention, 2004 art. VI(2)(a), (b)). In order to avoid duplication of certification or confusion as to standards, Article VII of the Convention provides that a party who complies with the Annex certification is not obligated to provide any other survey certificate (BWM Convention, 2004 art. VII(2)). This measure should reduce the paperwork and other delays associated with matters relating to compliance with the Convention. However, it does create the potential for a need for double certification from non-member parties, which may cause additional delays.

The BWM Convention cogently complements environmental marine protection in line with other Conventions for marine protection, such as the International Convention on the Control of Harmful Anti-fouling Systems on Ships (2001), which clarifies the consequences of non-compliance and violation of its provisions (BWM Convention, 2004 art. VIII, IX).

The Annex to the BWM Convention, which consists of regulations, certificates and ballasting records required under the Convention, is also important (BWM Convention, Annex). The Annex comprises several regulations categorised into sections. Section A regulations deal with ships and other important details concerning information about the parties involved, as well as some exemptions to certain rules (Annex, regulations A1–A5). Section B regulations set out the practical steps towards the implementation of a ballast water management plan and the keeping of a record book by shipowners.

Annex regulation B-1 provides for the ‘Ballast Water Management Plan’. Each ship shall have on board and implement a Ballast Water Management Plan. Such a plan shall be approved by the Administration taking into account Guidelines developed by the Organization. Annex regulation B-2 provides for the details of a ‘Ballast Water Record Book’.

These record books will be invaluable for research as well as forming a record of violations or risks in ballast water management systems. Although this will add further administrative responsibility, it is not so onerous that it cannot be attended to easily, bearing in mind the goals to be achieved in the process. Therefore, the answer to whether the steps to implement the Convention are clear is yes, the steps are clear; however, until the Convention comes into force, these steps cannot be fully implemented except through acceptable port State regulations. The goals of the Convention are achievable by States that will issue compliance certificates and they are not cumbersome; however, difficulty to enter ports that do not recognize the certifications under the Convention will still create port entry problems in certain jurisdictions.

6.2. Certification and expected standards of the BWM Convention

The BWM Convention is applicable to any type of vessel (BWM Convention, 2004 art. I(12)). It requires an international certificate to be carried by a ship flying a party flag or a non-member ship to carry a certificate within the territorial waters of a State party. It would seem that the most challenging aspect of the BWM Convention is not only the development or application of technology to allow
compliance by vessels but also the uncertainty concerning ships that are not compliant with the standards of the Convention (Hamburg Messe Shipbuilding, 2012). However, the established standard benchmarks for ballast water management systems (BWM Convention, 2004, Annex, section D) provide ongoing guidance for the contracting State parties so that improving technology should ensure compliance, as is the case in Japan and Germany (IMO, 2015c) for example. More countries are coming up with certified technologies as the date of implementation approaches with the assistance of a working group created by the IMO.

The two main standards expected of ships in terms of the Convention are contained in Annex Section D-1 (ballast water exchange, which will eventually be phased out) and Annex Section D-2 standards (ballast water treatment). The provisions of the Convention set out in regulation B-3 (BWM Convention, 2004 art. I (2)) concerning D-1 ballast water exchange aim to phase out this method by 2016 (Annex regulation B-3). This is a crucial step in the enhancement of technologies for ballast water management systems since contaminated ballast water, if exchanged, is simply an exchange of source port organisms with organisms of the EEZ coastal waters, which fails to deal effectively with the nuisance created by AIS.

For certification, the BWM Convention requires a Ballast Water Management Plan to be submitted by shipowners for approval to the Administration. Article I of the Convention defines the ‘Administration’ as the government of the State under whose authority the ship is operating. The Ballast Water Management Plan must be submitted together with a ballast water record book, which does not need approval of the Administration. After the submission of the documents, an initial survey will be conducted, which will result in the issuance of a certificate of approval to the shipowner (BWM Convention, 2004, regulations B-1 and B-2 of Annex).

Compliance with Section D-1 and D-2 standards will be determined according to the year in which a vessel is built. Technological expertise is necessary to explain, scientifically, what is to be done in terms of these standards and ballast water volumes. However, what is clear is that the standards must be implemented in such a manner that the ballast water, prior to discharge, is treated to the extent that there is only a very low risk of the introduction of harmful pathogens and AIS. Contracting State parties will deal only with compliant vessels in terms of the Convention. Uncertainties concerning compliance are expressly provided for in the Convention (BWM Convention, 2004 art. III). For clarity on approved systems, the IMO’s working group on ballast water technologies monitors the compliance with IMO standards and keeps a current list of approved BWM systems that manufacturers may have tested for compliance.

7. South Africa, selected APEC countries and South Pacific islands

In comparison with ballast water regulations of countries that have robust national laws, such as the United States, South Africa’s ballast water law appears to lag behind. For example, the United States has federal and state laws (Salzman et al., 2001; Marine Protected Areas Center (MPA), 2015) that suit its national interests; naturally this will relate to specific concerns over ballast water discharges. Comparing South Africa with Canada, another APEC nation, on ballast water regulations or AIS, Canadian laws have also historically dealt with ballast water discharges under other statutory topics instead of specific law (Canada Shipping Act, 2001; Canada Transport Publication TP 13617 E). This was also the case in South African law (National Environmental Management Act 107 of 1998) until the creation of the South African Draft Ballast Water Management Bill of 2013 (Government Gazette No. 363303, 3 April 2013, Notice 340 of 2013).
GloBallast stated in its legislative review that Australia was one of the first countries to look to the IMO to deal with ballast water issues (McConnell, 2002). When considering the ballast law of Australia and South Africa as maritime nations, it is clear that they will benefit from the BWM Convention, which allows a more technical world standard approach to dealing with ballast water management. It is also noteworthy that New Zealand has now signed the Convention and is working towards ratification (IMO Treaty Status, 2015; New Zealand House of Representatives Report, undated).

A glance at the signatories of the BWM Convention demonstrates that the South Pacific island nations of Kiribati, the Cook Islands and Tuvalu have been receptive to the BWM Convention. This will be important in keeping the marine environment of those islands in pristine condition. It is suggested that other islands in the same region should adopt these measures as they are easier to implement with island nations whose business is generally dependent on their ocean health. In terms of general national law, ballast water is dealt with very briefly in most national South Pacific island laws as a regulated shipping technical issue or a marine pollution issue. Some examples include the Samoa Marine Pollution Prevention Act, (2008a, 2008b) s 10. See also the Fiji Marine Act 35 of 1986 and the ballasting regulations thereunder.

8. Conclusion

Having investigated the legal issues concerned with the harmful discharge of ballast water, it is clear that the BWM Convention is supportive of international efforts to regulate global marine environmental threats. The Convention in essence supports national sea and ocean health as a common heritage of mankind. The OHI (as an indicator of the world’s ocean health) will be a helpful measure to apply now and in the years to come after the implementation of the Convention and to test the success of the application of the Convention. The OHI index is a general indicator. This paper does not argue that the BWM Convention is the only way to increase the OHI index but simply argues that its implementation is a step in that direction together with other marine protection regulations by the IMO as well as with appropriate domestic laws.

The BWM Convention cannot be forced on countries and any delay in its implementation has simply allowed the IMO and the industry to prepare itself for the implementation. It is also recommended that developing and developed nations implement the BWM Convention standards while awaiting force of the Convention. Actions of this nature will ultimately lead to the common international goal of having a sustainable future for the marine environment and the resources that come from it. The financial cost of implementation will ensure that future costs of a destroyed marine environment and marine ecosystems are lower. Leading economies should continue to commit to setting an example in acceding to the BWM Convention as this shows international commitment to sustainable trade.

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