Chapter 5
CONTROL OF BALLAST WATER POLLUTION IN PORTS

Loading and unloading of ballast water is an important process in vessel operation. Large vessels would require thousands of tonnes of ballast water to ensure stability. Ballast water contains hundreds of species causing serious impacts over environment, public health and economy, if are carried to places where they are alien. Hence, ballast water management is very significant in controlling port pollution.

The Meaning of Ballast Water Pollution

The ballast literally means ‘any material that is used to balance an object to maintain its buoyancy’\(^1\). A Ship need ballast water for stability and maneuverability, when she is empty or is partially loaded. This will have to be discharged subsequently when the ship is in cargo. The water quality and biological content of ballast water may vary depending upon the ship’s navigational route, whether it is in river or sea. The ship’s crew will have to adjust ballast level continuously and this depends upon its design and weather conditions and accordingly, the ballast water discharge may happen either in ports or in open seas\(^2\).

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The ability of planktons, microbes and pathogens to pump into ship’s ballast system and survive relatively long voyages, drifting in the ballast water till the end of the voyage was identified as early as 1897\(^3\). No wonder some scholars have described a ship’s ballast tank as ‘floating aquariums’\(^4\). Earlier, most of the ships were wooden and sailed on dry ballast. With the introduction of steel hulled vessels and water as the most economic form of ballast in usage, it is said that there can be up to 10,000 different species getting a free ride in ballast tanks of ships in global transport\(^5\). Mostly, the dark and toxic conditions inside the tank do not support photosynthesis and majority of these organisms end up their life inside the tank itself.

Yet, some organisms like the *holoplankton, meroplankton* or *tychoplankton, Chinese Mitten Crabs, European Green Crabs, Mussels, Whelks, American Jack Knife Clam, Comb Jelly fish and Vibrio Cholerae* have been reported to have survived in ballast water and multiplied at an alarming rate causing considerable disruption to the port environment if the aquatic conditions are hospitable\(^6\). These organisms may disrupt the physical condition of water in ports, affect fisheries and cause serious health and sanitation issues\(^7\).


\(^4\) Sharonne O’Shea & Allegra Cangelosi, “Trojan Horses in Our Harbours: Biological Contamination from Ballast Water Discharge”, 27 University of Toledo Law Review 381 (1996)


\(^7\) For example, it is reported that in the countries around the Pacific Ocean the presence of *toxic dino flagellates* have been responsible for *red-tides* resulting in fish mortality and ultimately producing human neurotoxins causing serious health hazards for
Therefore, pollution of port environment by the introduction of harmful aquatic organisms, and pathogens through ships’ ballast water as a vector has been identified as one of the four greatest threats to the world’s oceans. Also, the introduction of ‘Non-Indigenous Species’ into a foreign ecosystem is considered as a second major threat for biodiversity. Reports on ‘Harmful Algal Bloom’ have established that the ballast water is an important vector for global dispersal of toxic microalgae. The ballast water discharge should be controlled in ports because of three major reasons. First, it may cause port pollution, second, it may disrupt biodiversity and third, it may have negative impacts on human health.

Maritime ports in India are under rapid expansion with increased volume of trade especially, the oil imports. This may possibly introduce many more invasive species capable of polluting the port waters. The GLOBALLAST programme under the aegis of IMO had conducted a pilot study based on trading patterns in Mumbai and Jawaharlal Nehru Ports on the risk assessment of biological invasions through the ship’s ballast. India’s tropical or subtropical climate and its estuarine and lagoon ports favour the humans feeding on them. See, N.V. Madhu, P.D. Reny, Meenu Paul, N. Ullas & P. Reshmi, “Occurrence of Red Tide Caused by Kaernia Mikimotoi (toxic dino flagellate) in the South West Coast of India”, 40 Indian Journal of Geo Marine Sciences 821 (2011)


9 The United Nations Environment Programme (UNEP), 2002


11 Supra n.8, at p. viii
spread of water-borne pathogens from ship’s ballast water. Therefore, urgent attention is required to control the ballast water pollution in ports. Also, if secondary invasions spread to highly sensitive coral reefs of Andaman and Nicobar and Lakshadweep islands, the environmental threats may be beyond human predictions. Hence, India need appropriate laws to control this form of biological pollution from ships.


The earliest legislative attempts on control of ballast water pollution may be the United Nations Convention on Law of the Sea. The UNCLOS obligates equally all states to prevent this form of biological pollution. One of the significant questions that need to be answered is whether discharge of ballast containing pathogens falls under the definition of marine pollution or is it some other form of ecological harm? The answer to this question is a highly debated one. It could be construed positively as marine pollution from the provisions of the convention. Under the convention, marine pollution means,

“...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 sea, impairment of quality for use of sea water and reduction of amenities”\(^\text{12}\).

\(^{12}\) *Supra* n.1, art. 1(4)
Whether the expression ‘substances’ includes introduction of alien species seems doubtful. Some scholars opine that it includes the introduction of alien species, if it is producing deleterious and harmful effects in coasts\(^\text{13}\).

If ballast water containing harmful invasive species may be construed as ‘ship sourced marine pollution’ the provisions of operational pollution under MARPOL 73/78 may be applied or may be incorporated with minor amendments thereto and also at domestic levels. In that case there is no need for a separate convention.

The problem of untreated discharge of sewage from on board a vessel is already accommodated under MARPOL 73/78. The ballast contains diluted form of sewage. What the ship does is just taking in sewage containing water from one port and discharging it into a different ecosystem. The ship is just a transporting link. In that case, it could be made liable for causing intentional pollution at the discharge ports. The precautionary principle may not work out in such cases.

The actual causation of ballast water pollution is the reluctance of coastal state in properly disposing the municipal sewage and other land based sources of pollution. It is well understood that states have been reluctant in admitting the political, social and economic causes of pollution. Moreover, there are diverse problems associated with ballast water discharge and marine pollution is one among them. Hence, the UNCLOS regime of marine pollution control may be extended over it based on the impact or potential harm it may cause to the port ecosystem disregarding the exact classification of the causal agent.

The introduction of invasive pathogens such as *vibrio cholera* can be recognized as marine pollution instead of treating it as just a human health hazard. Traditionally the situation was categorized under the International

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Health Regulations but contemporary thinking links health and environmental aspects in order to ensure bio-security\textsuperscript{14}.

The United Nations Convention on Law of the Sea calls for prevention, reduction and control of accidental or intentional introduction of species into the marine environment\textsuperscript{15}. All states have a duty to protect and preserve the marine environment\textsuperscript{16}. This duty includes prevention of marine pollution and protection of rare and fragile ecosystems, depleted habitats, and threatened or endangered marine species from all sources of pollution\textsuperscript{17}.

The convention allows all states to take measures ‘to prevent, reduce and control pollution of the marine environment from ‘any’ source\textsuperscript{18}. The ballast water containing NIS detrimental to or causing phenomenal changes to a part of the marine environment is a form of marine pollution. The definition


\textsuperscript{15}The U.N. Convention on the Law of the Sea, 1982, art. 196(1) reads, “States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto; Art. 196(2): This article does not affect the application of this Convention regarding the prevention, reduction and control of pollution of the marine environment.”

\textsuperscript{16}\textit{Id}, art.192

\textsuperscript{17}\textit{Id.}, art. 194(1)-(5)

\textsuperscript{18}Article 196 originates from Article 192. Yet Article 192 clearly does not establish the source of this form of marine pollution. this conclusion is reached when reading together Article 196 with Article 192 and Article 194(5)
of “dumping” does not accommodate ballast water pollution\textsuperscript{19}. Hence, it may be safely categorized as ship sourced operational pollution\textsuperscript{20}.

If ballast water is treated as a source of operational pollution by ships, by giving due publicity of the port entry requirements, the coastal state can effectively regulate access to ships violating the ballast water discharge standards\textsuperscript{21}. They can also take necessary action against violations when the ship is at port or its territorial sea\textsuperscript{22}. This right includes the right to enact intensive legislation on the topic, provided the requirements should not hamper the right to innocent passage through the territorial sea\textsuperscript{23}. Physical inspections could be done in accordance with international requirements, when there is ample evidence for doing so, avoiding unnecessary delays and hardships to the vessels\textsuperscript{24}. Apart from these general rights, UNCLOS does not specifically address the issue of seeking permission of the coastal state during ballasting or de-ballasting.

Flag states do have the responsibility of establishing minimum international standards to control ballast water pollution by legislating and

\textsuperscript{19} UNCLOS, art. 1(5)(b) reads that, “dumping” does not include:

(i) the disposal of wastes or other matter incidental to, or derived from the normal operations of vessels, aircraft, platforms or other man-made structures at sea and their equipment, other than wastes or other matter transported by or to vessels, aircraft, platforms or other man-made structures at sea, operating for the purpose of disposal of such matter or derived from the treatment of such wastes or other matter on such vessels, aircraft, platforms or structures;

\textsuperscript{20} \textit{Id.}, art.194 (1) and (3)


\textsuperscript{22} \textit{Id.}, art.25(2)

\textsuperscript{23} \textit{Id.}, art.24

\textsuperscript{24} \textit{Id.}, art.226(1)(a)
enforcing the same over vessels registered in their countries. This responsibility includes the inspection of vessels to verify the records and to see that the construction, design, equipment and manning standards on ballast water discharging as per the international requirements are being carried out properly. Flag states have the duty to see that warships and other non-commercial vessels also comply with these standards. The UNCLOS also calls for regional and global co-operation for the protection and preservation of marine environment. This includes all measures to eliminate the risks of ballast water pollution. States have the responsibility to provide adequate compensation in their legal systems for damages caused by ballast water pollution.

The provisions of UNCLOS are designed mainly to eliminate conflict between nations engaged in international trade. They provide ample space for domestic remedial regime but are often criticized for creating rooms for unilateral enforcement measures. They concentrate on balancing of rights and responsibilities and cannot be said to provide accurate remedial measures. Hence, there was the need for a specific convention.

**Control of Ballast Water Pollution under the Rio Declarations and Agenda 21**

Out of the twenty seven key principles set out by the Rio Declaration, the precautionary and the polluter pay principles may be applied to the control of ballast water pollution. The International Convention on Biological Diversity

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25 *Id.*, arts.211(2) & 217(1) (4)

26 *Id.*, arts.217(2) (3)

27 *Id.*, art.236

28 *Id.*, arts. 197-201

29 *Id.*, art.235

30 E. Molenaar, *Supra* n.13

calls for the protection of biodiversity, including marine biodiversity. Soft laws like the Agenda 21 also calls upon nations to consider regulating ballast water discharge to prevent the spread of non-indigenous organisms.

**Control under the MARPOL 73/78 Regime**

The original objective of MARPOL 73/78 was to respond to marine pollution from the “deliberate, negligent or accidental release of oil and other harmful substances from ships…” and to eliminate “intentional pollution of the marine environment by oil and other harmful substances and the minimization of accidental discharges of such substances…” Under the convention, harmful substances mean to include

“…any substance which, if introduced into the sea, is liable to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea, and includes any substance subject to control by the present Convention…”

Like the UNCLOS, it also defines discharge from dumping,

“…Discharge, in relation to harmful substances or effluents containing such substances, means any release howsoever caused from a ship and includes any escape, disposal, spilling or leaking, pumping, emitting or emptying…”

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32 The Convention on Biological Diversity, 1992, art. 8(h), 31 I.L.M. 818


34 The Preamble of MARPOL 73/78

35 MARPOL 73/78, art.2(1)
Hence, there was a deliberate attempt to include ballast water pollution under a separate annex. Even though, a separate convention is established to control this form of pollution, MARPOL 73/78 would still be considered important because many states may treat ballast water pollution as ship source operational pollution in the absence of a definite international and national legislation on the topic. As of now, the provisions of the CBD and MARPOL 73/78 as regards the bio invasions run concurrently. Unless they complement each other the replication of surveys and certifications can make the enforcement highly cumbersome and inefficient.

**Safety Control under the SOLAS 74**

Ship’s stability and safety are closely linked. The provisions of Safety Convention and the ISM code are applicable to the ballast management operations. With the adoption of the Convention on Biological Diversity, 1992 sufficient changes need to be made to the SOLAS 1974 and ISM Code in order to efficiently implement the provisions for controlling the ballast operations safely. The ballast water exchange, irrespective of the place of discharge should be consistent with the provisions of SOLAS\(^\text{36}\).

**Conceptual Basis under Other International Laws**

A series of international laws are applicable to the ballast water management\(^\text{37}\). From the above discussion, it can be seen that ballast water pollution is an important form of ship sourced marine pollution. It is also a

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\(^{36}\) SOLAS 1974, Ch. II -1, Reg. 22

\(^{37}\) Some of these are the Antifouling Convention, 2001 , the International Health Regulations, 2005, the International Plant Protection Convention, 1951, the Aquatic Animal Health Code, 2005, the ICES Code of Practice on the Introduction and Transfer of Marine Organisms, 2006, the Convention on the Law of the Non-navigational Uses of International Watercourses, 1997, the Food and Agriculture Organization’s Code of Conduct for Responsible Fisheries, 1995, and most important, the World Trade Organization’s policy of free trade and open markets, 1948.
unique source of pollution creating multiples challenges for bio-security. Hence, there is urgent need of a specific legislation to control it.

**The Ballast Convention, 2004**

In the early 1990s, the IMO through its Marine Environment Protection Committee, started studies on the negative impacts of ballast water pollution on the port environment. The concerns of international community about this form of marine pollution were triggered by the zebra mussel invasion of the U.S and the Canadian waters. Subsequently, the United Nations General Assembly passed a Resolution to prevent ballast water pollution. It was understood by this time that the problem of ballast water pollution cannot be eliminated completely. Thus the guidelines were modified in 1997 setting better ballast management practices which the states could adopt by means of their national legislation. The guidelines were meant to assist nations to enact domestic laws for minimizing and eliminating the risks associated with the ballast water discharge. There emerged a plethora of divergent practices among states as the guidelines were binding laws.

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38 Herein after to be referred to as the MEPC

39 The U.N. General Assembly Resolution A. 774(18)


An Overview of the Ballast Convention, 2004

The Ballast Water Working Group of IMO drafted a new convention on Ballast Water Discharge Standards\textsuperscript{42}. The Convention is not yet in force\textsuperscript{43} but it aims to prevent, minimize and finally eliminate the ballast water pollution.

It is a complex convention with almost 22 articles, regulations and 1 annex detailing general obligations of states to implement the technical requirements. It has an appendix setting model formats for the issuance of International Ballast Water Management Certificate and Ballast Water Record Book. A plain reading of the convention would give the impression that like all international treaties this convention is also not an exception but a compromise of various maritime interests.

It is the duty of every member state to give “full and effective implementation” of its provisions\textsuperscript{44}. The flag state should manage the ballast water so as to ‘prevent, minimize and ultimately eliminate the transfer of aquatic organisms and pathogens’\textsuperscript{45}. Every state should establish a national policy as to ballast water management\textsuperscript{46}.

Ballast Water Exchange and Ballast Water Exchange Areas

Ships are to exchange a minimum of 95% of the ballast volume\textsuperscript{47}. It requires that the discharge of ballast water should have maintained organism

\textsuperscript{42} The International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004 herein after to be referred to as the BWC

\textsuperscript{43} See, www.imo.org/statusofconventions.

\textsuperscript{44} The International Convention for the Control and Management of Ships’ Ballast Water and Sediments, 2004, art.2(2)

\textsuperscript{45} Id., art.2(1)

\textsuperscript{46} Id., art.4(2)

\textsuperscript{47} Id., reg. D-1 Ballast Water Exchange Standard
concentrations below the specified limits\textsuperscript{48}. The ballast water performance standards are based upon the ship’s age and capacity and are very stringent. Some scientific studies put forth that 95\% volumetric exchange may not result in 95\% organism removal. Also sometimes, the set volumetric limits may result in even higher organism removal\textsuperscript{49}.

The convention prescribes that the ship shall undertake ballast water exchange\textsuperscript{50} at 200 nm from the nearest land and in water depths of 200m. If it is not possible BWE may be done at least 50nm from the nearest land and at 200m in depth. At emergency situations, when the prescribed distance an in-depth measures cannot be met, the port states may designate BWE areas keeping into consideration the time required, shipping route and safety requirements\textsuperscript{51}. For example, coastal ships may be using routes close to shores and may not fall under the category of vessels for which the said provisions of BWE may be applicable. Hence, the port state may prescribe BWE areas for such ships.

Practicalities suggest that the selection of BWE areas may be highly challenging for port states. BWE is a temporary mechanism and scientific studies have proven that it is not very effective many a times. The water depths and distance specified under the convention cannot be met always. For example, the convention provides that when prescribing BWE areas, the state should not cause undue delay for ships. Many countries have rules requiring ships to take routes distant from the shores in order to minimize the risks of maritime casualties. If the coast guards require the ship to take specific routes, definitely it may cause delay for the vessel. The developing countries with less

\textsuperscript{48} Id., reg. D-2 Ballast Water Performance Standard  
\textsuperscript{50} Hereinafter to be referred to as the BWE  
\textsuperscript{51} The Ballast Water Convention, s. 2.2
sophisticated infrastructural capabilities may be even more affected by this provision as unnecessary delay may make them liable to pay heavy compensation to the vessel owner.

Scientific studies have established that an environmentally ballast may be done ‘as far from the nearest land and as deep as possible’ in order to eliminate the risk of pollutants and pathogens. It should also be close to shipping routes if it were not to cause delay in voyages. The convention provides for BWE at high seas under the assumption that the high sea organisms may not survive in coastal waters and vice versa. But studies have reported that after the discharge at high seas, more organisms were found inside ballast tanks\(^52\). Also, one time exchange may not eliminate the organisms that are settled in sediments inside the ballast tanks. Hence, it is said that the given requirements for BWE seem to be totally inapt and inadequate the risk of pollution associated with the BWE.

The consultation with adjacent coastal states also seems to be significant before designating BWE areas in order to avoid controversies. In this regard, the G14 guidelines may be useful for the port states. The practical difficulties to fix responsibility to monitor such areas biologically may also ignite disputes.

**Ballast Water Performance Standards**

The guidelines prescribe the acceptable number of micro-organisms and the method of determining their size and classes\(^53\). This has been a topic

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\(^53\) *Id.*, reg. D-2 reads, “less than 10 viable organisms per cubic meter greater than or equal to 50 mm in minimum dimension, and less than 10 viable organisms per ml less than 50 mm in minimum dimension and greater than or equal to 10 mm in minimum dimension, and less than the following concentrations of indicator microbes, as a human health standard:
for significant discussion and has already raised several crucial issues. Yet this provision seems to be a compromise. These standards are set without taking into account the human health aspect. They are purely technical because they aim at reducing the microbe content in the ballast water but not much effort has been put to set mandatory the rules for identification of the species type. The standards set may not eliminate the risk of species introduction in all cases. Also, it does not specify the species introduction below 10 viable organisms below cubic metre, whereas, studies have established that a considerable number of harmful algae exist below this minimum dimension prescribed under the convention. These specifications are applicable for ships alone and it is not clear whether these standards are applicable to on board and treatment systems. Unless the treatment technologies are also brought under the provisions of the convention, complete elimination of pathogens may not be possible. All ships are to set these requirements by the end of the year 2016.\textsuperscript{54} The MEPC may propose amendments to the said provisions as and when required.\textsuperscript{55} In order to enforce the BWC requirements of performance standards, the approval of the administration is essential and the Guidelines on ship and crew safety should be strictly implemented.\textsuperscript{56}

\begin{itemize}
\item Toxigenic Vibrio cholerae (serotypes O1 and O139) with less than 1 colony forming unit (cfu) per 100 ml or less than 1 cfu per 1 g (wet weight) of zooplankton samples,
\item Escherichia coli less than 250 cfu per 100 ml, and intestinal Enterococci less than 100 cfu per 100 ml."
\end{itemize}

\textsuperscript{54} The BWC, reg. B-3
\textsuperscript{55} Id., reg. D-5
\textsuperscript{56} Id., reg. D-5(1) & D-3
Surveys and Certifications

The rules regarding survey and certification of BWM for the flag states are given under the Annex\(^{57}\). Ships have to undergo initial\(^{58}\), renewal\(^{59}\), intermediate\(^{60}\), annual\(^{61}\) and additional surveys\(^{62}\). The ship gets its first ballast water certificate after the initial survey, which is valid for next five years. It may be cancelled or withheld at any time for non-compliance\(^{63}\).

Port Reception Facilities under the Guideline

The BWE is not applicable for ships intending to use port reception facilities provided the guidelines G5 is to be followed. Yet, it is not mandatory under the convention that the Port states should provide for reception of ballast water exchange. This would require exorbitant expenses as new pipeline connections need to be installed both on board vessels as well as in ports. This would be a huge problem in big ports.

\(^{57}\) Id., art.7.1

\(^{58}\) Id., reg. E-1(1).1. This survey is done before the ship is put into service for the very first time to ensure that the ship’s BWMP, structure and all systems are in accordance with the BWC requirements

\(^{59}\) Id., reg. E-1(1).2. This survey is done after 5 years after the initial survey to find out strict compliance of the provisions of the BWC

\(^{60}\) Id., reg. E-1(1).3. This survey is like the Annual survey may be put into its place to ensure BWC compliance after the completion of one year of service or fewer as the administration finds it necessary

\(^{61}\) Id., reg. E-1(1).4. This is the general annual inspection to see to the BWC compliance.

\(^{62}\) Id., reg. E-1(1).5. Additional survey is conducted after a major structural change or replacement has been effected to the ship and thereby to verify the compliance of BWC requirements

\(^{63}\) Id., reg. E-1(1).6
Emergency Situations

If due to adverse weather conditions, the BWE is not possible at mid seas or no area has been designated by the port states and no reception facilities are available on shore, then the ship is allowed to discharge ballast water anywhere at 50nm from the nearest land, provided the ship will have to document why the BWE was not carried out. It shall be the discretion of the Master to decide that such “…exchange would threaten the safety or stability of the ship, crew, or passengers because of adverse weather, ship design limitations, structural stress, equipment failure, or any other extraordinary condition” and thus seek an exemption from the BWE requirements. The situations which had necessitated the exemption of BWE requirements should be entered in the record book. The main criticism about the said provisions of BWE is that it does not eliminate completely the species introduction but stresses more on ballast water management.

Authorization of Ballast Water Management System

The guidelines provides for approval of ballast water management systems so as to comply with D-2 requirements. Unlike the tests and approval under the MARPOL regime, the ballast water approval system is very stringent. It has to satisfy both land based and ship on board tests within a duration of 6 months. The land based test has to be done under several challenges. For example, selection of sampling locations and maintaining of proper quality management and quality assurance of sampling done under limited technology and supervision are all challenges for port states. The ship board sampling has to meet both practical challenges as well as biological efficacy as prescribed under the guidelines. The failure of the sampling may result in heavy loss to the ship owner as exorbitant cost is involved to fulfill the
G8 requirements. If the treatment system uses some active substances such as chemicals or generating agents in the water flow, it would also require approval under the G9 guidelines issued by the IMO.

**Port State Control on Sampling Techniques**

The Guidelines G2 provides for various port state control inspections to assess the sampling quality required under the regulations. Accordingly, a ship should have on board a ballast water management certificate. There should be a verified ballast management plan for every ship, which is approved by the flag state. The port state control officers should undertake an inspection of the ballast water record book. Inspections are done to authenticate that the ship has a valid international ballast water management certificate, ballast water record book and sampling of the ship’s ballast water. In case of violations, more detailed inspections could be carried out to ensure that it will not carry out ballast discharge deteriorating the port environment. The convention empowers member nations to set higher and stringent sanctions for violations in tune with the international law. The major criticism about the port state control inspections requirements of the sampling techniques is that it

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67 *Id.*, art. 9.1

68 *Id.*, reg. B-1 reads, “The Ballast Water Management Plan (BWMP) should detail safety of the ship and crew, implementation plans, techniques for sediment disposal on shores, coordinating ballast management at ship board and land based treatment systems, ship board officer in charge of BWMP and the reporting of BWM.”

69 *Id.*, reg.B-2(1)-(6) reads, “Every time the ship makes a ballast water discharge or exchange, it should be entered in the Ballast Water Record Book. This record book should be available for inspection at any time and the Master of the ship has to give certified copy of this record, which may be admissible as evidence in judicial proceedings.”

70 *Id.*, arts.9.2 & 9.3

71 *Id.*, arts.1.1, 8.8.2 & 10
provides for only demonstration of non-compliance and not demonstration of compliance of specified standards.

**Selective and Blanket Approaches to Ballast Water Management**

The BWC provides for a selective and not blanket approach\(^{72}\) to ballast water management\(^{73}\). Accordingly, ships are to comply with BWM in port in accordance with their level of risk assessed. Each state has to comply with the ballast water policy, strategy and implementation based upon its conditions and capabilities\(^{74}\). The main disadvantage of the selective approach is that it requires higher efficiency and skills from the port state control officers, more stringent and extensive data gathering for the port states and data reporting and other requirements for the vessels.

In an effort to reduce the risk associated with the BWE, the convention puts extra burden and responsibilities on the port states as to the creation of treatment technologies, port reception facilities and designation of BWE areas\(^{75}\). The convention empowers state parties to adopt more stringent measures, implementing higher level of protection. Hence, it may ultimately result in disparity as to the laws controlling this form of marine pollution. It is indeed a recognized principle that marine pollution can be controlled effectively only by setting uniform standards of control at the international level and co-ordinated efforts of control through regional bodies\(^{76}\).

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\(^{72}\) *Id.*, art.4.2

\(^{73}\) Here in after to be referred to as the BWM

\(^{74}\) The Ballast Convention provides for less stringent rules under Regulation A-4 for ships posing low risk and additional measures under C-1 for high risk vessels

\(^{75}\) The BWC, 2004, arts. 5.1 & 12

\(^{76}\) *Id.*, art.2.9 & 13, the convention provides for regional co-operation for eliminating ballast pollution. Accordingly, member states must cooperate under the aegis of the IMO to address threats and risks to marine ecosystems and biodiversity in areas beyond the territorial jurisdictional limits
Effect of Non Ratification of the BWC by a State

Non-state parties are to comply with the convention in ports of a state party\(^{77}\). Hence, even if India is not a signatory to this convention, Indian ships in foreign ports of a state party should comply with BWC requirements if they wish to trade in that region. Conversely, foreign ships not complying with BWC would get an easy entry to Indian ports which may be highly detrimental to the country’s port ecosystem. Hence, it is high time that India should ratify this convention.

A Critical Appraisal of the Ballast Convention

The international law on control of ballast water pollution is still in its infancy, the convention is not in force yet. The reasons are several. The BWC is basically an attempt to harmonize the conflicting concepts of international trade requirements and protection of bio-diversity. It takes a balanced precautionary approach in preventing the spread of invasive organisms by merely prescribing the minimum international standards. Regarding its implementation, port state and flag state jurisdictions run concurrently. It contains detailed sampling techniques and performance standards. It also gives ample opportunity for the port states to enact even more powerful laws for the prevention of bio-invasions. This provision enables a port state to enact laws controlling ballast water pollution taking into consideration local conditions and requirements. It may lead to divergent standards of control at international level. The convention is not adequate in suggesting solutions for the complete elimination of bio invasions. The convention prescribes for mid ocean BWE, or BWE in designated areas but remains silent as to how the ports states should designate areas for the same. It is silent on the aspects of liability for bio-invasions and efforts to reduce harmful effects of species that have already been introduced.\(^{78}\)

\(^{77}\) Id., art.3.3

\(^{78}\) Lance K. Terpstra, “There Goes the Neighbourhood”—The Potential Private Party Liability of the International Shipping Industry for Exotic Marine Species Introduction

Indian Law on Control of Vessel Sourced Pollution in Maritime Ports
The facilities to conduct sampling may vary in different countries. Therefore, there are chances of delay in issuing port clearance for some ships. In such cases, port states may be liable to pay compensation under the existing regime. The convention does not address this problem. It would have been better if the member states could share technology transfer in creating sampling testing laboratories in developing countries. The monitoring of the control systems under this convention could not be accomplished without imparting proper training to the port officers and equipment transfer.

As of now, the convention is highly criticized for its inadequacy in providing for commercially viable technology solutions to create long lasting results to the problem of bio invasions. The only solution it could offer is BWE in mid ocean which is primarily a risk avoidance method.

**Indian Law on Control of Ballast Water Pollution**

Every year more than ten billion tonnes of ballast water are transferred between ports. Depending upon its size and purpose, a ship may carry several hundred tons of ballast water. India has been one among the six pilot countries identified under the GloBallast Programme initiated by the IMO for creating awareness and for conducting study on the harmful effects of bio-invasions in ports. The study was conducted mainly at the Mumbai and the Jawaharlal Nehru ports. It states that like in many other parts of the world, the awareness on this crucial environmental issue is minimal to non-existent among various stakeholders of the industry. Scientific research in India on


bio pollutions of the sea is still in the budding stage which has created complications for the administration in designing a proper regulatory regime.\(^1\) As the number of vessels visiting Indian ports increases day by day, the risk associated with bio-invasions increase.\(^2\) Even though ballast water discharge from ships is not the sole source of bio-invasions, it is a major contributor.\(^3\) Hence, it is high time that India should legislate exclusively on the topic.

India does not have a direct and comprehensive law to control the harmful effects of bio invasions through the ballast water discharges from ships. Yet this does not exempt India from its obligations to enact a comprehensive ocean management law. India is a party to UNCLOS III and is under obligation to enforce its provisions at domestic level. This includes protection of marine environment from biological pollution. In the Research Foundation for Science., Technology & Natural Resource Policy v. Union of India,\(^4\) considering the inadequacy of environmental jurisprudence in India, the Supreme Court of India has grounded its decisions on standards set in unincorporated international agreements based on the premise that these conventions “elucidate and go to effectuate the fundamental rights guaranteed by our Constitution [and therefore] can be relied upon by Courts as facets of those fundamental rights and hence enforceable as such.” Hence, India is obligated to ratify BWC and enact domestic legislation for its implementation. In Essar Oil Ltd. v. Halar UtkarshSamiti,\(^5\) the Supreme Court had referred to

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\(^1\) *Id.*

\(^2\) *Id.*\(^,\) around 5000 ships call annually at the Mumbai port, discharging about two million tonnes of Ballast water


\(^4\) 2005 (10) SCC 510

\(^5\) [2004] 2 SCC 392
the 1972 Stockholm Conference on the Human Environment is the “Magna-Carta of our environment” and had imported into domestic law the concepts such as the “sustainable development, polluter pays and the precautionary principles” \(^{86}\). Hence, there is no doubt regarding India’s obligation to control ballast water pollution. Even if it has not ratified the BWC, still there is obligation under the customary treaty law to give effect to its provisions.

Under the existing system the major difficulty would be to identify the nature of the problem of ballast pollution, i.e. whether it is a ship sourced operational pollution or a problem of bio diversity or a health hazard? If identified as a form of ship sourced operational pollution should India follow a centralized or decentralized regime of control?

In this study the primary analysis would be about the effectiveness of the control regime when ballast pollution is treated as source of vessel sourced operational pollution in ports with incidental effects on bio-diversity and human health. If ballast water pollution is categorized as a ship sourced operational pollution, the provisions of the Indian Ports Act, 1908 and the Merchant Shipping Act, 1958 may be applicable to control it. The reports on increasing numbers of bio invasions and its ill effects suggest that the system of control is inept.

**Regulatory Regime under the Indian Ports Act, 1908**

The Government may make port rules for regulating vessels while discharging ballast in ports \(^{87}\). The conservator is the authority to monitor improper discharge of ballast in port area. If ballast or any rubbish or oil containing ballast mix has been improperly discharged within the port area, the conservator may serve notice to the Master of the vessel may be punished with

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\(^{87}\) The Indian Ports Act, 1908, s. 6(1) (e)
up to one year and to a fine up to five lakh rupees. The provisions are not applicable if the discharge happens with the consent in writing of the Conservator of Ports or if any such acts have been authorized by the Government. The Indian Ports Act, 1908 being a vintage law still considers ballast as solid and prohibits its discharge, if it is likely to form a bank or shoal or turn out to be a hindrance to navigation.

**Regulatory Regime under the Merchant Shipping (Amendment) Act, 2003**

The Act defines “ballast” as “any solid or liquid placed in a ship to increase the draft to change the trim, to regulate the stability, or to maintain stress load within such limits as may be prescribed.” This definition excludes the settled sediments in ballast tanks within the meaning of ballast. The settled sediments in ballast tanks often create recurrent challenges to those engaged in BWM in their efforts to prevent bio-invasions. The laws of countries like Canada, the definition of ballast include settled sediments.

The Merchant Shipping Act, 1958, apply to marine casualties or acts relating to such casualties with grave and imminent danger of pollution or threat to pollution from deliberate, accidental or negligent ballast water discharge into sea or such incidents in high seas.

Under the Merchant Shipping Act, 1958, the ballast water pollution is recognized only as incidental to potential source of ship board oil pollution rather

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88 Id., s.21
89 Ibid
90 The Merchant Shipping Amendment Act, 2003, s. 2 gives definition of “Ballast”. Shipping Act, No. 44 Of 1958
92 The Merchant Shipping (Amendment) Act, 2003, s.356A(1)(B)
than pollution causing bio hazards. As such there is mandatory requirement to keep the Oil Record Book and international oil prevention pollution certificates. These provisions are intended to give effect to Annexures of MARPOL 73/78 which lay emphasis on ship sourced oil pollution. They are totally inadequate to control the drastic consequences of bio invasions.

Control under Other Laws

The central government can regulate ballast water pollution under the provisions of the Environmental Protection Act, 1986, the Hazardous Waste Management and Handling Rules, 1989 and the Coastal Zone Management notifications, 1992. These laws lay down broad spectrum of control and may be assumed to have general application on the control of ballast water pollution. But the provisions in no way could comply with international requirements so as to check bio invasions and its multidimensional harmful effects.

Environmental Laws Empowering State Governments to Control Ballast Pollution

The definition of “pollution” under the Water Prevention and Control of Pollution Act, 1974 can be interpreted to include ballast water pollution also.

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93 The MSA 1958, Part XIA, s. 356 C(I)
94 Id., ss. 356 (C) (1)-(3) and 356 (F)
96 The Water (Prevention and Control of Pollution) Act, 1974, s. 2(e ) reads, “pollution” means ‘such contamination of water or such alteration of the physical, chemical or biological properties of water or such discharge of any sewage or trade effluent or of any other liquid, gaseous or solid substance into water (whether directly or indirectly) as may, or is likely to, create a nuisance or render such water harmful or injurious to public health or safety, or to domestic, commercial, industrial, agricultural or other legitimate uses, or to the life and health of animals or plants or of aquatic organisms.”
The provisions of the Water Act are applicable to ‘streams’, which include, “sea or tidal waters to such extent or, as the case may be, to such point as the State Government may, by notification in the Official Gazette, specify in this behalf”\textsuperscript{97}. Thus the State Pollution Control Board or the Central Pollution Control Board may check and control ballast pollution effectively under the scheme of the Water Act.

The State Government may also exercise control over this form of pollution by invoking the provisions of the Wild Life Protection Act, 1972\textsuperscript{98}.

**The American Model of Control**

As soon as the problem of Zebra mussels invading the Great lakes was identified, the United States Congress had passed the Non-indigenous Aquatic Nuisance Prevention and Control Act, 1990 in the very next year\textsuperscript{99}. This was amended by the National Invasive Species Act, 1996 by making it enforceable in the U.S. Ports\textsuperscript{100}. Both these legislation gave the United States Coast Guard enormous powers to control the ballast water pollution. A series of rules and regulations most important being the ballast water regulations are issued by the USCG to control this form of pollution in the U.S. Ports and the U.S. Waters\textsuperscript{101}. The BWR provides for minimal ballast water exchange in order to

\textsuperscript{97} Id., s. 2(j)(v)

\textsuperscript{98} The Wildlife (Protection) Act, 1972, schedule. 1


maintain stability in the U.S. Ports and the U.S. Waters and encourages mid-ocean exchange. It also provides for specific ballast water management practices. There are also provisions for eco-friendly technology offering solutions for ballast water exchange and performance standards prescribed under the BWC. It has specifications on periodic monitoring by the USCG of the BWMP and self-regulatory submission of timely reports on BWE by the master and crew. Specifications also insist on sufficient training and frequent mock trials for the crew on BWMP. Under no case, BWE is permissible in eco-sensitive areas and heavy penalty, both civil and criminal will be inflicted upon willful violators. Several executive orders also check the BWE in the United States ports. An Invasive Species Council has been set up to advice the Federal agency and to establish a National Invasive Species Management Plan. In addition, several U.S. States have legislated exclusively on this topic thereby empowering the respective governments to control this form of pollution, complementing the efforts of federal agencies in this regard. In Fednav Ltd. v. Chester, the U.S. Supreme court had held that Michigan’s ballast water statute making the permit system compulsory for all seagoing vessels, using Michigan port, was constitutional.

In Northwestern Environmental Advocates v. EPA, the main issue was that whether Clean Water Act could be used to prevent ballast pollution. The U.S. Environmental Protection Agency had the authority to issue the National Pollution Discharge Elimination System Permit and had exempted ship sourced point pollutants including ballast and ship’s sewage from the

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102 2008 FED App. 0414P (6th Cir.)
103 42 ELR 20061 (2005)
104 33 U.S.C. §§ 1311(a), 1342(a) (2006)
purview of the permit system. The court had held that the EPA had no authority to pass any regulation thereby exempting ballast from the NPDES system. In effect the ballast pollution can be effectively controlled under the EPA regime also.

Thus in the United States both the federal and state governments can control ballast pollution. The Federal government through the USCG effectively monitors ballast discharges in coastal waters and the states enact regulations to control this form of pollution in ports.

**The Canadian Model of Control**

Canada was the first among a few countries to develop a centralized model of control for ballast pollution after growing concerns and reports about the destruction of its marine sanctuaries by bio invasions. The Ballast Water Control and Management Regulations is the Canadian law. Regulations are applicable to every ship in the Canadian waters. Every effort should be taken by the master and crew to minimize the BWE in Canada’s territorial sea or at least make the ballast harmless before discharge. For this, several methods like BWE, treatments, retentions and discharge into reception facilities are listed in the regulations.

When it comes to BWE, distinctions are clearly set for transoceanic and non-transoceanic ships. Transoceanic ships from outside Canada are not encouraged to make BWE in the mid oceans. Each ship should carry a BWMP on board. It should detail the Ballast water management process and the safety procedures for the Ballast water management, sediment disposal procedures, design specifications of the ballast system, officers in charge for monitoring the plan and for co-coordinating BWMP with Canadian officials.

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If in case of any emergency, the ship is unable to comply with the BWCM, the matter should be notified to the Ministry of Transport ninety eight hours prior to entry into Canadian waters. The master should discuss the issues in detail with the Ministry and act accordingly so that ship may not discharge harmful invasive species into the ports and nearby areas. This model is a centralized approach of control of ballast water pollution.

**Conclusions**

India does not have a comprehensive legislation to control bio invasions. As a result, many of the environmental issues connected with ballast pollution remain un-addressed in law suits filed before the courts of the country. For example, in *Rama Gopalan v. Union of India* \(^{106}\) and *O. Fernandes v. T.N.P.C.B.* \(^{107}\) the major issue that should have been decided was the efficiency of the environmental management plan of the Sethu Samudram Canal Project. The project links two major Indian seas, the Arabian Sea and the Bay of Bengal, raising considerable threat of possible bio invasions at massive levels during shipping operations in these areas. It also threatens the unique bio system of the Gulf of Mannar marine biosphere reserve. Yet, this major issue got little attention and the religious consequences and issues associated with the dredging of *Rama Sethu* were discussed in detail.

In *Unnikrishnan v. Divisional Inspector of Police* \(^{108}\), the vessel, *M.T. Dadabhai Naoroji* had discharged naphtha along with ballast operations within the Cochin Port Limits. Fire broke out and four men who were asleep in two fishing boats were killed in the incident. Investigations were ordered under

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\(^{106}\) Writ Petition Nos. 18076, 18223 & 18224 (High Court of Judicature at Madras June 19, 2007) (Ajith Prakash Shah C.J. & P. Jyothimani J.)

\(^{107}\) Special Leave Petition (Civil) 20758 of 2005 (Supreme Court of India), available at http://courtnic.nic.in/supremecourt/querycheck.asp., last accessed in June 2013

\(^{108}\) 2001Cri.L.J 4558
the Merchant Shipping Act, 1958\textsuperscript{109} and criminal trial was initiated against the captain, chief officer and chief engineer of the vessel under the Indian Penal Code. Section 361 enables the Magistrate to conduct preliminary enquiry about such incidents and arrest, give out bail or hand over the violators to the proper court. There after the Indian Penal Code will apply. This is a major constraint in exercising port state jurisdiction in pollution cases. In the present system, if cases are charged under the Merchant Shipping Act, local police and enforcement agencies cannot exercise jurisdiction. Hence, the provisions of the Penal Code are applied in most cases to extend local jurisdiction over such incidents. This may ultimately weaken the enforcement regime under the Merchant Shipping Act. Criminal Laws need to complement the Merchant Shipping Act in this regard.

Two major countries that have exclusively legislated on the topic of ballast pollution are the United States of America and Canada. The legislative approaches of both these nations on control of ballast pollution are distinct and suit to address the unique problems faced by these countries in this regard. Whether India should follow a centralized or decentralized system of control would depend upon the typical trade and economic policies of the country.

If ballast water pollution is treated as a ship sourced operational pollution, India could go for a comprehensive Ballast Water Management Regulations under the scheme of the Merchant Shipping Act. At present the system is working upon the marine notices issued by the D.G. Shipping’s office. These are no laws in the strict sense but are strong recommendations seeking compliance from interested parties. These notices are not in par with clear legislation and these cannot in any way make the enforcement stringent. Only a proper legislation could set international shipping standards envisaged under the BWC. Proper legislation may facilitate to establish an environmental management system for port operations in accordance with internationally

\textsuperscript{109} The Merchant Shipping Act, 1958, s.361
accepted environmental standards. The Indian Ports Act, 1908 should be amended to compliment the provisions of the Merchant Shipping Act, 1958 in this regard. Hence, under the prevailing system in India a decentralized approach like that exists in the United States, delegating some powers to make rules under the major legislation is recommended. In this manner, the local enforcement agencies may adopt stringent byelaws setting standards for BWE and BWMP in accordance with the local concerns and demands.

Both precautionary and curative concepts have equal importance in controlling ballast water pollution. The major legislation should adopt the important precautionary principles set forth in the BWC for all ships visiting Indian ports. Specifications for mid ocean exchange, BWE, BWMP, performance standards, monitoring and control specifications should be clearly set under the BWMR. The mid-ocean exchange is a temporary measure and new technologies are coming up to control ballast pollution which the law should be anticipating for the future.

The officer in charge of monitoring the oil record book, BWMP implementation should be identified and clearly designated.

The Coast Guard should be vested with more surveillance powers. Monitoring of vessels beyond the port limits is equally important and this involves high costs and requires sophisticated infrastructural and technology specifications. Empowering the Coast Guard will be an ideal tool to check unwarranted vessel entries.

Indian ports should provide for ballast reception facilities. Liaison officers need to be designated in ports in case of contingencies to make effective communications on BWE between the port officials, ship owner and the master and crew.

Most important is to create awareness about the problems of bio invasion among various stake holders of the industry. This could be done by means of organizing workshops and conferences on the topic.
The problem of ballast water pollution may be plagued effectively by concentrating on the training to crew, ship engineering, education campaigns and enforcement. The problem of bio invasions has got global implications as it extends beyond boundaries. It is not an issue specific to shipping industry. Therefore, international and regional co-operation is important to control this form of pollution.

The National Institute of Oceanography (NIO) is the nodal agency designated by the Government of India under the GLOBALLAST programme to conduct baseline studies and sampling techniques, ballast water risk assessment, to develop sites where BWE can be permitted, to list port areas where BWE can be safely done in case of contingencies and advising the Government of India on safe BWMP. Under this scheme, the NIO has already entered into MOU with D.G. Shipping and eight major ports for enabling e-reporting of ballast water history for all vessels visiting the ports.

India should go for a comprehensive law on ballast water pollution as the protection of marine bio diversity and public health are also larger commitments under the ballast water management. For example, the provisions of Indian Ports Health Rules, 1989, the Epidemic Diseases Act, 1897 and the Destructive Insects and Pests Act, 1914 could be invoked only when the ballast water contains pathogens that may endanger human health. These laws are of no use in regulating routine ballast water discharges.

The Biological Diversity Act, 2002 and other laws for preserving endangered marine flora and fauna also find seldom application in the control of routine ballast discharges. The massive destructive power of biological pollution through ships as a vector needs to be addressed immediately. This may be successfully controlled only by passing a comprehensive law on ballast pollution. State practices suggests that this form of pollution is very unique and distinct in its kind that it may be controlled to considerable extent by continuous monitoring and enforcement of proper laws but very difficult to eliminated the risk associated with it in its entirety.